1 Integers

Exercise-1.1

1. (i) Ascending order is
$-9 < -7 < -5 < 0 < 5 < 12$
(ii) Ascending Order is
$-19 < -3 < 0 < 5 < 9 < 15$

2. (i) The integers in between -5 and 4 are $-4, -3, -2, -1, 0, 1, 2, 3,$
(ii) The integers in between -13 and -4 are
$-12, -11, -10, -9, -8, -7, -6, -5$

3. (i) $-5 < -3$ (ii) $4 > 0$ (iii) $-5 < 4$
(iv) $-15 < 7$ (v) $-7 > -11$ (vi) $13 > -25$

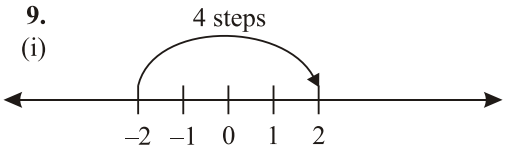
4. (i) $15, -12$; greater integer is 15.
Successor of 15 = 16
(ii) $-4, 7$; greater integer is 7
Successor of 7 = 8
(iii) $-14, 25$; greater integer is 25.
Successor of 25 = 26
(iv) $-3, -9$; greater integer is -3.
Successor of $-3 = -2$
(v) $-12, -5$; greater integer is -5.
Successor of $-5 = -4$
(vi) $0, -5$; greater integer is 0.
Successor of 0 = 1

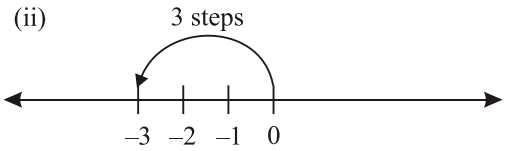
5. (i) $-4, -7$; Smaller integer is -7.
Predecesor of $-7 = -8$
(ii) $-2, -5$; Smaller integer is -5.
Predecessor of $-5 = -6$
(iii) $2, -3$; Smaller integer is -3.
Predecessor of $-3 = -4$
(iv) $-10, 15$; Smaller integer is -10.
Predecessor of $-10 = -11$
(v) $-5, 13$; Smaller integer is -5.
Predecessor of $-5 = -6$
(vi) $-4, 2$; Smaller integer is -4
Predecessor of $-4 = -5$

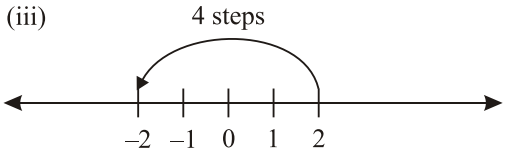
6. 3 integers preceeding -4 are $-5, -6, -7$

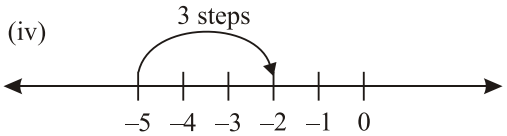
7. 2 integers succeeding -7 are $-6, -5$

8. (i) Absolute value of $-4 = |-4| = 4$
(ii) Absolute value of $0 = |0| = 0$
(iii) Absolute value of $+7 = |7| = 7$
(iv) Absolute value of $-8 = |-8| = 8$

9.
(i)


(ii)


(iii)


(iv)


10. (i) $(-4) + 3 + (-5)$
$= [(-4) + 3] + (-5)$
$= (-4 + 3) - 5$
$= -1 - 5 = -6$
(ii) $5 + (-2) + (-5)$
$= 5 + (-2 - 5)$
$= 5 - 7 = -2$
(iii) $16 + (-4) + (-7)$
$= 16 + (-4) + (-7)$
$= 16 - 11$
$= 5$
(iv) $(-4) + (15) + (-12)$
$= (-4 + 15) - 12$
$= 11 - 12$
$= -1$
(v) $(-25) + (50) + 20$
$= (-25 + 50) + 20$
$= 25 + 20$
$= 45$
(vi) $(40 + (-5) + (-20)$
$= 40 + (-5 - 20)$
$= 40 - 25$
$= 15$

11. (i) Subtract -7 from -8

$= -8 - (-7)$

$= -8 + 7 = -1$

(ii) Subtract 4 from -15

$= -15 - 4 = -19$

(iii) Subtract -17 from 25

$= 25 - (-17)$

$= 25 + 17 = 42$

(iv) Subtract 15 from 35

$= 35 - 15 = 20$

12. (i) $-50 + 20 - 30 + 40$

$= (-50 - 30) + (20 + 40)$

$= -80 + 60 = -20$

(ii) $-5 + 7 - 5 + 2 - 5$

$= -5 - 5 - 5 + 7 + 2$

$= -15 + 9 = -6$

(iii) $4 + (-5) + (-7)$

$= 4 + (-5 - 7)$

$= 4 - 12 = -8$

(iv) $16 + (-17) + 20$

$= 16 + 20 - 17$

$= 36 - 17 = 19$

13. (i) Shimla -6°C, Manali -9°C, Srinagar -17°C, Ooty -7°C, Pune 14°C

(ii) Hottest place is Pune with temperature 14°C

Coldest place is Srinagar with temperature -17°C

difference of these temperatured is

$= 14°C - (-17)°C$

$= 14°C + 17°C = 31°C$

(iii) Yes, the temperature of Srinagar and Manali taken together is less than temperature of Srinagar.

Yes, it is less than temperature of Shimla.

Exercise-1.2

1. (i) Let $a = -13, b = 8$

Sum of $a + b = -13 + 8 = -5$

(ii) Let $a = -13, b - 8$

difference of $a - b = -13 - (-8)$

$= -13 + 8 = -5$

(iii) Let $a = 12, b = -8$

Sum of $a + b = 12 - 8$

$= 4$

(iv) Let $a = -8, b = -13$

difference $= -8 - (-13)$

$= -8 + 13 = 5$

2. (i) Let $a = -5, b = -3$

$a + b = -5 + (-3) = -8$

(ii) Let $a = -8, b = 5$

$a + b = -8 + 5 = -3$

(iii) Let $a = -4, b = +8$

$a + b$

$= -4 - (-8)$

$= -4 + 8 = 4$

(iv) Let $a = -4, b = -8$

difference of $a - b$

$= -4 - (-8)$

$= -4 + 8 = 4$

(v) Let $a = -8, b = 4$

$a - b$

$= -8 - (-4)$

$= -8 + 4 = -4$

(vi) Let $a = -3, b = 8$

Sum of $a + b = -3 + (8)$

$= -3 + 8 = 5$

3. Total score of team A

$= 45 + (-50) + 75$

$= 120 - 50 = 70$

Total score of team B

$= -45 + 50 + 25$

$= -45 + 75 = 30$

Difference $= 70 - 30 = 40$

Team A scored 40 points more than Team B.

4. (i) $(-5) + (-4) = (-4) + (-5)$

(Commutative property of addition)

(ii) $4 + 0 = 4$ (Additive identity)

(iii) $-53 + 0 = -53$ (Additive identity)

(iv) $4 + [(-5) + 7] = [4 + (7)] + (-5)$

(Associativity of addition)

(v) $25 + [(-50) + 5] = (25 + 5) + (-50)$

(Associativity of addition)

(vi) $(-4) + 0 = -4$ (Additive identity)

(vii) $4 + (-4) = 0$ (Additive inverse)

(viii) $5 + (-5) = 0$ (Additive inverse)

5. (i) $(-4) + (-5) \square 10 + (-5)$

LHS	RHS
$= -4 - 5$	$= 10 - 5$
$= -9$	$= 5$

$\therefore \quad -9 < 5$

(ii) $(-25)+(50)\square 50+(-25)$

LHS RHS

$=-25+50$ $=50-25$

$=25$ $=25$

$25 = 25$

(iii) $75+(-100)\square 25+(-60)$

LHS RHS

$=75-100$ $=25-60$

$=-25$ $=-35$

$-25>-35$

(iv) $48+120\square(-48)+(-120)$

LHS RHS

$=48+120$ $=-48-120$

$=168$ $=-168$

$168>-168$

(v) $-24+5+(-7)\square 36+(-52)$

LHS RHS

$=-24+5-7$ $=36-52$

$=-31+5$ $=-16$

$=-26$

$-26<-16$

6. Maximum temperature of a city = 18°C

Minimum temperature $=-3$°C

Temperature fall $=18$°C $-(-3)$°C

$=18$°C + 3°C

$=21$°C

7. Sum of two integers $=-30$

Let required integers be x

One integer $=15$

Thus, $x+15=-30$

$x=-30-15=-45$

Required integer is -45.

8. Depth = 3500 m below sea level

Ascending height = 1200 m

Depth at new position

$=3500$ m – 1200 m

$=2300$ m

Submarine is now at 2300 m below the sea level.

9. Rehana had money = ₹ 2000

Money deposited = ₹ 700

Withdraw money = ₹ 1000

Her balance money

= ₹ $(2000+700-1000)$

= ₹ 1700

10. Distance travelled to east of Delhi = 49 km

Again, Distance to west delhi = 80 km

Mohit was far form Delhi $=(80-49)$ km

$=31$ km

Exercises-1.3

1. (i) $15\times(-16)=-240$

(ii) $32\times(-21)=-672$

(iii) $12\times(-42)=-504$

(iv) $25\times(-15)=-375$

(v) $25\times 22=550$

(vi) $24\times -12=-288$

2. (i) $24\times(-22)=(-22)\times 24$

LHS; $24\times(-22)=-528$

RHS; $(-22)\times 24=-528$

$\therefore$ LHS = RHS

$-528=-528$

(ii) $7\times\{5\times(-3)\}=(-3)\times(7\times 5)$

LHS; $7\times\{5\times(-3)\}$

$=7\times -15=-105$

RHS; $(-3)\times(7\times 5)$

$=-3\times 35=-105$

LHS= RHS

$-105=-105$

(iii) $(-25)\times(-20)=(-20)\times -25$

LHS; $(-25)\times(-20)=500$

RHS; $(-20)\times -25=500$

$\therefore$ LHS = RHS

$500=500$

(iv) $(-75)\times 10=10\times(-75)$

LHS $(-75)\times 10=-750$

RHS $10\times(-75)=-750$

LHS = RHS

$-750=-750$

(v) $(-24)\times(5\times 2)=\{(-24)\times 5\}\times 2$

LHS $=(-24)\times(5\times 2)=240$

RHS $=\{(-24)\times 5\}\times 2$

$=-120\times 2=-240$

LHS = RHS

$-240=-240$

3. Product of $(-9)\times(-5)\times(-6)$

$=-270$

Product of $(-9)\times(-5)\times(-6)\times(-1)$

$=270$

Because number of negative inegers in $(-9)\times(-5)\times(-6)$ is odd.

Where as number of negative integer in $(-9)\times(-5)\times(-6)\times(-1)$ is even.

4. (i) $(-4)\times(-2)\times(-1)$

or $(4)\times(-2)\times(-1)$

$(-4\times-2)\times-1$ or $(4\times-2)\times-1$

$=8\times-1=-8$ $\quad -8\times-1=8$

$-8<8$

$(4)\times(-2)\times(-1)$ is greater.

(ii) $(-2)\times(5)\times(-7)$ or $(-1)\times(-5)\times 8$

$(-2\times(5)\times(-7)$ $\quad (-1\times-5)\times 8$

$=-10\times-7$ $\quad =5\times 8$

$=70$ $\quad =40$

$70>40$

$(-2)\times(5)\times(-7)$ is greater.

(iii) $(-4)\times 0\times(-3)$ or $(-4)\times(-3)$

$=-4\times 0\times-3$ $\quad =-4\times-3$

$=0$ $\quad =12$

$0<12$

$(-4)\times(-3)$ is greater.

(iv) $(-7)\times(-5)\times(-1)$

or $(-7)\times(1)\times(-5)$

$(-7)\times(-5)\times(-1)$ or $(-7)\times(1)\times(-5)$

$=-35\times-1$ $\quad =-7\times-5$

$=-35$ $\quad =35$

$-35<35$

5. (i) $(-3)\times(-1)=(-1)\times(-3)$

(Commutative property of multiplication)

(ii) $\{(-4)\times(1)\}\times 5=(1\times 5)\times(-4)$

(Associative property of multiplication)

(iii) $(-3)\times\{5+(-6)\}=(-3)\times 5$
$+(-6)\times 5$

(Distributive property of multiplication)

(iv) $(-3)\times 1=1\times(-3)$

(Commutative property of multiplication)

(v) $(-1756)\times 0=0$

(Property of multiplication)

(vi) $(-24)\times 25=25\times-24$

(Commutative property of multiplication)

(vii) $(-2)\times 3=3\times(-2)$

(Commutative property of multiplication)

6. (i) $(-18)\times(-10)\times 9=(-18\times-10)\times 9$

$=180\times 9$

$=1620$

(ii) $(-20)\times 7\times(-5)=(-20\times-5)\times 7$

$=100\times 7=700$

(iii) $(-1)\times(-4)\times(-6)\times(-5)$

$=(-4\times-6\times-5)\times-1$

$=-120\times-1=120$

(iv) $(-40)\times 4\times 125=-40\times(4\times 125)$

$=-40\times 500$

$=-20000$

7. (i) $10\times\{8-(-3)\}=10\times 8-10\times(-3)$

LHS $=10\times\{8-(-3)\}$

$=10\times\{8+3\}$

$=10\times 11=110$

RHS $=(10\times 8)-(10\times-3)$

$=80-(-30)$

$=80+30=110$

$\therefore$ LHS $=$ RHS

(ii) $(-25)\times\{(-9)-(-4)\}$

LHS $=(-25)\times\{(-9)-(-4)\}$

$=-25\times\{-9+4\}$

$=-25\times-5=125$

RHS $=\{(-25)\times(-9)\}$
$-\{(-25)\times(-4)\}$

$=225-(100)$

$=225-100=125$

$\therefore$ LHS = RHS

(iii) $(-40)\times\{43+(-3)\}$

$=\{(-40)\times 43\}+\{(-40)\times(-3)\}$

LHS $=(-40)\times\{43+(-3)\}$

$=-40\times\{43-3\}$

$=-40\times 40=-1600$

RHS $=\{(-40)\times 43\}$
$+\{(-40)\times(-3)\}$

$=-1720+120$

$=-1600$

$\therefore$ LHS = RHS

(iv) $28\times(10+(-7)\}$

$=\{28\times 10\}+\{28\times(-7)\}$

LHS $=28\times\{10+(-7)\}$

$=28\times(10-7)$

$=28\times 3=84$

RHS $=\{28\times 10\}+\{28\times(-7)\}$

$=280+(-196)$

$=280-196=84$

$\therefore$ LHS = RHS

8. (i) $36\times(-56)+(-56)\times(-46)$

$=-56(36+(-46)$

$=-56\times-10=560$

(ii) $8\times 48\times(-125)=(8\times -125)\times 48$
$=-1000\times 48$
$=-48000$

(iii) $7\times(48+2)$
$=(7\times 48)+(2\times 7)$
$=336+14=350$

(iv) $(-45)\times 108$
$=(-45)(100+8)$
$=(-45\times 100)+(-45\times 8)$
$=(-4500)+(-360)$
$=-4500-360=-4860$

(v) $725\times(-35)+(-725)\times 65$
$=725(-35+(-1)\times 65)$
$=725(-35+(-65)$
$=725(-35-65)$
$=725\times -100=-72500$

(vi) $(-17)\times -29)$
$=(-17)\times(-30+1)$
$=(-17\times -30)+(-17\times 1)$
$=510-17=493$

(vii) $-57\times\{(-19)+57\}$
$=57\{(-1)\times(-19)+1\}$
$=57\{19+1\}$
$=57\times 20=1140$

(viii) $83\times(-99)+(-83)$
$=83(-99+(-1)\}$
$=83(-99-1)$
$=83\times -100=-8300$

(ix) $46+(-79)\times(-46)$
$=(46)\{1+(-79)\times(-1)\}$
$=46\{1+79\}$
$=46\times 80=3680$

9. Starting temperature = 50°C
Rate of falling temperature
= 5°C per hour
Temperature after 8 hours
= 50°C – (5°C × 8)
= 50°C – 40°C
= 10°C

10. Total questions = 24
Marks on correct answer = 5
Marks on incorrect answer $=-2$

(i) David attempts correct answers = 8
David attempts incorrect answer = 16
His marks $=8\times 5-16\times 2$
$=40-32=8$

(ii) Raveena attempts correct answers = 16
Raveena attempts incorrect answers = 8
His marks $=16\times 5-8\times 2$
$=80-16=64$

(iii) Hamid attempts correct answer = 4
Hamid attempts incorrect answer = 12
His marks $=4\times 5-12\times 2$
$=20-24=-4$

Exercise-1.4

1. (i) $(-40)\div 5=-(40\div 5)=-8$

(ii) $(-450)\div(3+6)=-(450\div 9)$
$=-50$

(iii) $(-36)\div(12+0)=(36\div 12)=-3$

(iv) $(-50)\div 50=-(50\div 50)=-1$

(v) $420\div\{10+(-8)\}=420\div\{10-8)$
$=420\div 2=210$

(vi) $(-46)\div[(-40)+(-6)]$
$=(-46)\div[(-40-6]$
$=-46\div -46=+1$

(vii) $\{(-48)\div 12\}\div 2$
$=\{-48\div 12\}\div 2$
$=-4\div 2=-2$

(viii) $\{(-16)+12\}\div\{(-4)+2\}$
$=\{-16+12\}\div\{-4+2)$

(ix) $(25\div 5)\div[5\div 5]=5\div 1=5$

2. (i) $a=-15, b=3$
Value of a and b put in eq. (i)
$a\div b\neq b\div a$ …(i)
$-15\div 3\neq 3\div -15$
$-5\neq -0.2$

(ii) $a=36, b=6$
Value of a and b put in eq. (i)
$a\div b\neq b\div a$ …(i)
$36\div 6\neq 6\div 36$
$6\neq 0.17$

(iii) $a=50, b=-5$
Value of a and b put in eq. (i)
$a\div b\neq b\div a$ …(i)
$50\div -5\neq 5\div 50$
$-10\neq -0.1$

(iv) $a=-72, b=-6$
Value of a and b put in eq. (i)
$a\div b\neq b\div a$ …(i)

$$-72 \div 6 \neq -6 \div -72$$
$$12 \neq 0.083$$

3. (i) $a = 48, b = 4, c = -2$

Value of a, b, c put in $a \div (b + c) \neq (a \div b) + (a \div c)$

$$48 \div (4 + (-2)) \neq (48 \div 4) + (48 \div -2)$$
$$48 \div 2 \neq 12 + (-24)$$
$$24 \neq -12$$

(ii) $a = -20, b = -5, c = 4$

Value of a, b, c put in $a \div (b + c) \neq (a \div b) + (a \div c)$

$$-20 \div (-5 + 4) \neq (-20 \div -5) + (-20 \div 4)$$
$$-20 \div -1 \neq (4 + (-5))$$
$$20 \neq -1$$

4. The ground level $= -25$ m

Starting point $= -25$ m

Total distance $= (25 + 50)$ m = 75 m

rate = 5 m/min

Time taken $= (75 \div 5) = 15$ m

5. Temperature at midnight (12:00) $= -4$°C

Increasing temperature rate

$= +2$°C per hour

Temperature at 4 a.m. $= (-4 + 2 \times 4)$°C

$= 4$°C

Temperature at 12 noon

$= (-4 + 2 \times 12)$°C

$= (-4 + 24)$°C $= 20$°C

6. Marks for a correct answer $= (+5)$

Marks for an incorrect answer $= (-1)$

(i) Rohit scored = 30 marks

Correct answer = 10

Marks in correct answer

$= 10 \times 5 = 50$

Number of incorrectly question

$= 50 - 30 = 20$

(ii) $\because$ Total number of question = 50

marks obtained by joy $= -14$

Let correctly answered questions be x.

$\therefore$ incorrectly answered questions

$= 50 - x$

then,

$(x \times 5) + [(50 - x) \times -1] = -14$

$5x + [-50 + x] = -14$

$5x - 50 + x = -14$

$6x = -14 + 50$

$x = 36 \div 6 = 6$

$\because$ correcly answered questions = 6

$\therefore$ incorrecly answered questions

$= 50 - 6$

$= 44$

MCQs

1. (b) **2.** (c) **3.** (c) **4.** (a) **5.** (c) **6.** (a) **7.** (a) **8.** (b) **9.** (a) **10.** (c)

Mental Maths

Ans. 1. -7 km 2. +1 3. greater, less 4. zero.

2 Fractions

Exercise-2.1

1. (i) $4 - \frac{3}{7} = \frac{4 \times 7 - 3}{7} = \frac{28 - 3}{7} = \frac{25}{7}$ or $3\frac{4}{7}$

(ii) $3\frac{3}{4} + 5\frac{1}{2} = \frac{15}{4} + \frac{11}{2} = \frac{15 + 11 \times 2}{4}$

$= \frac{15 + 22}{4} = \frac{37}{4}$ or $9\frac{1}{4}$

(iii) $9 + \frac{5}{11} = \frac{9 \times 11 + 5}{11} = \frac{104}{11}$ or $9\frac{5}{11}$

(iv) $8\frac{1}{3} - 2\frac{5}{8} = \frac{25}{3} - \frac{21}{8} = \frac{25 \times 8 - 21 \times 3}{24}$

$= \frac{200 - 63}{24} = \frac{137}{24}$ or $5\frac{17}{24}$

(v) $\frac{13}{4} - \frac{16}{5} = \frac{13 \times 5 - 16 \times 4}{20}$

$= \frac{65 - 64}{20} = \frac{1}{20}$

(vi) $5\frac{1}{7} + 3\frac{1}{9} = \frac{36}{7} + \frac{28}{9} = \frac{36 \times 9 + 28 \times 7}{63}$

$= \frac{324 + 196}{63} = \frac{520}{63}$ or $8\frac{16}{63}$

(vii) $\frac{8}{9} + \frac{3}{2} + \frac{5}{6} = \frac{8 \times 2 + 3 \times 9 + 5 \times 3}{18}$

$= \frac{16 + 27 + 15}{18} = \frac{58}{18}$ or $\frac{29}{9}$ $3\frac{2}{9}$

2. (i) Ascending order $= \frac{1}{10} < \frac{1}{6} < \frac{1}{3} < \frac{1}{2}$

(ii) Ascending order $= \frac{5}{9} < \frac{7}{9} < \frac{8}{9} < \frac{11}{9}$

(iii) $\frac{2}{3}, \frac{3}{4}, \frac{1}{2}, \frac{5}{6}$

LCM of 3, 4, 2 and 6 is 12.

We convert each of the given fraction into an equivalent fraction with denominator.

Thus, we have

$$\frac{2}{3} = \frac{2\times 4}{3\times 4} = \frac{8}{12}$$
$$\frac{3}{4} = \frac{3\times 3}{4\times 3} = \frac{9}{12}$$
$$\frac{1}{2} = \frac{1\times 6}{2\times 6} = \frac{6}{12}$$
$$\frac{5}{6} = \frac{5\times 2}{6\times 2} = \frac{10}{12}$$

Ascending order

$$= \frac{6}{12} < \frac{8}{12} < \frac{9}{12} < \frac{10}{12}$$

or $$= \frac{1}{2} < \frac{2}{3} < \frac{3}{4} < \frac{5}{6}$$

(iv) $\frac{7}{10}, \frac{3}{5}, \frac{8}{15}, \frac{19}{30}$

LCM of 10, 5, 15 and 30 is 30.

We convert each of the give fraction into an equivalent fraction with denominator.

Thus, we have

$$\frac{7}{10} = \frac{7\times 3}{10\times 3} = \frac{21}{30}$$
$$\frac{3}{5} = \frac{3\times 6}{5\times 6} = \frac{18}{30}$$
$$\frac{8}{15} = \frac{8\times 2}{15\times 2} = \frac{16}{30}$$
$$\frac{19}{30} = \frac{19\times 1}{30\times 1} = \frac{19}{30}$$

Ascending order $= \frac{16}{30} < \frac{18}{30} < \frac{19}{30} < \frac{21}{30}$

or $$\frac{8}{15} < \frac{3}{5} < \frac{19}{30} < \frac{7}{10}$$

3. (i) $$\frac{8}{13} = \frac{8\times 2}{13\times 2} = \frac{8\times 3}{13\times 3}$$
$$= \frac{8\times 4}{13\times 4} = \frac{8\times 5}{13\times 5} = \frac{80\times 6}{13\times 6}$$
$$= \frac{16}{26} = \frac{24}{39} = \frac{32}{52} = \frac{40}{65} = \frac{48}{78}$$

Five equivalent fractions of

$$\frac{8}{13} = \frac{16}{26}, \frac{24}{39}, \frac{32}{52}, \frac{40}{65}, \frac{48}{78}.$$

(ii) $$\frac{9}{17} = \frac{9\times 2}{17\times 2} = \frac{9\times 3}{17\times 3} = \frac{9\times 4}{17\times 4}$$
$$= \frac{9\times 5}{17\times 5} = \frac{9\times 6}{17\times 6}$$
$$= \frac{18}{34} = \frac{27}{51} = \frac{36}{68} = \frac{45}{85} = \frac{54}{102}$$

Five equivalent fractions of

$$\frac{9}{17} = \frac{18}{34}, \frac{27}{51}, \frac{36}{68}, \frac{45}{85}, \frac{54}{102}.$$

(iii) $$\frac{5}{11} = \frac{5\times 2}{11\times 2} = \frac{5\times 3}{11\times 3} = \frac{5\times 4}{11\times 4}$$
$$= \frac{5\times 5}{11\times 5} = \frac{5\times 6}{11\times 6}$$
$$= \frac{10}{22} = \frac{15}{33} = \frac{20}{44} = \frac{25}{55} = \frac{30}{66}$$

Five equivalent fractions of

$$\frac{5}{11} = \frac{10}{22}, \frac{15}{33}, \frac{20}{44}, \frac{25}{55}, \frac{30}{66}.$$

4. Let x added to $8\frac{1}{7}$ to get 14.

$$x + 8\frac{1}{7} = 14$$
$$x + \frac{57}{7} = 14$$
$$\frac{7x+57}{7} = 14$$
$$7x + 57 = 14\times 7$$
$$7x = 98 - 57$$
$$x = \frac{41}{7} \text{ or } 5\frac{6}{7}$$

Thus, required number is $5\frac{6}{7}$.

5. Let subtract x form $12\frac{3}{5}$ to get $7\frac{1}{5}$

$$\frac{63}{5} - x = \frac{36}{5}$$
$$\frac{63-5x}{5} = \frac{36}{5}$$
$$(63-5x)5 = 36\times 5$$
$$315 - 25x = 180$$

$$-25x = 180 - 315$$
$$x = \frac{-135}{-25} \text{ or } \frac{27}{5} \text{ or } 5\frac{2}{5}$$

Required number is $5\frac{2}{5}$.

6. Length of a rectangular sheet of a paper
$$= 15\frac{1}{3} \text{ cm} = \frac{46}{3} \text{ cm}$$

Breadth of a rectangular sheet of a paper
$$= 12\frac{1}{2} \text{ cm} = \frac{25}{2} \text{ cm}$$

Perimeter of rectangular sheet $= 2(l + b)$
$$= 2\left(\frac{46}{3} + \frac{25}{2}\right)$$
$$= 2\left(\frac{46 \times 2 + 25 \times 3}{6}\right)$$
$$= 2\left(\frac{92 + 75}{6}\right)$$
$$= 2 \times \frac{167}{6} = \frac{167}{3} \text{ or } 55\frac{2}{3} \text{ cm.}$$

7. Side of a squares hoped frame $= 17\frac{2}{9}$ cm

Perimeter of picture frame $= 4 \times$ side
$$= 4 \times 17\frac{2}{9} \quad = 4 \times \frac{155}{9}$$
$$= \frac{620}{9} \text{ or } 68\frac{8}{9} \text{ cm}$$

8. Geeta solve $= \frac{3}{5}$ part

Aditi solved $= \frac{7}{9}$ part

Comparison of $\frac{3}{5}$ and $\frac{7}{9}$

LCM of 5 and 9 is 45.
$$\frac{3}{5} = \frac{3 \times 9}{5 \times 9} = \frac{27}{45}$$
$$\frac{7}{9} = \frac{7 \times 5}{9 \times 5} = \frac{35}{45}$$
$$\frac{27}{45} < \frac{35}{45} \text{ or } \frac{3}{5} < \frac{7}{9}$$

Aditi solve more exercise.

9. Shagun ate $= \frac{2}{7}$ part of a cake

Remaining cake $= 1 - \frac{2}{7} = \frac{5}{7}$

Part eaten by the two brothers $= \frac{5}{7}$

$\because$ $\frac{5}{7}$ is greater $\frac{2}{7}$

$\therefore$ The brothers had a larger share.

The part eaten by the brothers in excess
$$= \frac{5}{7} - \frac{2}{7} = \frac{3}{7}$$

10. Let two numbers be x and y.
$$x = \frac{3}{2} - y$$

(a) Sarika had 1m long rope. Aman had $\frac{1}{2}$ m rope. Find total length of the rope.

(b) Find the sum of $\frac{3}{5}$ and $\frac{9}{10}$

(c) Rahul read $\frac{7}{6}$ part of story book in moving and he read $\frac{1}{3}$ part in evening. How much book did he read?

(d) Difference of two fraction numbers is $\frac{1}{4}$. Smaller fraction number is $\frac{5}{4}$. Find the other fraction number.

(e) Kiran brought $\frac{1}{6}$ cm red ribbon and $\frac{4}{3}$ cm green ribbon.
Find the total length of the ribbon brought by her.

Exercise 2.2

1. (i) $\frac{8}{3} \times 4 = \frac{32}{3}$ or $10\frac{2}{3}$

(ii) $13 \times \frac{2}{5} = \frac{26}{5}$ or $5\frac{1}{5}$

(iii) $\frac{3}{5} \times 7 = \frac{21}{5}$ or $4\frac{1}{5}$

(iv) $20 \times \frac{3}{4} = 5 \times 3 = 15$

2. (i) $\frac{1}{2}$ of $48 = 48 \times \frac{1}{2} = 24$

(ii) $\frac{1}{2}$ of $36 = \frac{1}{2} \times 36 = 18$

(iii) $\frac{1}{2}$ of $102 = \frac{1}{2} \times 102 = 51$

(iv) $\frac{1}{2}$ of $998 = 998 \times \frac{1}{2} = 499$

3. (i) $\frac{4}{5}$ of $35 = \frac{4}{5} \times 35 = 28$

(ii) $\frac{4}{5}$ of $60 = \frac{4}{5} \times 60 = 48$

(iii) $\frac{4}{5}$ of $105 = \frac{4}{5} \times 105 = 84$

(iv) $\frac{4}{5}$ of $1500 = \frac{4}{5} \times 1500 = 1200$

4. (i) $\frac{1}{4}$ of an hour [1 hour = 60 min]

$\frac{1}{4} \times 60 = 15$ min

(ii) $\frac{2}{3}$ of a year (1 year = 12 months)

$\frac{2}{3} \times 12 = 8$ month

(iii) $\frac{5}{6}$ of a day (1 day = 24 hours)

$\frac{5}{6} \times 24 = 20$ hours

5. (i) $4 \times 8\frac{1}{8} = 4 \times \frac{65}{8}$

$= \frac{65}{2} = 32\frac{1}{2}$

(ii) $3 \times 5\frac{2}{7} = 3 \times \frac{37}{7}$

$= \frac{111}{7} = 15\frac{6}{7}$

(iii) $9 \times 2\frac{4}{9} = 9 \times \frac{22}{9} = 22$

6. (i) Number of triangle12

$\frac{1}{4}$ of $12 = \frac{1}{4} \times 12 = 3$

(ii) Number of circles = 15

$\frac{2}{5}$ of $15 = \frac{2}{5} \times 15 = 2 \times 3 = 6$

(iii) Number of squres = 20

$\frac{1}{2}$ of $20 = \frac{1}{2} \times 20 = 10$

7. (i) Number of students = 50

Number of members in Drama club

$= \frac{1}{5} \times 50 = 10$

Number of members in Debating society $= \frac{1}{10} \times 50 = 5$

(ii) Number of members in mathematics or science club

$= 50 - (10 + 5)$

$= 50 - 15 = 35$

Total number of student = 50

Fraction $= \frac{35}{50}$ or $\frac{7}{10}$

8. Total number pages in a book = 550

Preeti has read $= \frac{4}{5}$ of $550 = 440$

She has read 440 pages.

9. Distance covers in 1 hour $= 70\frac{1}{3}$ km

$= \frac{211}{3}$ km

Distance covers in 6 hours $= \frac{211}{3} \times 6$

$= 422$ km

10. Armaan's monthly income = ₹ 20000

His house hold expenses

$= \frac{4}{5}$ of his income

$= \frac{4}{5} \times$ ₹ 20000

= ₹ 16000

His saving = ₹ (20000 – 16000)

= ₹ 4000

Exercise 2.3

1. (i) $\frac{3}{4} \times 5\frac{2}{3} = \frac{\cancel{3}^{1}}{4} \times \frac{17}{\cancel{3}_{1}} = \frac{17}{4}$

(ii) $\frac{8}{9} \times \frac{27}{4} = \frac{\cancel{8}^{2}}{\cancel{9}_{1}} \times \frac{\cancel{27}^{3}}{\cancel{4}_{1}} = 6$

(iii) $\frac{13}{6} \times \frac{3}{26} = \frac{\cancel{13}^{1}}{\cancel{6}_{2}} \times \frac{\cancel{3}^{1}}{\cancel{26}_{2}} = \frac{1}{4}$

(iv) $\frac{4}{5} \times \frac{12}{7} = \frac{4}{5} \times \frac{12}{7} = \frac{48}{35}$

(v) $\frac{25}{3}\times\frac{25}{3}=\frac{25}{3}\times\frac{25}{3}=\frac{625}{9}$

(vi) $\frac{2}{5}\times 5\frac{1}{4}=\frac{2}{5}\times\frac{21}{4}=\frac{42}{20}$ or $\frac{21}{10}$

(vii) $6\frac{2}{3}\times\frac{9}{15}=\frac{\cancel{20}^{4}}{\cancel{3}_{1}}\times\frac{\cancel{9}^{3}}{\cancel{5}_{1}}=12$

(viii) $3\frac{4}{7}\times\frac{3}{5}=\frac{\cancel{25}^{5}}{7}\times\frac{3}{\cancel{5}_{1}}=\frac{15}{7}$

(ix) $\frac{11}{12}\times\frac{144}{110}=\frac{\cancel{11}^{1}}{\cancel{12}_{1}}\times\frac{\cancel{144}^{\cancel{12}^{6}}}{\cancel{110}_{\cancel{10}_{5}}}=\frac{6}{5}$

(x) $19\frac{1}{2}\times 1\frac{1}{4}=\frac{39}{2}\times\frac{5}{4}=\frac{195}{8}$

2. (i) $\frac{1}{4}$ of $\frac{3}{4}=\frac{1}{4}\times\frac{3}{4}=\frac{3}{16}$

(ii) $\frac{1}{4}$ of $\frac{16}{7}=\frac{1}{4}\times\frac{16}{7}=\frac{4}{7}$

(iii) $\frac{1}{4}$ of $\frac{20}{3}=\frac{1}{4}\times\frac{20}{3}=\frac{5}{3}$

3. (i) $\frac{2}{3}$ of $\frac{9}{4}=\frac{2}{3}\times\frac{9}{4}=\frac{3}{2}$

(ii) $\frac{2}{3}$ of $\frac{6}{5}=\frac{2}{3}\times\frac{6}{5}=\frac{4}{5}$

(iii) $\frac{2}{3}$ of $\frac{3}{10}=\frac{2}{3}\times\frac{3}{10}=\frac{1}{5}$

4. (i) $\frac{1}{3}$ of $\frac{3}{4}$ or $\frac{1}{2}$ of $\frac{4}{5}$

$\frac{1}{3}$ of $\frac{3}{4}$ $\qquad$ $\frac{1}{2}$ of $\frac{4}{5}$

$=\frac{1}{3}\times\frac{3}{4}$ $\qquad$ $=\frac{1}{2}\times\frac{4}{5}$

$=\frac{1}{4}$ $\qquad$ $=\frac{2}{5}$

LCM of 4 and 5 is 20.

$\frac{1\times 5}{4\times 5}=\frac{5}{20}$

$\frac{2\times 4}{5\times 5}=\frac{8}{20}$

$\frac{5}{20}<\frac{8}{20}$

$\frac{1}{2}$ of $\frac{4}{5}$ is greater than $\frac{1}{3}$ of $\frac{3}{4}$.

(ii) $\frac{6}{7}$ of $\frac{49}{5}$ or $\frac{7}{8}$ of $\frac{48}{5}$

$\frac{6}{7}$ of $\frac{49}{5}$ $\qquad$ $\frac{7}{8}$ of $\frac{48}{5}$

$=\frac{6}{7}\times\frac{49}{5}$ $\qquad$ $=\frac{7}{8}\times\frac{48}{5}$

$=\frac{42}{5}$ $\qquad$ $=\frac{42}{5}$

$\frac{6}{7}$ of $\frac{49}{5}=\frac{7}{8}$ of $\frac{48}{5}$

Both are equal.

5. Length of rectangular park $=15\frac{1}{3}$ cm

$=\frac{46}{3}$ cm

Breadth of rectangular park $=13\frac{1}{2}$ cm

$=\frac{27}{2}$ cm

Area of rectangular park $=\frac{46}{3}\times\frac{27}{2}$

$=23\times 9=207\text{ cm}^2$

6. Cost of 1 kg tomatoes $=$ ₹ $19\frac{1}{4}=$ ₹ $\frac{77}{4}$

$\therefore$cost of $3\frac{1}{2}$ kg of tomatoes $=$ ₹ $\frac{77}{4}\times\frac{7}{2}$

$=$ ₹ $\frac{539}{8}$

$=$ ₹ 67.375 or ₹ 67.38

7. Side of square $=13\frac{3}{4}$ m $=\frac{55}{4}$ m

Area of square $=\frac{55}{4}\times\frac{55}{4}\text{ m}^2$

$=\frac{3025}{16}$ or $189\frac{1}{16}$

8. Side of an equilateral triangle $=7\frac{3}{8}$ cm

$=\frac{59}{8}$ cm

Perimeter of triangle $=\frac{59}{8}\times 3=\frac{177}{8}$ cm

$\frac{1}{2}$ of perimeter $=\frac{177}{8}\times\frac{1}{2}$

$=\frac{177}{16}$cm or $11\frac{1}{16}$ cm

9. Money that Neeru and Zaara had together $=$ ₹ 2500

Neeru's share $= ₹\frac{3}{5} \times 2500 = ₹1500$

Zaara's share $= ₹(2500 - 1500) = ₹1000$

10. Distance covered by using 1 litre petrol = 25 km

Distance covered by using $3\frac{1}{5}l\left(\frac{16}{5}l\right)$ petrol $= 25 \times \frac{16}{5}$ km

$= 5 \times 16 = 80$ km

11. Leena reads book in 1 day $= 1\frac{5}{7}$ hours

$= \frac{12}{7}$ hours

Leena reads book in 7 day $= \frac{12}{7} \times 7$ hours

= 12 hours

12. Total number of students = 50

Number of girls $= 50 \times \frac{2}{5} = 20$

Number of boys $= 50 - 20 = 30$

Exercise 2.4

1. (i) $16 \div \frac{4}{5} = 16 \times \frac{5}{4} = 20$

(ii) $14 \div \frac{5}{6} = 14 \times \frac{6}{5} = \frac{84}{5}$ or $16\frac{4}{5}$

(iii) $21 \div \frac{3}{7} = 21 \times \frac{7}{3} = 49$

(iv) $4 \div \frac{8}{3} = 4 \times \frac{3}{8} = \frac{3}{2}$ or $1\frac{1}{2}$

(v) $4 \div 2\frac{1}{5} = 4 \div \frac{11}{5} = 4 \times \frac{5}{11} = \frac{20}{11}$ or $1\frac{9}{11}$

(vi) $12 \div 5\frac{4}{9} = 12 \div \frac{49}{9} = 12 \times \frac{9}{49}$

$= \frac{108}{49} = 2\frac{10}{49}$

2. (i) $\frac{2}{3} \div \frac{1}{6} = \frac{2}{3} \times 6 = 2 \times 2 = 4$

(ii) $\frac{3}{8} \div \frac{3}{4} = \frac{3}{8} \times \frac{4}{3} = \frac{1}{2}$

(iii) $2\frac{1}{3} \div \frac{3}{5} = \frac{7}{3} \div \frac{3}{5} = \frac{7}{3} \times \frac{5}{3} = \frac{35}{9}$ or $3\frac{8}{9}$

(iv) $5\frac{1}{2} \div 6\frac{1}{5} = \frac{11}{2} \div \frac{31}{5} = \frac{11}{2} \times \frac{5}{31} = \frac{55}{62}$

(v) $\frac{4}{7} \div \frac{8}{9} = \frac{4}{7} \times \frac{9}{8} = \frac{9}{14}$

(vi) $8\frac{1}{3} \div \frac{4}{37} = \frac{25}{3} \times \frac{37}{4} = \frac{925}{12}$ or $77\frac{1}{12}$

(vii) $4\frac{3}{8} \div 2\frac{5}{6} = \frac{35}{8} \div \frac{17}{6} = \frac{35}{8} \times \frac{6}{17}$

$= \frac{35}{4} \times \frac{3}{17} = \frac{105}{68}$ or $1\frac{37}{68}$

(viii) $\frac{3}{5} \div \frac{9}{4} = \frac{3}{5} \times \frac{9}{4} = \frac{27}{20}$ or $1\frac{7}{20}$

3. (i) $\frac{4}{9} \div 5 = \frac{4}{9} \times \frac{1}{5} = \frac{4}{45}$

(ii) $\frac{2}{15} \div 8 = \frac{2}{15} \times \frac{1}{8} = \frac{1}{60}$

(iii) $3\frac{1}{2} \div 4 = \frac{7}{2} \times \frac{1}{4} = \frac{7}{8}$

(iv) $5\frac{3}{7} \div 14 = \frac{38}{7} \times \frac{1}{14} = \frac{38}{98}$ or $\frac{19}{49}$

(v) $\frac{2}{3} \div 5 = \frac{2}{3} \times \frac{1}{5} = \frac{2}{15}$

(vi) $\frac{8}{19} \div 6 = \frac{8}{19} \times \frac{1}{6} = \frac{4}{57}$

4. Cost of $7\frac{1}{2}$ kg ($\frac{15}{2}$ kg) apples = ₹ 600

Cost of 1 kg apples $= ₹\ 600 \div \frac{15}{2}$

$= ₹\ 600 \times \frac{2}{15} = ₹\ 80$

5. Total quantity of rice bought in every week = 250 kg

Quantity that each student consumes per week $= \frac{5}{2}$ kg

Number of student $= 250 \div \frac{5}{2}$

$= 250 \times \frac{2}{5} = 100$

6. Required number $= x$

One number $= 5\frac{5}{6} = \frac{35}{6}$

Product of these numbers $= 3\frac{1}{3} = \frac{10}{3}$

$\frac{35}{6} \times x = \frac{10}{3}$

$x = \frac{10}{3} \div \frac{35}{6} = \frac{10}{3} \times \frac{6}{35} = \frac{4}{7}$

7. Length of a rope $= 8\frac{1}{3}$ m $= \frac{25}{3}$ m

Number of pieces = 5

Length of each piece $= \frac{25}{3} \div 5$

$= \frac{25}{3} \times \frac{1}{5}$

$= \frac{5}{3}$ or $1\frac{2}{3}$ m

8. Product of two numbers $= \frac{91}{6}$

One number $= 4\frac{1}{3}$ or $\frac{13}{3}$

Other number $= \frac{91}{6} \div \frac{13}{3} = \frac{91}{6} \times \frac{3}{13}$

$= \frac{7}{2}$ or $3\frac{1}{2}$

MCQs

1. (b) **2.** (b) **3.** (a) **4.** (b) **5.** (c) **6.** (b).

Mental Maths

1. $\frac{-3}{13}$ **2.** $\frac{4}{5} \times 80 = 64$ **3.** $\frac{7}{22}$ **4.** 1 **5.** $\frac{9}{12}$

6. $\frac{3 \times 3}{7 \times 3} = \frac{9}{21}$ **7.** $\frac{9}{17}$ **8.** $\frac{3}{4} \times \frac{2}{3} = \frac{1}{2}$

3 Decimals

1. (i) $3.5 \times 10 = 35$
(Shifting decimal 1 place to the right)

(ii) $1.33 \times 10 = 13.3$
(Shifting decimal 1 place to the right)

(iii) $2.75 \times 10 = 27.5$
(Shifting decimal 1 place to the right)

(iv) $2.01 \times 10 = 20.1$
(Shifting decimal 1 place to the right)

(v) $8.9 \times 100 = 890$
(Shifting decimal 2 place to the right)

(vi) $0.13 \times 100 = 13$
(Shifting decimal 2 place to the right)

(vii) $0.2416 \times 100 = 24.16$
(Shifting decimal 2 place to the right)

(viii) $16.17 \times 100 = 1617$
(Shifting decimal 2 place to the right)

(ix) $2.31 \times 1000 = 2310$
(Shifting decimal 3 place to the right)

(x) $6.123 \times 1000 = 6123$
(Shifting decimal 3 place to the right)

(xi) $1.53 \times 1000 = 1530$
(Shifting decimal 3 place to the right)

(xii) $2.61 \times 1000 = 2610$
(Shifting decimal 3 place to the right)

2. (i) 1.5×9

First we multiply 15 by 9

$$\begin{array}{r} 15 \\ \times\ 9 \\ \hline 135 \\ \hline \end{array}$$

Now put decimal after 1place form right

$1.5 \times 9 = 13.5$

(ii) 1.3×7

First we multiply 13 by 7

$$\begin{array}{r} 13 \\ \times 7 \\ \hline 91 \\ \hline \end{array}$$

Now put decimal 1 place form right

$1.3 \times 7 = 9.1$

(iii) 0.225×13

First we multiply by 225 by 13

$$\begin{array}{r} 225 \\ \times\ 13 \\ \hline 675 \\ 2250 \\ \hline 2925 \\ \hline \end{array}$$

Now put decimal after 2 places of form right $0.225 \times 13 = 2.925$

(iv) 2.57×18

First we multiply 2.57×18

$$\begin{array}{r} 2\ 5\ 7 \\ \times\ 18 \\ \hline 2056 \\ 2570 \\ \hline 4626 \\ \hline \end{array}$$

Now put decimal after 2 places form right

$2.57 \times 18 = 46.26$

(v) 49.25×25

First we multiply

4925×25

$$\begin{array}{r} 4925 \\ \times\ 25 \\ \hline 24625 \\ 98500 \\ \hline 123125 \\ \hline \end{array}$$

Now put decimal after 2 places form right

$49.25 \times 25 = 1231.25$

(vi) 19.84×27

First multiply 1984×27

$$\begin{array}{r} 1984 \\ \times\ 27 \\ \hline 13888 \\ 39680 \\ \hline 53568 \\ \hline \end{array}$$

Now put decimal after 2 places form right

$79.84 \times 27 = 535.68$

(vii) 16.34×79

$$\begin{array}{r} 1634 \\ \times\ 79 \\ \hline 14706 \\ 14380 \\ \hline 129086 \\ \hline \end{array}$$

Now put decimal after 2 places form righ

$16.34 \times 79 = 1290.86$

(viii) 0.427×235

First multiply 427×235

$$\begin{array}{r} 427 \\ \times\ 235 \\ \hline 2135 \\ 12810 \\ 85400 \\ \hline 100345 \\ \hline \end{array}$$

Now put decimal after 3 places form right

$0.427 \times 235 = 100.345$

3. (i) 3.6×0.5

We multiply 36 by 5

$$\begin{array}{r} 3\ 6 \\ \times\ 5 \\ \hline 180 \\ \hline \end{array}$$

Sum of decimal places in given decimals $= 1 + 1 = 2$

$\therefore \quad 3.6 \times 0.5 = 1.80$

(ii) 1.2×1.2

We multiply 12 by 12

$$\begin{array}{r} 12 \\ \times\ 12 \\ \hline 24 \\ 120 \\ \hline 144 \\ \hline \end{array}$$

Sum of decimal places in given decimals $1 + 1 = 2$

$\therefore \quad 1.2 \times 1.2 = 1.44$

(iii) 0.13×0.6

First we multiply 13×6

$$\begin{array}{r} 13 \\ \times\ 6 \\ \hline 78 \\ \hline \end{array}$$

Sum of decimal places in given decimal $2 + 1 = 3$

$0.13 \times 0.6 = 0.078$

(iv) 2.01×1.1

We multiply 201 by 11

$$\begin{array}{r} 201 \\ \times\ 11 \\ \hline 201 \\ 2010 \\ \hline 2211 \\ \hline \end{array}$$

Sum of decimal places in given decimal $2 + 1 = 3$

$2.01 \times 1.1 = 2.211$

(v) 4.21×7.25

First we multiply 421 by 725

$$\begin{array}{r} 421 \\ \times\ 725 \\ \hline 2105 \\ 8420 \\ 294700 \\ \hline 305225 \\ \hline \end{array}$$

Sum of decimal places in given decimal $2 + 2 = 4$

$4.21 \times 7.25 = 30.5225$

(vi) 12.23×6.3

First we multiply 1223 by 63

$$\begin{array}{r} 1223 \\ \times\ 63 \\ \hline 3669 \\ 73380 \\ \hline 77049 \\ \hline \end{array}$$

Sum of decimal places in given decimal $2 + 1 = 3$

$12.23 \times 6.3 = 77.049$

(vii) 12.24×6.5

First we multiply 1224 by 65

$$\begin{array}{r} 1224 \\ \times\ 65 \\ \hline 6120 \\ 73440 \\ \hline 795600 \\ \hline \end{array}$$

Sum of decimal places in given decimal $2 + 1 = 3$

$12.24 \times 6.5 = 79.560$

(viii) 13.63×1.1

First we multiply 1363 by11

$$\begin{array}{r} 1363 \\ \times\ 11 \\ \hline 1363 \\ 13630 \\ \hline 14993 \\ \hline \end{array}$$

Sum of decimal places in given decimal $2 + 1 = 3$

$13.63 \times 1.1 = 14.993$

(ix) 13.25×1.5

First we multiply 1325 by 15

$$\begin{array}{r} 1325 \\ \times\ 15 \\ \hline 6625 \\ 13250 \\ \hline 19875 \\ \hline \end{array}$$

Sum of decimal places in given decimal $2 + 1 = 3$

$13.25 \times 1.5 = 19.875$

(x) 19.84×27.9

First we multiply 1984 by 279

$$\begin{array}{r} 1984 \\ \times\ 279 \\ \hline 17856 \\ 138880 \\ 396800 \\ \hline 553536 \\ \hline \end{array}$$

Sum decimal places in given decimal $2 + 1 = 3$

$19.84 \times 27.9 = 553.536$

(xi) 0.235×4.8

First we multiply 235 by 48

$$\begin{array}{r} 235 \\ \times\ 48 \\ \hline 1880 \\ 9400 \\ \hline 11280 \\ \hline \end{array}$$

Sum of decimal places in given decimal $3 + 1 = 4$

$0.235 \times 4.8 = 1.1280$

(xii) 1.475×2.112

First we multiply 1475 by 2112

$$\begin{array}{r} 1475 \\ \times\ 212 \\ \hline 2950 \\ 14750 \\ 147500 \\ 2950000 \\ \hline 3152000 \\ \hline \end{array}$$

Sum of decimal places in given decimal $3 + 3 = 6$

$1.475 \times 2.112 = 3.115200$

(xiii) 114.2×2.14

First we multiply 1142by 214

$$\begin{array}{r} 1142 \\ \times\ 214 \\ \hline 4568 \\ 11420 \\ 228400 \\ \hline 244388 \\ \hline \end{array}$$

Sum of decimal places in given decimal of $1+2=3$

$114.2 \times 2.14 = 244.388$

(xiv) 3.101×1.007

First we multiply 3101 by 1007

$$\begin{array}{r} 3101 \\ \times 1007 \\ \hline 21707 \\ 00000 \\ 000000 \\ 3101000 \\ \hline 3122707 \\ \hline \end{array}$$

Sum of decimal places in given decimal $3+3=6$

$3.101 \times 1.007 = 3.122707$

(xv) 0.427×23.5

First we multiply 427 by 235

$$\begin{array}{r} 427 \\ \times\ 235 \\ \hline 2135 \\ 12810 \\ 85400 \\ \hline 100345 \\ \hline \end{array}$$

Sum of decimal places in given decimal $3+1=4$

$0.427 \times 23.5 = 10.0345.$

(xvi) $1.3 \times 1.5 \times 2.7$

First we muliply

$13 \times 15 \times 27 = 13 \times 405$

$$\begin{array}{r} 405 \\ \times\ 13 \\ \hline 1215 \\ 4050 \\ \hline 5265 \\ \hline \end{array}$$

Sum of decimal places in decimal $1+1+1=3$

$\therefore \quad 1.3 \times 1.5 \times 2.7 = 5.265$

(xvii) $3.5 \times 1.15 \times 2.2$

First we multiply

$35 \times 115 \times 22 = (35 \times 22) \times 115$

$= 770 \times 115$

$$\begin{array}{r} 770 \\ \times\ 115 \\ \hline 3850 \\ 7700 \\ 77000 \\ \hline 88550 \\ \hline \end{array}$$

Sum of decimal places in decimals $1+2+1=4$

$3.5 \times 1.15 \times 2.2 = 8.8550$

(xviii) $6.7 \times 4.4 \times 1.31$

First we multiply $67 \times 44 \times 131$

2948×131

$$\begin{array}{r} 2948 \\ \times\ 131 \\ \hline 2948 \\ 88440 \\ 294800 \\ \hline 386188 \\ \hline \end{array}$$

Sum of decimal places in decimals $1+1+2=4$

$6.7 \times 4.4 \times 1.31 = 38.6188$

(xix) $0.04 \times 0.7 \times 0.02$

First we multiply

$4 \times 7 \times 2 = 28 \times 2$

$$\begin{array}{r} 28 \\ \times\ 2 \\ \hline 56 \\ \hline \end{array}$$

Sum of decimal places in decimals

$2+1+2=5$

$0.04 \times 0.7 \times 0.02 = 0.00056$

(xx) $2.3 \times 6.8 \times 5.4$

First we multiply $= 23 \times 68 \times 54$

$= 1564 \times 54$

$$\begin{array}{r} 1564 \\ \times\ 54 \\ \hline 6256 \\ 78200 \\ \hline 84456 \\ \hline \end{array}$$

Sum of decimal places in decimals

$1+1+1=3$

$2.3 \times 6.8 \times 5.4 = 84.456$

Exercise 3.2

1. (i) $34.19 \div 10 = 3.419$

Shifting decimal to the left by 1 place.

(ii) $9.69 \div 10 = 0.969$

Shifting decimal to the left by 1 place

(iii) $56.192 \div 10 = 5.6192$

Shifting decimal to the left by 1 place

(iv) $13.05 \div 10 = 1.305$

Shifting decimal to the left by 1 place

(v) $0.01 \div 100 = 0.0001$

Shifting decimal to the left by 2 places

(vi) $0.73 \div 100 = 0.0073$

Shifting decimal to the left by 2 places

(vii) $479.25 \div 100 = 4.7925$

Shifting decimal to the left by 2 places

(viii) $100.32 \div 100 = 1.0032$

Shifting decimal to the left by 2 places

(ix) $10.01 \div 100 = 0.01001$

Shifting decimal to the left by 3 places

(x) $167.3 \div 1000 = 0.1673$

Shifting decimal to the left by 3 places

(xi) $0.76 \div 1000 = 0.00076$

Shifting decimal to the left by 3 places

(xii) $8754.5 \div 1000 = 8.7545$

Shifting decimal to the left by 3 places

(xiii) $1.305 \div 9 =$

$$
\begin{array}{r}
9\overline{)1.305(}\ 1.45 \\
\underline{-9} \\
40 \\
\underline{-36} \\
45 \\
\underline{-45} \\
0
\end{array}
$$

$\therefore$ $1.305 \div 1.45$

(xiv) $188.4 \div 60$

$$
\begin{array}{r}
60\overline{)188.4(}\ 3.14 \\
\underline{-180} \\
84 \\
\underline{-60} \\
240 \\
\underline{-240} \\
0
\end{array}
$$

$\therefore$ $188.4 \div 60 = 3.14$

(xv) $231.7 \div 70$

$$
\begin{array}{r}
70\overline{)231.7(}\ 3.31 \\
\underline{-210} \\
217 \\
\underline{-210} \\
70 \\
\underline{-70} \\
0
\end{array}
$$

$\therefore$ $231.7 \div 70 = 3.31$

(xvi) $49.6 \div 80$

$$
\begin{array}{r}
80\overline{)49.6(}\ 0.62 \\
\underline{-480} \\
160 \\
\underline{-160} \\
0
\end{array}
$$

$\therefore$ $49.6 \div 80 = 0.62$

2. (i) $4.9 \div 0.7$

$$\frac{4.9 \times 10}{0.7 \times 10} = \frac{49}{7} = 7$$

$\therefore$ $4.9 \div 0.7 = 7$

(ii) $80 \div 1.6$

$$\frac{80 \times 10}{1.6 \times 10} = \frac{800}{10} = 50$$

$\therefore$ $80 \div 1.6 = 50$

(iii) $5.45 \div 0.25$

$$\frac{5.45 \times 100}{0.25 \times 100} = \frac{545}{25}$$

$$
\begin{array}{r}
25\overline{)545(}\ 21.8 \\
\underline{-50} \\
45 \\
\underline{-25} \\
200 \\
\underline{-200} \\
0
\end{array}
$$

$\therefore$ $5.45 \div 0.25 = 21.8$

(iv) $9.69 \div 1.9$

$$\frac{9.69 \times 10}{1.9 \times 10} = \frac{96.9}{19}$$

$$
\begin{array}{r}
19\overline{)96.9(}\ 5.1 \\
\underline{-95} \\
19 \\
\underline{-19} \\
0
\end{array}
$$

$\therefore$ $9.69 \div 1.9 = 5.1$

(v) $56.192 \div 3.2$

$$\frac{56.192 \times 10}{3.2 \times 10} = \frac{561.92}{32}$$

$32 \overline{)561.92(} \; 17.56$

-32

241

-224

179

-160

192

-192

0

$\therefore \quad 56.192 \div 3.2 = 17.56$

(vi) $289.6 \div 6.4$

$$\frac{289.6 \times 10}{6.4 \times 10} = \frac{2896}{64}$$

$64 \overline{)2896(} \; 45.25$

-256

336

-320

160

-128

320

-320

0

$\therefore \quad 289.6 \div 6.4 = 45.25$

(vii) $0.0102 \div 1.7$

$$\frac{0.0102 \times 10}{1.7 \times 10} = \frac{0.102}{17}$$

$17 \overline{)0.102(} \; 0.006$

-102

0

$\therefore \quad 0.0102 \div 1.7 = 0.006$

(viii) $0.759 \div 0.3$

$$\frac{0.759 \times 10}{0.3 \times 10} = \frac{7.59}{3}$$

$3 \overline{)7.59(} \; 2.53$

-6

15

-15

09

-9

0

$\therefore \quad 0.759 \div 0.3 = 2.53$

(ix) $25.395 \div 1.5$

$$\frac{25.395 \times 10}{1.5 \times 10} = \frac{253.95}{15}$$

$15 \overline{)253.95(} \; 16.93$

-15

103

-90

139

-135

45

-45

0

$\therefore \quad 25.395 \div 1.5 = 16.93$

(x) $2.0484 \div 0.18$

$$\frac{2.0484 \times 100}{0.18 \times 100} = \frac{204.84}{18}$$

$18 \overline{)204.84(} \; 11.38$

-18

24

-18

68

-54

144

-144

0

$\therefore \quad 2.0484 \div 0.18 = 11.38$

(xi) $11.13 \div 0.21$

$$\frac{11.13 \times 100}{0.21 \times 100} = \frac{1113}{21}$$

$21 \overline{)1113(} \; 53$

-105

63

-63

0

$\therefore \quad 11.13 \div 0.21 = 53$

(xii) $236.6 \div 0.26$

$$\frac{236.6 \times 100}{0.26 \times 100} = \frac{23660}{20}$$

$26 \overline{)23660(} \; 910$

-234

260

-260

0

$\therefore \quad 236.6 \div 0.26 = 910$

(xiii) $0.8085 \div 0.35$

$$\frac{0.8085 \times 100}{0.35 \times 100} = \frac{80.35}{35}$$

$$\begin{array}{r} 35\overline{)80.85(}\ 2.31 \\ -70 \\ \hline 108 \\ -105 \\ \hline 35 \\ -35 \\ \hline 0 \end{array}$$

$\therefore$ $0.8085 \div 0.35 = 2.31$

(xiv) $21.976 \div 1.64$

$$\frac{21.976 \times 100}{1.64 \times 100} = \frac{2197.6}{164}$$

$$\begin{array}{r} 164\overline{)2197.6(}\ 13.4 \\ -164 \\ \hline 557 \\ -492 \\ \hline 656 \\ -656 \\ \hline 0 \end{array}$$

$\therefore$ $21.976 \div 1.64 = 13.4$

(xv) $131.58 \div 2.15$

$$\frac{311.58 \times 100}{2.15 \times 100} = \frac{13158}{215}$$

$$\begin{array}{r} 215\overline{)13158(}\ 61.2 \\ -1290 \\ \hline 258 \\ -215 \\ \hline 430 \\ -430 \\ \hline 0 \end{array}$$

$\therefore$ $131.58 \div 2.15 = 61.2$

(xvi) $0.759 \div 0.3$

$$\frac{0.759 \times 10}{0.3 \times 10} = \frac{7.59}{3}$$

$$\begin{array}{r} 3\overline{)7.59(}\ 2.53 \\ -6 \\ \hline 15 \\ -15 \\ \hline 09 \\ -9 \\ \hline 0 \end{array}$$

$\therefore$ $0.759 \div 0.3 = 2.53$

Exercise 3.3

1. 0.79 m = **79** cm
   (0.79 m = 0.79 × 100 cm = 79 cm)
   ($\therefore$ 1 m = 100 cm)
2. 4.165 mm = **0.004165** m
   (4.165 mm = 4.165 ÷ 1000 m = 0.004165) ($\therefore$ 1 mm = 1000 m)
3. 8.73 kg = **8730** g
   (8.73 kg = 8.73 × 1000 g = 8730 g)
   ($\therefore$ 1 kg = 1000 g)
4. 725 mL = **0.725** L
   (725 mL = 725 ÷ 1000 mL = 0.725 L)
   ($\therefore$ 1 L = 1000 mL)
5. 15 L = **15000** mL
   (15 L = 15 × 1000 mL = 15000 mL)
   ($\therefore$ 1 L = 1000 mL)
6. 50 km = **5000000** cm
   (50 km = 50 × 100000 cm= 5000000 cm)
   ($\therefore$ 1 km = 100000 cm)
7. 4.7 kg = **4700** g
   (4.7 kg = 4.7 × 1000 g = 4700 g)
   ($\therefore$ 1 kg = 1000 g)
8. 73 m = **7300** cm
   (73 m = 73 × 100 cm = 7300 cm)
   ($\therefore$ 1 m = 100 cm)
9. 3 g 20 mg = 3020 mg
   (3g 20 mg = (3 × 1000 + 20) mg
   = 3020 mg) ($\therefore$ 1 g = 1000 mg)
10. 0.35 m = 350 mm
    (0.35 m = 0.35 × 1000 = 350 mm)
    ($\therefore$ 1 m = 1000 mm)
11. 5 m 60 cm = 560 cm
    (5 m 60 cm = 5 × 100 + 60 cm = 560 cm)
    ($\therefore$ 1 cm = 100 cm)
12. 470 g = 0.47 kg
    (470 g = 470 ÷ 1000 kg = 0.47 kg)
    ($\therefore$ 1 kg = 1000 g)
13. 0.75 km = 750 m
    (0.75 km = 0.75 × 1000 = 750 m)
    ($\therefore$ 1 km = 1000 m)
14. 7843 g = 7.843 kg
    (7843 g = 7843 ÷ 1000 = 7.843 kg)
    ($\therefore$ 1 kg = 1000 g)
15. 7 kL = 7000 L
    (7 kL = 7 × 1000 = 7000 L)
    ($\therefore$ 1 kL = 1000 L)

Exercise 3.4

1. Cloth required for a shirt = 2.7 m
Number of piece of cloth = 40.5 m
Number of shirt = 40.5 ÷ 2.7

$$\frac{40.5\times 10}{2.7\times 10}=\frac{405}{27}=15$$

15 shirts can be made from a piece of cloth 40.5 m.

2. Shubham's monthly salary = ₹ 5500
Annual salary = ₹ (5500 × 12) = ₹ 66000
his monthly saving
= 0.2 part of his salary
His annual saving = ₹ 66000 × 0.2
= ₹ 13200

3. 1 m = 39.37 inches
16 m = (39.37 × 16) inches
First 3937 multiply by 16

```
  3937
 × 16
 23622
39370
62992
```

Now put decimal after 2 places form the right (39.37 × 16) inches = 629.92 inches

4. Number of steel chairs = 15
Cost of 15 chairs = ₹ 1706.25
Cost of 1 chair = ₹ (1706.25 ÷ 15)

```
15 ) 1706.25 ( 113.75
     −15
      20
     −15
      56
     −45
      112
     −105
       75
      −75
        0
```

Cost of 1 chair is ₹ 113.75

5. Cost of one orange = ₹ 6.45
Cost of 12 oragnes = ₹ 6.45 × 12
First we multiply 645 by 12

```
  645
 × 12
 1290
6450
7740
```

Now put decimal after 2 places from right.
(6.45 × 12) = ₹ 77.40
Cost of 12 oranges is ₹ 77.40

6. Product of two decimal numbers
= 131.58
One number = 2.15
Other number = 131.58 ÷ 2.15

$$\frac{131.58\times 100}{2.15\times 100}=\frac{13158}{215}$$

```
215 ) 13158 ( 61.2
     − 1290
       258
     − 215
        430
      − 430
          0
```

Thus required number is 61.2.

7. Number of workers = 44
Amount distributed = ₹ 4483.60
Money got by one worker
= ₹ (4483.60 ÷ 44)

```
44 ) 4483.60 ( 101.9
     −44
      83
     −44
      396
     −396
       0
```

One worker got ₹ 101.9.

8. Cost of 1 metre cloth = ₹ 62.85
Cost of 23 m metre cloth = ₹ 62.85 × 23
First we multiple 6285 × 23

```
  6285
 × 23
 18855
125700
144555
```

Now put decimal after 2 place from the right

₹ $(62.85 \times 23) =$ ₹ 1445.55

Cost of 23 m cloth is ₹ 1445.55.

9. Height of pile of books = 54.4 cm

Thickness of each book = 3.2 cm

Number of books in the pile = 54.4 ÷ 32

$$\frac{54.4}{3.2} = \frac{54.4 \times 10}{3.2 \times 10} = \frac{544}{32}$$

$$\begin{array}{r} 32\overline{)544}(17 \\ \underline{-32} \\ 224 \\ \underline{-224} \\ 0 \end{array}$$

17 books are there in the pile.

10. Number of cement bags = 73

weight of 73 cement bags = 4106.25 kg

weight of 1 cement bags $= \frac{4106.25}{73}$

= 56.25 kg

Weight of 100 cement bags

$= 56.25 \times 100$

= 5625 kg

11. Distance between Delhi and Roorkee

= 180 km

Time taken by bus = 4.5 hrs.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{180}{4.5}$$

= 40 km/hr

If distance = 280 km

speed = 40 km/hr

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$= \frac{280}{40} = 7 \text{ hr}$$

12. Number of boys

= 0.8 part of strength of school

Number of girl 0.2 part of strength of school = 150

Number of girls 0.1 part of strength of school $= \frac{150}{0.2} = 750$

Number of boys 0.8 part of strength of school $= 750 \times 0.8 = 600$

Thus, 600 boys in the school.

MCQs

1. (a) **2.** (b) **3.** (a) **4.** (c) **5.** (b) **6.** (d) **7.** (a) **8.** (c)

Mental Maths

1. 0.4 **2.** 8500 **3.** 25 **4.** 0.63 **5.** 0.9 **6.** 2.8435 **7.** 0.1 **8.** 5.678 **9.** 1250 **10.** 0 **11.** 0

4 Rational Numbers

Exercise-4.1

1. Negative rational number are

$$-\frac{15}{4}, -6\frac{-5}{7}$$

2. Positive rational numbers are

$$\frac{-5}{-8}, \frac{37}{53}, 8$$

3. (i) $\frac{12}{-17} = \frac{12 \times -1}{-17 \times -1} = -\frac{12}{17}$

(ii) $\frac{1}{-2} = \frac{1 \times -1}{-2 \times -1} = -\frac{1}{2}$

(iii) $\frac{-8}{-19} = \frac{-8 \times -1}{-19 \times -1} = \frac{8}{19}$

(iv) $\frac{11}{-6} = \frac{11 \times -1}{-6 \times -1} = -\frac{11}{6}$

4. (i) $-\frac{3}{8}$

Five rational numbers equivalent to $-\frac{3}{8}$ are

$$-\frac{3 \times 2}{8 \times 2} = \boxed{-\frac{6}{16}}, -\frac{3 \times 3}{8 \times 3} = \boxed{-\frac{9}{24}},$$

$$-\frac{3 \times 4}{8 \times 4} = \boxed{-\frac{12}{32}}$$

$$-\frac{3 \times 5}{8 \times 5} = \boxed{-\frac{15}{40}}, -\frac{3 \times 6}{8 \times 6} = \boxed{-\frac{18}{48}}$$

(ii) $-\frac{4}{15}$

Five rational numbers equivalent to $-\frac{4}{15}$ are

$-\frac{4\times 2}{15\times 2}=\boxed{-\frac{8}{30}}, -\frac{4\times 3}{15\times 3}=\boxed{-\frac{12}{45}},$

$-\frac{4\times 4}{15\times 4}=\boxed{-\frac{16}{60}}$

$-\frac{4\times 5}{15\times 5}=\boxed{-\frac{20}{75}}, -\frac{4\times 6}{15\times 6}=\boxed{-\frac{24}{90}}$

(iii) $-\frac{2}{9}$

Five rational numbers equivalent to $-\frac{2}{9}$ are

$-\frac{2\times 2}{9\times 2}=\boxed{-\frac{4}{18}}, -\frac{2\times 3}{9\times 3}=\boxed{-\frac{6}{27}},$

$-\frac{2\times 4}{9\times 4}=\boxed{\frac{-8}{36}}$

$-\frac{2\times 5}{9\times 5}=\boxed{-\frac{8}{45}}, \frac{-2\times 6}{9\times 6}=\boxed{-\frac{12}{54}}$

(iv) -1

Five rational numbers equivalent to – 1 are

$-1\times\frac{2}{2}=\boxed{-\frac{2}{2}}, -1\times\frac{3}{3}=\boxed{\frac{-3}{3}},$

$-\frac{1\times 4}{4}=\boxed{-\frac{4}{4}}$

$-1\times\frac{5}{5}=\boxed{-\frac{5}{5}}, -1\times\frac{6}{6}=\boxed{-\frac{6}{6}}$

5. (i) $-\frac{2}{3}$

we need numerator 6

$\therefore \quad \frac{-2\times -3}{3\times -3}=\frac{6}{-9}$

(ii) $-\frac{2}{3}$

we need denominator 12

$\therefore \quad \frac{-2\times 4}{3\times 4}=-\frac{8}{12}$

(iii) $\frac{-2}{3}$ we need numerator – 8

$\therefore \quad \frac{-2}{3}\times\frac{4}{4}=\frac{-8}{12}$

(iv) $-\frac{2}{3}$ we need denominator – 30

$\therefore \quad \frac{-2\times -10}{3\times -10}=\frac{20}{-30}$

6. $\frac{-64}{36}$

(i) $\frac{-64}{36}$

we need numerator as 16

$\therefore \quad \frac{-64\div -4}{36\div -4}=\frac{16}{-9}$

(ii) $\frac{-64}{36}$

we need 9 as denominator

$\therefore \quad \frac{-64\div 4}{36\div 4}=\frac{-16}{9}$

(iii) $-\frac{64}{36}$

we need – 32 as numerator

$\therefore \quad \frac{-64\div 2}{36\div 2}=\frac{-32}{18}$

(iv) $\frac{-64}{36}$

we need – 18 as denominator

$\therefore \quad \frac{-64\div -2}{36\div -2}=\frac{32}{-18}$

7. (i) $\frac{8}{-36}$

HCF of 8 and 36 is 4.

$\therefore \quad \frac{8\div 4}{-36\div 4}=\frac{2}{-9}$ (standard form)

(ii) $\frac{35}{49}$

HCF of 35 and 49 is 7.

$\therefore \quad \frac{35\div 7}{49\div 7}=\frac{5}{7}$ (standard form)

(iii) $\frac{91}{-78}$

HCF of 91 and 78 is 13.

$\therefore \quad \frac{91\div 13}{-78\div 13}=\frac{7}{-6}$ (standard form)

(iv) $\frac{-87}{116}$

HCF of 87 and 116 is 29.

$\therefore \quad \frac{-87 \div 29}{116 \div 29} = \frac{-3}{4}$ (standard form)

8. (i) $-\frac{4}{9} = \frac{.....}{18} = \frac{12}{.....}$

9 is multiplied by 2 to get 18.

$\therefore$ – 4 should be multiplied by 2.

$\therefore \quad -4 \times 2 = -8$

$\therefore$ –4 is multiplied by – 3 to get 12.

$\therefore$ 9 should be multiplied by – 3.

$\therefore \quad -\frac{4}{9} = \frac{\mathbf{-8}}{18} = \frac{12}{\mathbf{-27}}$

(ii) $\frac{3}{-8} = \frac{-12}{.....} = \frac{24}{.....}$

$\because$ 3 is multiplied by – 4 to get – 12.

$\therefore$ – 8 should be multiplied by –4.

$\therefore \quad -8 \times -4 = 32$

$\because$ 3 is multiplied by 8 to get 24.

$\therefore$ – 8 should be multiplied by 8.

$\therefore \quad -8 \times 8 = -64$

$\therefore \quad \frac{3}{-8} = \frac{-12}{\mathbf{32}} = \frac{24}{\mathbf{-64}}$

(iii) $\frac{-6}{.....} = \frac{3}{11} = \frac{.....}{-55}$

$\because$ 3 is multiplied by –2 to get – 6.

$\therefore$ 11 should be multiplied by – 2.

$\therefore \quad 11 \times -2 = -22$

$\because$ 11 is multiplied by – 5 to get – 55.

$\therefore$ 3 should be multiplied by – 5.

$\therefore \quad 3 \times -5 = -15$

$\therefore \quad \frac{-6}{\mathbf{-22}} = \frac{3}{11} = \frac{\mathbf{-15}}{-55}$

(iv) $\frac{3}{.....} = \frac{-6}{-4} = \frac{.....}{20}$

$\because$ – 6 is divided by – 2 to get 3.

$\therefore$ – 4 should be divided by – 2.

$\therefore \quad -4 \div -2 = 2$

$\because$ – 4 is multiplied by – 5 to get 20.

$\therefore$ – 6 should be multiplied by – 5.

$\therefore \quad -6 \times -5 = 30$

$\therefore \quad \frac{3}{\mathbf{2}} = \frac{-6}{-4} = \frac{\mathbf{30}}{20}$

9. (i) $-\frac{3}{2} = \frac{A}{4}$

$-3 \times 4 = 2 \times A$

by cross multiplication

$-\frac{3 \times 4}{2} = A$

$-6 = A$

(ii) $\frac{3}{5} = \frac{A}{-25}$

$3 \times -25 = 5 \times A$

by cross multiplicatioin

$\frac{-3 \times 25}{5} = A$

$-3 \times 5 = A$

$-15 = A$

(iii) $\frac{13}{6} = \frac{65}{A}$

$13 \times A = 65 \times 6$

by cross multiplication

$A = \frac{\overset{5}{\cancel{65}} \times 6}{\cancel{13}}$

$x = 30$

(iv) $\frac{12}{A} = -3$

$12 = -3 \times A$

by cross multiplication

$\frac{12}{-3} = A$

$-4 = A$

(v) $-\frac{48}{x} = 2$

$-\frac{48}{2} = x$ by cross multiplication

$-24 = x$

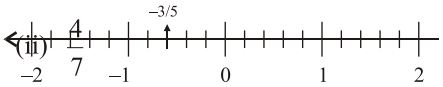
10. (i) $\frac{-2}{3}, \frac{-4}{6}, \frac{-6}{9}, \frac{-8}{12}, \frac{-10}{\mathbf{15}}, \_\_\_\_ \frac{-12}{\mathbf{18}}$

(ii) $\frac{5}{7}, \frac{10}{14}, \frac{15}{21}, \frac{20}{28}, \frac{25}{\mathbf{35}}, \_\_\_\_ \frac{30}{\mathbf{42}}$

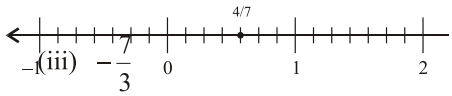
Exercise-4.2

1. (i) $-\frac{3}{5}$

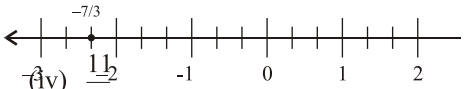
(ii) $\frac{4}{7}$



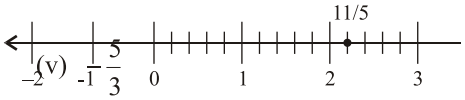
(iii) $-\frac{7}{3}$



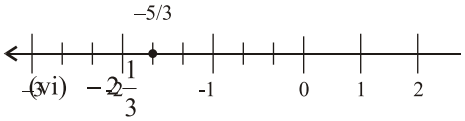
(iv) $\frac{11}{5}$



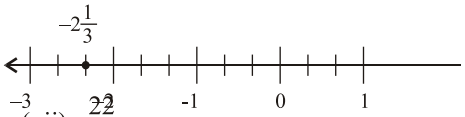
(v) $\frac{5}{3}$



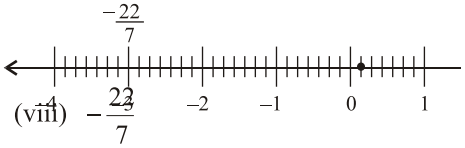
(vi) $-2\frac{1}{3}$



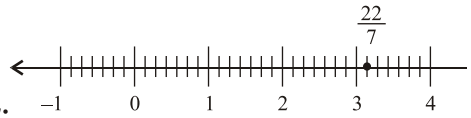
(vii) $\frac{22}{7}$

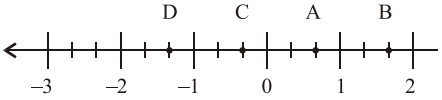


(viii) $-\frac{22}{7}$



2.





$A = \frac{2}{3}, B = \frac{5}{3}, C = \frac{-1}{3}, D = \frac{-4}{3}$

3. (i) $\frac{2}{5}, \frac{7}{10}, \frac{8}{15}, \frac{13}{30}$

LCM of 5, 10, 15,30 = 30

$\therefore \quad \frac{2\times 6, 7\times 3, 8\times 2, 13\times 1}{30}$

$= \frac{12, 21, 16, 13}{30}$

$\because \quad \frac{2}{5} < \frac{13}{30} < \frac{8}{15} < \frac{7}{10}$

(ii) $-\frac{3}{4}, \frac{5}{-12}, \frac{-7}{16}, \frac{9}{-24}$

or $-\frac{3}{4}, -\frac{5}{12}, -\frac{7}{16}, -\frac{9}{24}$

LCM of 4, 12, 16 and 24 is 48.

$\therefore \quad \frac{-3\times 12, -5\times 4, -7\times 3, -9\times 2}{48}$

$\frac{-36, -20, -21, -18}{48}$

$\therefore \quad -\frac{3}{4} < -\frac{7}{16}, \frac{5}{-12} < \frac{9}{-24}$

$[\because -36 < -21 < -20 < -18]$

(iii) $-\frac{3}{10}, \frac{7}{-15}, \frac{-11}{20}, \frac{17}{-30}$

or $-\frac{3}{10}, -\frac{7}{15}, -\frac{11}{20}, -\frac{17}{30}$

LCM of 10, 15, 20, 30 is 60.

$\therefore \quad \frac{-3\times 6, -7\times 4, -11\times 3, -17\times 2}{60}$

$\frac{-18, -28, -33, -34}{60}$

$\frac{17}{-30} < -\frac{11}{20} < \frac{7}{-15} < -\frac{3}{10}$

$[\because -34 < -33 < -28 < -18]$

(iv) $\frac{2}{3}, \frac{3}{4}, \frac{5}{-6}, -\frac{7}{12}$ or $\frac{2}{3}, \frac{3}{4}, \frac{-5}{6}, \frac{-7}{12}$

LCM of 3, 4, 6 and 12 is 12.

$= \frac{2\times 4, 3\times 3, -5\times 2, -12\times 1}{12}$

$= \frac{8, 9, -10, -12}{10}$

$\frac{5}{-6} < -\frac{7}{12} < \frac{2}{3} < \frac{3}{4}$

4. (i) $-\frac{2}{5}, \frac{7}{-10}, \frac{-11}{15}, \frac{19}{-30}$

$-\frac{2}{5}, -\frac{7}{10}, -\frac{11}{15}, -\frac{19}{30}$

LCM of 5, 10, 15, 30 is 30.

$\frac{-2\times 6, -7\times 3, -11\times 2, -19\times 1}{30}$

$\frac{-12, -21, -22, -19}{30}$

Descending order is

$-\frac{2}{5} > \frac{19}{-13} > \frac{7}{-10} > -\frac{11}{15}$

$[\because -12 > -19 > -21 > -22]$

(ii) $-2, -\frac{13}{6}, \frac{8}{-3}, \frac{1}{3}$

$-\frac{2}{1}, -\frac{13}{6}, \frac{-8}{3}, \frac{1}{3}$

LCM of 1, 6, 3 is 6.

$\frac{-2\times 6, -13\times 1, -8\times 2, 1\times 2}{6}$

$\frac{-12, -13, -16, 2}{6}$

Descending order is

$\frac{1}{3} > -2 > -\frac{13}{6} > \frac{8}{-3}$

$[\because 2 > -12 > -13 > -16]$

(iii) $-\frac{4}{9}, \frac{5}{-12}, -\frac{7}{18}, \frac{2}{-3}$

$-\frac{4}{9}, -\frac{5}{12}, -\frac{7}{18}, -\frac{2}{3}$

LCM of 9, 12, 18 and 3 is 36.

$\frac{-4\times 4, -5\times 3, -7\times 2, -2\times 12}{36}$

$\frac{-16, -15, -14, -24}{36}$

Descending order is

$-\frac{7}{18} > \frac{5}{-12} > -\frac{4}{9} > \frac{2}{-3}$

$[\because -14 > -15 > -16 > -24]$

(iv) $\frac{17}{-30}, \frac{11}{-15}, -\frac{7}{10}, \frac{3}{5}$

$-\frac{17}{30}, -\frac{11}{15}, -\frac{7}{10}, \frac{3}{5}$

LCM of 30, 15,10, 5 is 30.

$\frac{-17\times 1, -11\times 2, -7\times 3, 3\times 6}{30}$

$\frac{-17, -22, -21, 18}{30}$

Descending order is

$\frac{3}{5} > \frac{17}{-30} > -\frac{7}{10} > \frac{11}{-15}$

$[\because 18 > -17 > -21 > -22]$

5. (i) $-\frac{3}{7}, \frac{3}{7}$

$\frac{3}{7} > -\frac{3}{7}$

$\because$ Positive rational number > than negative rational number

(ii) $-\frac{11}{15} < 0$

$\because$ zero is greater than negative rational number.

(iii) $-\frac{4}{9}, -\frac{7}{9}$

$\therefore \quad -\frac{4}{9} > -\frac{7}{9} \qquad (\because -4 > -7)$

(iv) $\frac{3}{-8}, -\frac{8}{12}$

$-\frac{3}{8}, -\frac{8}{12}$

LCM of $8, 12 = 24$

$\frac{-3\times 3, -8\times 2}{24}$

$= \frac{-9, -16}{24}$

$\therefore \quad -\frac{3}{8} > -\frac{8}{12} \qquad (\because -9 > -16)$

(v) $\frac{-6}{-11}, -\frac{6}{11}$

$\frac{6}{11}, \frac{-6}{11}$

$\frac{6}{11} > -\frac{6}{11} \qquad (\because 6 > -6)$

6. (i) $\frac{-2}{-3}, \frac{5}{11}$

$\frac{2}{3}, \frac{5}{11}$

LCM of 3 and 11 is 33.

$\therefore \quad \frac{-2}{-3} > \frac{5}{11} \quad (\because \ 22 > 15)$

(ii) $-\frac{7}{12}, -\frac{5}{9}$

$-7 \times 9, \ -5 \times 12$ cross multiply

$-63, -60$

$\therefore \quad -\frac{7}{12} < -\frac{5}{9} \quad \because \ -63 < -60$

(iii) $-\frac{13}{5}, -3$

$-13 \times 1, -3 \times 5$ cross multiply

$-13, -15$

$\therefore \quad -\frac{13}{5} > -3 \quad \because \ -13 > -15$

(iv) $-\frac{5}{6}, -\frac{4}{5}$

$-5 \times 5, -4 \times 6$ cross multiply

$-25, -24$

$-\frac{5}{6} < -\frac{4}{5} \quad \because \ -25 < -24$

7. (i) False (ii) True (iii) False (iv) True

8. (i) $\frac{4}{5} > \frac{2}{5}$

$\because \ 4 \times 5, \ 2 \times 5$

$20 > 10$

(ii) $\frac{-3}{-7} < \frac{5}{8}$

$\because \ 3 \times 8, 5 \times 5$

$24 < 25$

(iii) $-\frac{2}{3} < \frac{8}{12}$

$\because$ Positive > Negative

(iv) $-\frac{3}{4} > -\frac{5}{6}$

$\because \ -3 \times 6, \ -5 \times 4$

$-18 > -20$

(v) $-\frac{3}{7} > \frac{6}{-13}$

$\because \ -3 \times 13, -6 \times 7$

$-39 > -42$

(vi) $-2 > -\frac{13}{5}$

$\because \ -2 \times 5, -13 \times 1$

$-10 > -13$

(vii) $-\frac{2}{3} < \frac{5}{8}$

$\because \ -2 \times 8, -5 \times 3$

$16 < 15$

(viii) $0 < \frac{-3}{-5}$

Positive rational number is greater than zero

(ix) $-\frac{8}{9} > -\frac{9}{10}$

$\because \ -8 \times 10, -9 \times 9$ (cross multiply)

$-80 > -81$

Exercise-4.3

1. (i) $\frac{3}{9} + \frac{4}{9}$

$= \frac{3+4}{9} = \frac{7}{9}$

(ii) $-\frac{4}{5} + \frac{-3}{5}$

$= \frac{-4+(-3)}{5} = -\frac{7}{5}$

(iii) $\frac{4}{7} + \left(-\frac{8}{7}\right)$

$= \frac{4-8}{7} = -\frac{4}{7}$

(iv) $\frac{10}{13} + \frac{-1}{13}$

$= \frac{10-1}{13} = \frac{9}{13}$

(v) $-\frac{19}{17} + \frac{1}{17}$

$= \frac{-19+1}{17} = -\frac{18}{17}$

(vi) $\frac{1}{15} + \frac{-17}{15}$

$= \frac{1-17}{15}$

$= -\frac{16}{15} = -\frac{8}{9}$

2. (i) $-\frac{2}{5} + \frac{7}{4}$

$= \frac{-2 \times 4 + 7 \times 5}{20}$

$= \frac{-8+35}{20}$

$= \frac{27}{20} = 1\frac{7}{20}$

(ii) $\frac{5}{8}+\frac{-3}{4}$

$=\frac{5\times 1+-3\times 2}{8}$

$=\frac{5-6}{8}=-\frac{1}{8}$

(iii) $-\frac{5}{33}+0$

$=-\frac{5}{33}$

(iv) $-\frac{5}{18}+\left(-\frac{18}{5}\right)$

$=\frac{-5\times 5-18\times 18}{90}$

$=\frac{-25-324}{80}=-\frac{349}{80}$

(v) $\frac{4}{9}+\frac{9}{4}$

$=\frac{4\times 4+9\times 9}{36}$

$=\frac{16+81}{36}=\frac{97}{36}$

(vi) $-\frac{4}{5}+\frac{5}{4}$

$=\frac{-4\times 4+5\times 5}{20}$

$=\frac{-16+25}{20}=\frac{9}{20}$

3. (i) $\frac{1}{9}+\frac{-5}{6}+\frac{-2}{3}$

$=\frac{1\times 2-5\times 3-2\times 6}{18}$

$=\frac{2-15-12}{18}$

$=\frac{2-27}{18}$

$=\frac{-25}{18}$

(ii) $-\frac{4}{5}+\frac{13}{10}+\left(-\frac{7}{15}\right)$

$=-\frac{4}{5}+\frac{13}{10}-\frac{7}{15}$

$=\frac{-4\times 6+13\times 3-7\times 2}{30}$

$=\frac{-24+39-14}{30}$

$=\frac{-38+39}{30}=\frac{1}{30}$

(iii) $-\frac{3}{4}+\frac{2}{5}+\frac{1}{20}$

$=\frac{-3\times 5+2\times 4+1\times 1}{20}$

$=\frac{-15+8+1}{20}$

$=\frac{-15+9}{20}$

$=-\frac{6}{20}$ or $\frac{-3}{10}$

(iv) $\frac{3}{5}+\frac{-8}{5}+\frac{1}{10}$

$=\frac{3\times 2-8\times 2+1\times 1}{10}$

$=\frac{6-16+1}{10}$

$=\frac{7-16}{10}=\frac{-9}{10}$

(v) $-\frac{2}{5}+\frac{5}{7}+\frac{-4}{35}$

$=\frac{-2\times 7+5\times 5-4\times 1}{35}$

$=\frac{-14+25-4}{35}$

$=\frac{25-18}{35}$

$=\frac{7}{35}=\frac{1}{5}$

(vi) $\frac{4}{9}+\frac{7}{8}+\frac{-5}{9}$

$=\frac{4\times 8+7\times 9-5\times 8}{72}$

$=\frac{32+63-40}{72}$

$=\frac{95-40}{72}$

$=\frac{55}{72}$

4. (i) Additive inverse of $\frac{1}{2}=-\frac{1}{2}$

(ii) " " $-\frac{3}{2}=\frac{3}{2}$

(iii) " " $0=0$

(iv) " " $\frac{13}{-17}=\frac{13}{17}$

5. (i) We to find

$$=-2-\left(-\frac{3}{8}\right)$$
$$=-2+\frac{3}{8}$$
$$=\frac{-2\times 8+3\times 1}{8}$$
$$=\frac{-16+3}{8}=-\frac{13}{8}$$

(ii) We have to find

$$=2-\left(-\frac{15}{7}\right)$$
$$=2+\frac{15}{7}$$
$$=\frac{2\times 7+15\times 1}{7}$$
$$=\frac{14+15}{7}=\frac{29}{7}$$

(iii) We have to find,

$$=0-\left(-\frac{8}{17}\right)$$
$$=\frac{8}{17}$$

(iv) We have to find

$$=-\frac{3}{5}-(-5)$$
$$=-\frac{3}{5}+5$$
$$=\frac{-3+5\times 5}{5}$$
$$=\frac{-3+25}{5}=\frac{22}{5}$$

(v) We have to find,

$$=\frac{7}{8}-\left(-\frac{5}{8}\right)$$
$$=\frac{7}{8}+\frac{5}{8}$$
$$=\frac{7+5}{8}$$
$$=\frac{12}{8}=\frac{3}{2}$$

(vi) We have to find

$$=-\frac{3}{5}-\left(-\frac{24}{15}\right)$$
$$=-\frac{3}{5}+\frac{24}{15}$$
$$=\frac{-3\times 3+24\times 1}{15}$$
$$=\frac{-9+24}{15}=\frac{15}{15}=1$$

(vii) We have to find,

$$=-\frac{3}{7}-\left(-\frac{5}{8}\right)$$
$$=-\frac{3}{7}+\frac{5}{8}$$
$$=\frac{-3\times 8+5\times 7}{56}$$
$$=\frac{-24+35}{56}=\frac{11}{56}$$

(viii) We have to find

$$=\frac{-1}{3}-\frac{1}{2}$$
$$=\frac{-3-4}{8}$$
$$=\frac{-7}{8}$$

(ix) We have to find

$$=-\frac{7}{22}-\left(-\frac{9}{11}\right)$$
$$=-\frac{7}{22}+\frac{9}{11}$$
$$=\frac{-7\times 1+9\times 2}{22}$$
$$=\frac{-7+18}{22}$$
$$=\frac{11}{22}=\frac{1}{2}$$

6. (i) $\frac{3}{4}-\left(\frac{1}{2}-\frac{1}{3}\right)$

$$=\frac{3}{4}-\left(\frac{3-2}{6}\right)$$
$$=\frac{3}{4}-\frac{1}{6}$$

$$= \frac{3\times 3 - 1\times 2}{12}$$

$$= \frac{9-2}{12} = \frac{7}{12}$$

(ii) $\left(\frac{3}{4} - \frac{1}{2}\right) - \frac{1}{3}$

$$= \left(\frac{3\times 1 - 1\times 2}{4}\right) - \frac{1}{3}$$

$$= \frac{3-2}{4} - \frac{1}{3}$$

$$= \frac{1}{4} - \frac{1}{3}$$

$$= \frac{3-4}{12} = \frac{-1}{2}$$

No, $\frac{3}{4} - \left(\frac{1}{2} - \frac{1}{3}\right) \neq \left(\frac{3}{4} - \frac{1}{2}\right) - \frac{1}{3}$

7. (i) $\frac{5}{9} - \frac{11}{13}$

$$= \frac{5\times 13 - 11\times 9}{117}$$

$$= \frac{65-99}{117} = \frac{-34}{117}$$

(ii) $\frac{11}{13} - \frac{5}{9}$

$$= \frac{11\times 9 - 5\times 13}{117}$$

$$= \frac{99-65}{117}$$

$$= \frac{34}{117}$$

No, $\frac{5}{9} - \frac{11}{13} \neq \frac{11}{13} - \frac{5}{9}$

8. Let A should be added

$\therefore \quad \left(\frac{-13}{4} + \frac{-3}{8}\right) + A = 1$

$$\left(\frac{-26-3}{8}\right) + A = 1$$

$$-\frac{29}{8} + A = 1$$

$$A = 1 + \frac{29}{8}$$

$$A = \frac{8+29}{8}$$

$$A = \frac{37}{8}$$

$\therefore \frac{37}{8}$ should be added to $\left[\frac{-13}{4} + \left(\frac{-3}{8}\right)\right]$ to get 1.

9. We have to do

$$\left[\frac{33}{8} + \frac{-19}{4}\right] - \left[\frac{-36}{11} + \frac{49}{22}\right]$$

$$= \left[\frac{33\times 1 - 19\times 2}{8}\right] - \left[\frac{-36\times 2 + 49\times 1}{22}\right]$$

$$= \left(\frac{33-38}{8}\right) - \left(\frac{-72+79}{22}\right)$$

$$= \frac{-5}{8} - \left(\frac{-23}{22}\right) = \frac{-5}{8} + \frac{23}{22}$$

$$= \frac{-5\times 11 + 23\times 4}{88}$$

$$= \frac{-55+92}{88}$$

$$= \frac{37}{88}$$

10. Let A should be subtracted

$$-\frac{3}{4} - A = \frac{5}{6}$$

$$\frac{-3}{4} - \frac{5}{6} = A$$

$$\frac{-3\times 3 - 5\times 2}{12} = A$$

$$\frac{-9-10}{12} = A$$

$$\frac{-19}{12} = A$$

11. Let A should be added

$$\frac{-7}{9} + A = 3$$

$$\therefore \quad A = 3 + \frac{7}{9}$$

$$A = \frac{3\times 9 + 7\times 1}{9}$$

$$A = \frac{27+7}{9}$$

$$A = \frac{34}{9}$$

$\therefore \quad \frac{34}{9}$ should be added to $\frac{-7}{9}$ to get 3.

12. A butterfly flies to north $= 2\frac{3}{4}$ km or $\frac{11}{4}$ km

A butterfly flies to south $= 1\frac{2}{3}$ km or $\frac{5}{3}$ km

Distance point of $P = 2\frac{3}{4} - 1\frac{2}{3}$

$$= \frac{11}{4} - \frac{5}{3}$$

$$= \frac{33-20}{12} = \frac{13}{12} \text{ or } 1\frac{1}{12}.$$

Exercise-4.4

1. (i) $\frac{11}{\cancel{10}_{5}} \times \frac{\cancel{22}^{11}}{4}$

$$= \frac{11 \times 11}{5 \times 4}$$

$$= \frac{121}{20}$$

$$= 6\frac{1}{20}$$

(ii) $\frac{8}{\cancel{9}_{3}} \times \cancel{12}^{4}$

$$= \frac{8 \times 4}{3}$$

$$= \frac{32}{3} = 10\frac{2}{3}$$

(iii) $\frac{\cancel{2}^{1}}{\cancel{15}_{3}} \times \frac{\cancel{5}^{1}}{\cancel{8}_{4}}$

$$= \frac{1 \times 1}{3 \times 4}$$

$$= \frac{1}{12}$$

(iv) $\frac{-10}{\cancel{11}} \times \frac{\cancel{11}}{-4}$

$$= \frac{\cancel{10}^{5} \times 1}{1 \times \cancel{4}_{2}}$$

$$= \frac{5}{2} = 2\frac{1}{2}$$

(v) $\frac{-7}{\cancel{30}_{5}} \times \frac{\cancel{6}^{1}}{-11}$

$$= \frac{7}{5 \times 11}$$

$$= \frac{7}{55}$$

(vi) $-\cancel{45}^{3} \times \frac{-7}{\cancel{15}}$

$$= -3 \times -7$$

$$= 21$$

(vii) $\frac{\cancel{7}}{-15} \times \frac{-5}{\cancel{28}_{4}}$

$$= \frac{1 \times \cancel{5}}{\cancel{15}_{3} \times 4}$$

$$= \frac{1}{12}$$

(viii) $\frac{-11}{5} \times \frac{-15}{22}$

$$= \frac{\cancel{11}}{\cancel{5}} \times \frac{\cancel{15}^{3}}{\cancel{22}_{2}}$$

$$= \frac{3}{2}$$

(ix) $-16 \times \frac{-5}{48}$

$$= \cancel{16} \times \frac{5}{\cancel{48}_{3}}$$

$$= \frac{5}{3}$$

2. (i) We have to find,

$\frac{6}{7} \div \frac{-3}{14}$

$$= \frac{6}{\cancel{7}} \times \frac{\cancel{14}^{2}}{-3}$$

$$= \frac{-\cancel{6}^{2} \times 2}{\cancel{3}}$$

$$= -2 \times 2 = -4$$

(ii) We have to find,

$\frac{-4}{5} \div \frac{-2}{5}$

$$= -\frac{4}{5} \times \frac{5}{-2}$$

$$= \frac{4}{2} = 2$$

(iii) We have to find,

$$\frac{-8}{9} \div \frac{3}{-4}$$

$$= \frac{-8}{9} \times \frac{-4}{3}$$

$$= \frac{32}{27}$$

$$= 1\frac{5}{27}$$

3. (i) We have to find,

$$= -\frac{4}{7} \times \frac{2}{3}$$

$$= -\frac{8}{21}$$

(ii) We have to find,

$$= -\frac{2}{\cancel{5}} \times \frac{\overset{12}{\cancel{60}}}{17}$$

$$= -\frac{2 \times 12}{17}$$

$$= -\frac{24}{17} = -1\frac{7}{17}$$

(iii) We have to find,

$$= \frac{5}{\underset{9}{\cancel{18}}} \times (-\overset{4}{\cancel{8}})$$

$$= \frac{5}{9} \times -4$$

$$= -\frac{20}{9} = -2\frac{2}{9}$$

(iv) We have to find,

$$= \frac{7}{\underset{2}{\cancel{24}}} \times (-\overset{3}{\cancel{36}})$$

$$= \frac{7}{2} \times -3$$

$$= -\frac{21}{2} = -10\frac{1}{2}$$

(v) We have to find,

$$= \frac{\overset{8}{\cancel{-16}}}{\underset{37}{\cancel{74}}} \times 17$$

$$= \frac{-8 \times 17}{37}$$

$$= -\frac{136}{37} = -3\frac{25}{37}$$

(vi) We have to find,

$$= \frac{-\cancel{7}}{5} \times \frac{\overset{3}{\cancel{15}}}{\underset{4}{\cancel{28}}}$$

$$= \frac{-1 \times 3}{1 \times 4} = \frac{-3}{4}$$

(vii) We have to find,

$$= (-\underset{1}{\cancel{17}}) \times \frac{15}{\underset{3}{\cancel{51}}}$$

$$= -\frac{15}{3}$$

$$= -5$$

(viii) We have to find,

$$= \frac{5}{7} \times \frac{-3}{8}$$

$$= \frac{-15}{56}$$

(ix) We have to find,

$$= \frac{5}{\underset{3}{\cancel{18}}} \times (-\cancel{6})^2$$

$$= \frac{5 \times -1}{3} = \frac{-5}{3}$$

$$= -1\frac{2}{3}$$

(x) We have to find,

$$\frac{-5}{16} \times \frac{8}{15}$$

$$= \frac{-\cancel{5} \times 1}{2 \times \underset{3}{\cancel{15}}}$$

$$= \frac{-1}{6}$$

(xi) We have to find,

$$-\frac{\cancel{5}}{16} \times \frac{3}{\underset{4}{\cancel{20}}}$$

$$= -\frac{1 \times 3}{16 \times 4} = -\frac{3}{64}$$

(xii) We have to find,

$$= \frac{6}{\cancel{13}} \times \frac{-\cancel{26}^{\,2}}{40} = \frac{\cancel{6}^{\,3} \times -2}{1 \times \cancel{40}_{\,20}}$$

$$= \frac{-6}{20} = \frac{-3}{10}$$

4. (i) Reciprocal of $-\frac{3}{2} = \frac{2}{-3}$

(ii) Reciprocal of $-\frac{4}{5} = \frac{5}{-4}$

(iii) Reciprocal of $-1 = \frac{1}{-1}$

(iv) Reciprocal of $\frac{1}{10} = 10$

(v) Reciprocal of $\frac{5}{-6} = \frac{-6}{5}$

(vi) Reciprocal of $1 = 1$

5. (i) We have,

$$\left(\frac{-16}{7} \times \frac{3}{9}\right) + \frac{1}{2}$$

$$= \frac{-16}{21} + \frac{1}{2}$$

$$= \frac{-16 \times 2 + 21}{42} = \frac{-32 + 21}{42}$$

$$= \frac{-11}{42}$$

(ii) We have,

$$\left(\frac{15}{8} \times \frac{2}{5}\right) + \left[\frac{3}{5} \times \left(\frac{-10}{9}\right)\right]$$

$$= \left(\frac{\cancel{15}^{\,3}}{\cancel{8}_{\,4}} \times \frac{\cancel{2}}{\cancel{5}}\right) + \left[\frac{\cancel{3}^{\,1}}{\cancel{5}_{\,1}} \times \left(\frac{-\cancel{10}^{\,2}}{\cancel{9}_{\,3}}\right)\right]$$

$$= \frac{3}{4} + \left[\frac{1 \times -2}{1 \times 3}\right] = \frac{3}{4} - \frac{2}{3}$$

$$= \frac{3 \times 3 - 2 \times 4}{12}$$

$$= \frac{9 - 8}{12} = \frac{1}{12}$$

(iii) We have,

$$\left(\frac{-16}{5} \times \frac{20}{8}\right) + \left(\frac{15}{5} \times \frac{-35}{3}\right)$$

$$= \left(\frac{-\cancel{16}^{\,2}}{\cancel{5}} \times \frac{\cancel{20}^{\,4}}{\cancel{8}}\right) + \left(\frac{\cancel{15}^{\,5}}{\cancel{5}} \times \frac{-\cancel{35}^{\,7}}{\cancel{3}}\right)$$

$$= \left(\frac{-2 \times 4}{1 \times 1}\right) + \left(\frac{-5 \times -7}{1 \times 1}\right)$$

$$= -8 + (+35)$$

$$= -8 + 35 = 27$$

(iv) We have,

$$\left(\frac{-1}{2} \times \frac{1}{2}\right) + \left(\frac{3}{2} \times \frac{-3}{2}\right)$$

$$= -\frac{1}{4} + \left(\frac{-9}{4}\right)$$

$$= \frac{-1 - 9}{4} = \frac{-10}{4}$$

$$= \frac{-5}{2} = -2\frac{1}{2}$$

(v) We have,

$$\left(\frac{-3}{2} \times \frac{4}{5}\right) + \left(\frac{9}{5} \times \frac{-10}{3}\right) - \left(\frac{1}{2} \times \frac{3}{4}\right)$$

$$= \left(\frac{-3}{\cancel{2}} \times \frac{\cancel{4}^{\,2}}{5}\right) + \left(\frac{\cancel{9}^{\,3}}{5} \times \frac{-\cancel{10}^{\,2}}{\cancel{3}}\right) - \left(\frac{1}{2} \times \frac{3}{4}\right)$$

$$= \left(\frac{-3 \times 2}{1 \times 5}\right) + \left(\frac{3 \times -2}{1 \times 1}\right) - \left(\frac{3}{8}\right)$$

$$= -\frac{6}{5} - \frac{6}{1} - \frac{3}{8}$$

$$= \frac{-6 \times 8 - 6 \times 40 - 3 \times 5}{40}$$

$$= \frac{-48 - 240 - 15}{40}$$

$$= \frac{-303}{40} = -7\frac{23}{40}$$

(vi) We have,

$$\left(\frac{25}{8} \times \frac{2}{5}\right) - \left(\frac{3}{5} \times \frac{-10}{9}\right)$$

$$= \left(\frac{\cancel{25}^{\,5}}{\cancel{8}_{\,4}} \times \frac{\cancel{2}}{\cancel{5}}\right) - \left(\frac{\cancel{3}^{\,1}}{\cancel{5}_{\,1}} \times \frac{-\cancel{10}^{\,2}}{\cancel{9}_{\,3}}\right)$$

$$= \left(\frac{5 \times 1}{4 \times 1}\right) - \left(\frac{1 \times -2}{1 \times 3}\right)$$

$$= \frac{5}{4} + \frac{2}{3}$$
$$= \frac{5 \times 3 + 2 \times 4}{12}$$
$$= \frac{15 + 8}{12} = \frac{23}{12} = 1\frac{11}{12}$$

6. (i) We have,

$$\frac{-28}{27} \div \frac{-5}{9}$$
$$= \frac{-28}{\cancel{27}_{3}} \times \frac{\cancel{9}}{-5}$$
$$= \frac{-28}{-15}$$
$$= \frac{28}{15} = 1\frac{13}{15}$$

(ii) We have,

$$\left(\frac{-8}{35}\right) \div \frac{2}{3}$$
$$= \frac{\cancel{-8}^{4}}{35} \times \frac{3}{\cancel{2}_{1}}$$
$$= \frac{-4 \times 3}{35 \times 1} = \frac{-12}{35}$$

(iii) We have,

$$\frac{8}{9} \div \left(\frac{-5}{6}\right)$$
$$= \frac{8}{\cancel{9}_{3}} \times \frac{\cancel{6}^{2}}{-5}$$
$$= \frac{8 \times 2}{3 \times -5}$$
$$= -\frac{16}{15} = -1\frac{1}{15}$$

(iv) We have,

$$\frac{36}{5} \div \left(\frac{-9}{4}\right)$$
$$= \frac{\cancel{36}^{4}}{5} \times \frac{4}{-\cancel{9}}$$
$$= \frac{4 \times 4}{5 \times -1}$$
$$= -\frac{16}{5} = -3\frac{1}{5}$$

7. (i) $\frac{5}{19} \div \mathbf{-1} = \frac{-5}{19}$

(ii) $\frac{-17}{2} \div \frac{\mathbf{-17}}{\mathbf{2}} = 1$

(iii) $\frac{19}{4} \div \frac{\mathbf{-19}}{\mathbf{4}} = -1$

(iv) $\frac{\mathbf{-33}}{\mathbf{22}} \div -1 = \frac{33}{22}$

8. We have to find,

$$\left(\frac{65}{12} + \frac{8}{3}\right) \div \left(\frac{65}{12} - \frac{8}{3}\right)$$
$$= \left(\frac{65 \times 1 + 8 \times 4}{12}\right) \div \left(\frac{65 \times 1 - 8 \times 4}{12}\right)$$
$$= \left(\frac{65 + 32}{12}\right) \div \left(\frac{65 - 32}{12}\right)$$
$$= \frac{97}{12} \div \frac{33}{12} = \frac{97}{12} \times \frac{12}{33}$$
$$= \frac{97}{33} = 2\frac{31}{33}$$

9. We have to find,

$$\left(\frac{13}{5} + \frac{-12}{7}\right) \div \left(\frac{-31}{7} \times \frac{1}{-2}\right)$$
$$= \left(\frac{13 \times 7 - 12 \times 5}{35}\right) \div \left(\frac{31}{14}\right)$$
$$= \left(\frac{91 - 60}{35}\right) \times \frac{14}{31}$$
$$= \frac{\cancel{31}}{\cancel{35}_{5}} \times \frac{\cancel{14}^{2}}{\cancel{31}} = \frac{2}{5}$$

10. Let $-\frac{44}{9}$ is divided by A

$$\therefore \quad -\frac{44}{9} \div A = -\frac{11}{3}$$
$$-\frac{44}{9} \times \frac{1}{A} = \frac{-11}{3}$$
$$-\frac{\cancel{44}^{4}}{\cancel{9}_{3}} \times \frac{\cancel{3}}{-\cancel{11}} = A$$
$$\frac{4}{3} = A$$

$\therefore \quad -\frac{44}{9}$ should be divided by $\frac{4}{3}$ to get $-\frac{11}{3}$.

11. Let $-\frac{8}{15}$ should be multiplied by A.

$\therefore \quad \frac{-8}{15} \times A = 24$

$$A = \frac{\overset{3}{\cancel{24}} \times 15}{\underset{1}{\cancel{-8}}}$$

$$A = \frac{3 \times 15}{-1}$$

$$A = -45$$

$\therefore -\frac{8}{15}$ should be multiplied by -45 to get 24.

Exercise-4.5

1. (i) We have,

$\frac{3}{5}$

$$\begin{array}{r} 0.6 \\ 5\overline{)\,30} \\ -30 \\ \hline \times \end{array}$$

$\therefore \quad \frac{3}{5} = 0.6$

(ii) We have,

$\frac{5}{8}$

$$\begin{array}{r} 0.625 \\ 8\overline{)\,50} \\ -48 \\ \hline 20 \\ -16 \\ \hline 40 \\ -32 \\ \hline 80 \\ -80 \\ \hline \times \end{array}$$

$\therefore \quad \frac{5}{8} = 0.625$

(iii) We have, $\frac{5}{16}$

$$\begin{array}{r} 0.3125 \\ 16\overline{)\,50} \\ -48 \\ \hline 20 \\ -16 \\ \hline 40 \\ -32 \\ \hline 80 \\ -80 \\ \hline \times \end{array}$$

$\therefore \quad \frac{5}{16} = 0.3125$

(iv) We have, $\frac{19}{6}$

$$\begin{array}{r} 3.16..... \\ 6\overline{)\,19} \\ -18 \\ \hline 10 \\ -6 \\ \hline 40 \\ -36 \\ \hline 40 \end{array} .....$$

$\therefore \quad \frac{19}{6} = 3.1\bar{6}$

(v) We have, $\frac{8}{3}$

$$\begin{array}{r} 2.6... \\ 3\overline{)\,8} \\ -6 \\ \hline 20 \\ -18 \\ \hline 2 \end{array} .....$$

$\therefore \quad \frac{8}{3} = 2.\bar{6}$

(vi) We have, $\frac{22}{7}$

$$\begin{array}{r} 2.142857.... \\ 7\overline{)\,22} \\ -21 \\ \hline 10 \\ -7 \\ \hline 30 \\ -28 \\ \hline 20 \\ -14 \\ \hline 60 \\ -56 \\ \hline 40 \end{array} .....$$

$\therefore \quad \frac{22}{7} = 3.\overline{142857}$

(vii) We have, $\frac{3}{11}$

$$\begin{array}{r} 0.27.... \\ 11\overline{)\ 30} \\ -22 \\ \hline 80 \\ -77 \\ \hline 30 \end{array}$$

$\therefore \quad \frac{3}{11} = 0.\overline{27}$

(viii) We have, $\frac{5}{6}$

$$\begin{array}{r} 0.83... \\ 6\overline{)\ 50} \\ -48 \\ \hline 20 \\ -18 \\ \hline 2 \end{array}$$

$\therefore \quad \frac{5}{6} = 0.8\overline{3}$

(ix) We have, $\frac{10}{3}$

$$\begin{array}{r} 3.3.. \\ 3\overline{)\ 10} \\ -9 \\ \hline 10 \\ -9 \\ \hline 1 \end{array}$$

$\therefore \quad \frac{10}{3} = 3.\overline{3}$

(x) We have, $\frac{16}{7}$

$$\begin{array}{r} 2.\overline{285714} \\ 7\overline{)\ 16} \\ -14 \\ \hline 20 \\ -14 \\ \hline 60 \\ -56 \\ \hline 40 \\ -35 \\ \hline 59 \\ -49 \\ \hline 10 \\ -7 \\ \hline 30 \\ -28 \\ \hline 2\ .... \end{array}$$

$\therefore \quad \frac{16}{7} = 2.\overline{285714}.....$

2. (i) We have, $-\frac{2}{5}$

$$\begin{array}{r} 5\ )\ 20\ (\ 0.4 \\ 20 \\ \hline \times \\ \hline \end{array}$$

$\therefore \quad \frac{-2}{5} = -0.\overline{4}$

(ii) We have, $\frac{-11}{3}$

$$\begin{array}{r} 3.6.... \\ 3\overline{)\ 11} \\ -9 \\ \hline 20 \\ -18 \\ \hline 2 \end{array}$$

$\therefore \quad \frac{-11}{3} = -3.\overline{6}$

(iii) We have, $-\frac{17}{5}$

$$\begin{array}{r} 3.4 \\ 5\overline{)\ 17} \\ -15 \\ \hline 20 \\ -20 \\ \hline \times \\ \hline \end{array}$$

$\therefore \quad -\frac{5}{4} = -3.4$

(iv) We have, $-\frac{19}{6}$

$$\begin{array}{r} 3.16.... \\ 6\overline{)\ 19} \\ -\ 18 \\ \hline 10 \\ 6 \\ \hline 40 \\ 36 \\ \hline 4 \end{array}$$

$\therefore \quad -\frac{10}{6} = -3.1\overline{6}$

(v) We have $-\frac{13}{8}$

$$\therefore \quad 8\overline{)13}\ (1.625$$
$$\begin{array}{r} 18 \\ \hline 50 \\ 48 \\ \hline 20 \\ 16 \\ \hline 40 \\ 40 \\ \hline \times \end{array}$$

$\therefore \quad -\frac{13}{8} = -1.625$

(vi) We have, $-\frac{5}{4}$

$$\therefore \quad 4\overline{)5}\ (1.25$$
$$\begin{array}{r} -4 \\ \hline 10 \\ -8 \\ \hline 20 \\ -20 \\ \hline \times \end{array}$$

$\therefore \quad -\frac{5}{4} = -1.25$

(vii) We have, $-\frac{15}{2}$

$$2\overline{)15}\ (7.5$$
$$\begin{array}{r} -14 \\ \hline 10 \\ -10 \\ \hline \times \end{array}$$

$\therefore \quad -\frac{15}{5} = -7.5$

(viii) We have, $-\frac{16}{5}$

$$\therefore \quad 5\overline{)16}\ (3.2$$
$$\begin{array}{r} -15 \\ \hline 10 \\ -10 \\ \hline \times \end{array}$$

$\therefore \quad -\frac{16}{5} = -3.2$

(ix) We have, $-\frac{3}{7}$

$$7\overline{)30}\ (0.428571$$
$$\begin{array}{r} -28 \\ \hline 20 \\ -14 \\ \hline 60 \\ -56 \\ \hline 40 \\ -35 \\ \hline 50 \\ -49 \\ \hline 10 \\ -7 \\ \hline 3 \end{array}$$

$\therefore \quad -\frac{3}{7} = -0.\overline{428571}$

(x) We have, $-\frac{13}{6}$

$$6\overline{)13}\ (2.16$$
$$\begin{array}{r} -12 \\ \hline 10 \\ -6 \\ \hline 40 \\ -36 \\ \hline 40 \end{array}$$

$\therefore \quad -\frac{13}{6} = -2.1\bar{6}$

3. (i) We have, $\frac{361}{25}$

Making prime factors of denominator

$\therefore \quad \frac{361}{25} = \frac{361}{5 \times 5}$

$\therefore$ $\frac{361}{25}$ is terminating decimal because its denominator has prime factors only 5.

(ii) We have, $\frac{1000}{27}$

Making prime factors of denominator

$$\frac{1000}{27} = \frac{1000}{3 \times 3 \times 3}$$

$\therefore \frac{1000}{27}$ its non-terminating decimal because its denominator has prime factor other than 2 or 5.

(iii) We have, $\frac{37}{14}$

Making prime factor of denominator

$$\frac{37}{14} = \frac{37}{2 \times 7}$$

$\therefore \frac{37}{2 \times 7}$ is non-terminating decimal because its denominator has prime-factors other than 2 or 5.

(vi) $\frac{116}{75}$

Making prime factors of denominator

$$\frac{116}{75} = \frac{116}{3 \times 5 \times 5}$$

$\therefore \frac{116}{75}$ is non-terminating decimal because its denominator has prime factors other than 2 or 5.

(v) We have, $\frac{127}{32}$

Making prime factors of 32.

$$\frac{127}{32} = \frac{127}{2^5}$$

$\therefore \frac{127}{32}$ is terminating decimal because its denominator has prime factor only 2.

(vi) We have, $\frac{961}{625}$

Making prime factors of denominator

$$\frac{961}{625} = \frac{961}{5^4}$$

$\therefore \frac{961}{5^4}$ is terminating decimal because its denominator has prime factors only 5.

(vii) We have, $\frac{217}{143}$

Make prime factors of denominator

$$\frac{217}{143} = \frac{217}{13 \times 11}$$

$\therefore \frac{217}{143}$ is non-terminating decimal because its denominator has prime factors other than 2 or 5.

(viii) We have, $\frac{113}{90}$

Making prime factors of denominator

$$\frac{113}{90} = \frac{113}{5 \times 2 \times 3 \times 3}$$

$\therefore \frac{113}{90}$ is non-terminating decimal because its denominator has prime factor other than 2 or 5.

4. (i) We have, $\frac{29}{30}$

Making prime factors of denominator

$$\therefore \frac{29}{30} = \frac{29}{2 \times 3 \times 5}$$

$\therefore \frac{29}{30}$ is non-triminating decimal because its denominator has prime factor other than 2 or 5.

(ii) We have, $\frac{305}{108}$

Making prime factors of denominator

$$\frac{305}{2 \times 2 \times 3 \times 3 \times 3}$$

$\therefore \frac{305}{108}$ is non terminating decimal because its denominator has prime factors other than 2 or 5.

(iii) $\frac{27}{22}$

Making prime factors of denominator

$\therefore \frac{27}{2 \times 11}$ it is non-terminating decimal.

(iv) We have, $\frac{371}{256}$

Making prime factors of denominator

$$\frac{371}{2\times 2\times 2\times 2\times 2\times 2\times 2\times 2}$$

$\therefore$ $\frac{371}{256}$ is terminating decimal because its denominator has prime factors only 2.

(v) We have, $\frac{57}{625}$

Making prime factors of denominator

$$\frac{57}{625}=\frac{57}{5\times 5\times 5\times 5}$$

$\therefore$ $\frac{57}{625}$ is terminating decimal because its denominator has prime factors only 5.

(vi) We have, $\frac{613}{2000}$

Making prime factors of denominator

$$\frac{613}{2\times 2\times 2\times 2\times 5\times 5\times 5}$$

$\therefore$ $\frac{613}{2000}$ is terminating decimal because its denominator has prime factors only 2 and 5.

(vii) We have, $\frac{131}{36}$

Making prime factors of denominator

$$\frac{131}{36}=\frac{131}{2\times 2\times 3\times 3}$$

$\therefore$ $\frac{131}{36}$ is non-terminating because its denominator has factor other than 2 or 5.

(viii) We have, $\frac{103}{125}$

Making prime factors of denominator

$$\frac{103}{125}=\frac{103}{5\times 5\times 5}$$

$\therefore$ $\frac{103}{125}$ is terminating decimal because its denominator has prime factors only 5.

5. (i) False (ii) False (iii) False (iv) True

Exercise-4.6

1. Let other rational number be x

$\therefore$ $\frac{-4}{3}+x=-5$

$$x=-5+\frac{4}{3}$$

$$x=\frac{-5\times 3+4}{3}$$

$$x=\frac{-15+4}{3}$$

$\therefore$ $x=\frac{-11}{3}$

$\therefore$ other rational number is $\frac{-11}{3}$.

2. Let x should be added

$\therefore$ $-\frac{3}{8}+x=\frac{5}{12}$

$$x=\frac{5}{12}+\frac{3}{8}$$

$$x=\frac{5\times 2+3\times 3}{24}=\frac{10+9}{24}$$

$$x=\frac{19}{24}$$

$\therefore$ $\frac{29}{24}$ should added to $\frac{-3}{8}$ to get $\frac{5}{12}$.

3. Let x should be subtracted

$\therefore$ $-\frac{2}{3}-x=\frac{-5}{6}$

$$-\frac{2}{3}+\frac{5}{6}=x$$

$$\frac{-2\times 2+5\times 1}{6}=x$$

$$\frac{-4+5}{6}=x$$

$\Rightarrow$ $x=\frac{1}{6}$

$\therefore$ $\frac{1}{6}$ should be subtracted from $-\frac{2}{3}$ to get $\frac{5}{12}$.

4. Number of bags $=12$

Cost of 12 bags $=$ ₹ $205\frac{1}{2}$

$=$ ₹ $\frac{411}{2}$

Cost of 1 bag $= ₹\ \frac{411}{2} \div 12$

$= ₹\ \frac{411}{2} \times \frac{1}{12}$

$= ₹\ \frac{411}{24}$ or ₹ $\frac{137}{8}$

Cost of 1 bag is ₹ $\frac{137}{8}$ or ₹ $17\frac{1}{8}$.

5. Let other rational number $= x$

$\therefore \quad x \times -\frac{4}{3} = \frac{-16}{9}$

$\therefore \quad x = -\frac{16}{9} \div \left(-\frac{4}{3}\right)$

$= -\frac{16}{9} \times -\frac{3}{4} = \frac{\overset{4}{\cancel{16}} \times \cancel{3}}{\underset{3}{\cancel{9}} \times \cancel{4}}$

$x = \frac{4}{3} \quad \Rightarrow \quad x = 1\frac{1}{3}$

$\therefore$ other rational number is $1\frac{1}{3}$.

6. Let $\frac{-8}{5}$ should be multiplied by x

$\frac{-8}{5} \times x = \frac{-32}{35}$

$x = \frac{-32}{35} \div \frac{-8}{5}$

$= \frac{-32}{35} \times \frac{5}{-8} = \frac{4}{7}$

7. Product of two rational numbers $= 0$

One number $= \frac{7}{8}$

Other number $= x$

$x \times \frac{7}{8} = 0$

$x = \frac{7}{8} \div 0$

$x = 0$

Thus required number is 0.

8. Let x should be added

$\therefore \quad \left(\frac{2}{3} + \frac{3}{5}\right) + x = -\frac{12}{15}$

$\left(\frac{2 \times 5 + 3 \times 3}{15}\right) + x = -\frac{12}{15}$

$\left(\frac{10 + 9}{15}\right) + x = -\frac{12}{15}$

$\frac{19}{15} + x = -\frac{12}{15}$

$x = -\frac{12}{15} - \frac{19}{15}$

$x = \frac{-12 - 19}{15}$

$x = \frac{-31}{15}$ or $x = -2\frac{1}{5}$

$\therefore$ $-2\frac{1}{5}$ should be added to $\left(\frac{2}{3} + \frac{3}{5}\right)$ to get $-\frac{12}{15}$.

9. Let x should be added

$\therefore \quad \left(\frac{1}{2} + \frac{1}{3} + \frac{1}{5}\right) + x = 4$

$\left(\frac{15 + 10 + 6}{30}\right) + x = 4$

$\frac{31}{30} + x = 4$

$x = 4 - \frac{31}{30}$

$x = \frac{120 - 31}{30} = \frac{89}{30}$

or $\quad x = 2\frac{29}{30}$

$\therefore$ $2\frac{29}{30}$ should be added to $\left(\frac{1}{3} + \frac{1}{2} + \frac{1}{5}\right)$ to get 4.

10. Let x should be sbtracted

$\therefore \quad \left(\frac{3}{4} - \frac{2}{3}\right) - x = -\frac{1}{6}$

$\left(\frac{3 \times 3 - 2 \times 4}{12}\right) - x = -\frac{1}{6}$

$\left(\frac{9 - 8}{12}\right) - x = -\frac{1}{6}$

$\frac{1}{12} - x = -\frac{1}{6}$

$\frac{1}{12} + \frac{1}{6} = x$

$\frac{1 + 1 \times 2}{12} = x$

$\frac{1 + 2}{12} = x \quad \Rightarrow \quad \frac{3}{12} = x$

$\therefore \quad x = \frac{1}{4}$

$\therefore \frac{1}{4}$ should be subtracted from $\left(\frac{3}{4}-\frac{2}{3}\right)$ to get $-\frac{1}{6}$.

MCQs

1. (a) **2.** (b) **3.** (a) **4.** (c) **5.** (a) **6.** (b) **7.** (c) **8.** (a)

Mental Maths

1. We can multiply $\frac{1}{6}$ with 6.25 to get a whole. So, $6\frac{1}{4}$; $\frac{1}{6}$ will make a whole.

2. Yes, we change the mixed form of a number to improper fraction.

3. $\frac{1}{2}$ of 30 days $=\frac{1}{2}\times 30=15$ days

4. No, a proper fraction cannot be written as mixed numbers.

5. Capacity of bucket $=20\,\text{L}$

Milk in it $=\frac{3}{5}\times 20\,\text{L}=12\,\text{L}$

Thus, 12 L milk in the bucket.

5 Exponents

Exercise-5.1

1. (i) $37^2=37\times 37=1369$

(ii) $(-23)^2=-23\times -23=529$

(iii) $17^2=17\times 17=289$

(iv) $(-18)^2=-18\times -18=324$

2. (i) $7\times 7\times 7=\mathbf{(7)^3}$

(ii) $(-2)\times(-2)\times(-2)\times a\times a\times b$
$=\mathbf{(-2)^3\,a^2\,b}$

(iii) $(-3)\times(-3)\times b\times b\times b=\mathbf{(-3)^2\,b^3}$

(iv) $a\times a\times a\times a\times b\times b\times c\times c\times d$
$=\boldsymbol{a^4\,b^2\,c^2\,d}$

(v) $2\times 2\times 2\times b\times c\times c\times b=\mathbf{(2)^3\,c^2\,b}$

(vi) $(-3)\times(-3)\times(-3)\times p\times p\times q$
$=\mathbf{(-3)^3\,p^2\,q}$

(vii) $(-x)\times(-x)\times(-x)\times y\times y\times z$
$=\mathbf{(-x)^3\,y^2\,z}$

3. (i) $12^3=12\times 12\times 12=1728$

(ii) $(-15)^3=-15\times -15\times -15=-3375$

(iii) $(1000)^3=1000\times 1000\times 1000$
$=1000000000$

(iv) $(-11)^3=-11\times -11\times -11=-1331$

4.

	base	exponent
(i) 6^5	6	5
(ii) $(-3)^8$	-3	8
(iii) $(-1)^{15}$	-1	15
(iv) $(25)^5$	25	5
(v) 3^8	3	8
(vi) $(-24)^5$	-24	5

5. (i) $15^2=15\times 15=225$

(ii) $(50)^3=50\times 50\times 50=125000$

(iii) $(-7)^3=-7\times -7\times -7=-343$

(iv) $(-9)^3=-9\times -9\times -9=-729$

(v) $(-3)^7=-3\times -3\times -3\times -3\times -3$
$\times -3\times -3=-2187$

(vi) $(-1)^{63}=-1$ ($\because$ 63 is odd number)

(vii) $(-1)^{84}=1$ ($\because$ 84 is even number)

(viii) $1^{100}=1$

(ix) $(-41)^2=-41\times -41$
$=1681$

(x) $(100)^3=100\times 100\times 100$
$=1000000$

6. We have to prove

(i) $(-2)^4\times(-2)^3=(-2)^7$

LHS $=(-2\times -2\times -2\times -2)$
$\times(-2\times -2\times -2)$
$=(-2)^7$
$=$ RHS

$\therefore\ (-2)^4\times(-2)^3=(-2)^7$

(ii) $4^7\div 4^2=4^5$

LHS $=\frac{4^7}{4^2}$

$=\frac{4\times 4\times 4\times 4\times 4\times 4\times 4}{4\times 4}$

$= 4 \times 4 \times 4 \times 4 \times 4$

$= (4)^5 = \text{RHS}$

$\therefore \quad 4^7 \div 4^2 = 4^5$

(iii) We have to prove

$(-2)^3 \times (-2)^2 = (-2)^5$

$\text{LHS} = (-2)^3 \times (-2)^2$

$= (-2 \times -2 \times -2) \times (-2) \times (-2)$

$= -2 \times -2 \times -2 \times -2 \times -2$

$= (-2)^5 = \text{RHS}$

Hence proved

(iv) We have to prove

$(-3)^5 \div (-3)^3 = (-3)^2$

$\text{LHS} = \dfrac{(-3)^5}{(-3)^3}$

$= \dfrac{-3 \times -3 \times -3 \times -3 \times -3}{-3 \times -3 \times -3}$

$= -3 \times -3$

$= (-3)^2 = \text{RHS}$

Hence proved

7. (i) (-3) should be raised to power 3 to get -27.

(ii) (-2) should be raised to power 4 to get 16

8. (i) True (ii) False (iii) True (iv) True (v) True

9. (i) $2^3 \times 3^4$

$= (2 \times 2 \times 2) \times (3 \times 3 \times 3 \times 3)$

$= 8 \times 81 = 648$

$\therefore \quad 2^3 \times 3^4 = 648$

(ii) $(-3)^3 \times (-5)^2$

$= (-3 \times -3 \times -3) \times (-5 \times -5)$

$= -27 \times 25 = -675$

(iii) $(-12)^2 \times (-3)^3$

$= (-12 \times -12) \times (-3 \times -3 \times -3)$

$= 144 \times -27 = -3888$

(iv) $(-1)^{20} \times (-1)^{17} \times (-1)^{41}$

$= 1 \times -1 \times -1 = 1$

(v) $(-3)^5 \times (-2)^3$

$= (-3 \times -3 \times -3 \times -3 \times -3)$

$\times (-2 \times -2 \times -2)$

$= (-243) \times (-8)$

$= +1944$

(vi) $(-1)^{117} \times (-2)^6 \times (-3)^3$

$= -1 \times (-2 \times -2 \times -2 \times -2$

$\times -2 \times -2) \times (-3 \times -3 \times -3)$

$= -1 \times (64) \times (-27)$

$= 1728$

Exercise-5.2

1. (i) $\dfrac{3}{4} \times \dfrac{3}{4} \times \dfrac{3}{4} \times \dfrac{3}{4} = \left(\dfrac{3}{4}\right)^4$

(ii) $\left(-\dfrac{2}{7}\right) \times \left(-\dfrac{2}{7}\right) \times \left(-\dfrac{2}{7}\right)$

$\times \left(-\dfrac{2}{7}\right) \times \left(-\dfrac{2}{7}\right)$

$= \left(-\dfrac{2}{7}\right)^5$

(iii) $\left(-\dfrac{1}{9}\right) \times \left(-\dfrac{1}{9}\right) \times \left(-\dfrac{1}{9}\right) \times \left(-\dfrac{1}{9}\right)$

$= \left(-\dfrac{1}{9}\right)^4$

(iv) $\left(-\dfrac{13}{6}\right) \times \left(-\dfrac{13}{6}\right) \times \left(-\dfrac{13}{6}\right) \times \left(-\dfrac{13}{6}\right)$

$\times \left(-\dfrac{13}{6}\right) \times \left(-\dfrac{13}{6}\right) \times \left(-\dfrac{13}{6}\right) \times \left(-\dfrac{13}{6}\right)$

$= \left(-\dfrac{13}{6}\right)^8$

2. (i) $\left(\dfrac{6}{5}\right)^3 = \dfrac{6}{5} \times \dfrac{6}{5} \times \dfrac{6}{5}$

$= \dfrac{6 \times 6 \times 6}{5 \times 5 \times 5} = \dfrac{216}{125}$

(ii) $\left(-\dfrac{5}{7}\right)^3 = -\dfrac{5}{7} \times -\dfrac{5}{7} \times -\dfrac{5}{7}$

$= \dfrac{-5 \times -5 \times -5}{7 \times 7 \times 7}$

$= -\dfrac{125}{343}$

(iii) $\left(-\dfrac{7}{3}\right)^2 = -\dfrac{7}{3} \times -\dfrac{7}{3}$

$= \dfrac{-7 \times -7}{3 \times 3} = \dfrac{49}{9}$

(iv) $\left(-\dfrac{2}{3}\right)^4 = -\dfrac{2}{3} \times -\dfrac{2}{3} \times -\dfrac{2}{3} \times -\dfrac{2}{3}$

$= \dfrac{-2 \times -2 \times -2 \times -2}{3 \times 3 \times 3 \times 3} = \dfrac{16}{81}$

(v) $\left(\frac{2}{5}\right)^3 = \frac{2}{5}\times\frac{2}{5}\times\frac{2}{5}$

$= \frac{2\times 2\times 2}{5\times 5\times 5} = \frac{8}{125}$

(vi) $\left(-\frac{3}{5}\right)^5$

$= -\frac{3}{5}\times -\frac{3}{5}\times -\frac{3}{5}\times -\frac{3}{5}\times -\frac{3}{5}$

$= \frac{-3\times -3\times -3\times -3\times -3}{5\times 5\times 5\times 5\times 5}$

$= -\frac{243}{3125}$

3. (i) $\frac{49}{144} = \frac{7\times 7}{12\times 12} = \left(\frac{7}{12}\right)^2$

(ii) $-\frac{1}{216} = \frac{-1\times -1\times -1}{6\times 6\times 6} = \left(-\frac{1}{6}\right)^3$

(iii) $\frac{27}{125} = \frac{3\times 3\times 3}{5\times 5\times 5} = \left(\frac{3}{5}\right)^3$

(iv) $-\frac{64}{729} = \frac{-4\times -4\times -4}{9\times 9\times 9} = \left(-\frac{4}{9}\right)^3$

(v) $-\frac{8}{27} = \frac{-2\times -2\times -2}{3\times 3\times 3}\ \left(-\frac{2}{3}\right)^3$

(vi) $\frac{64}{125} = \frac{4\times 4\times 4}{5\times 5\times 5} = \left(\frac{4}{5}\right)^3$

4. (i) $\left(-\frac{2}{5}\right)^4 \times \frac{25}{16}$

$= \left(\frac{2}{5}\right)^4 \times \left(\frac{5}{4}\right)^2$

$= \frac{2\times 2\times 2\times 2}{5\times 5\times 5\times 5}\times\frac{5\times 5}{4\times 4} = \frac{1}{5\times 5}$

$\therefore\ \left(-\frac{2}{5}\right)^4 \times \left(\frac{25}{16}\right) = \left(\frac{1}{5}\right)^2$

(ii) $\left(\frac{2}{3}\right)^4 \times \left(-\frac{9}{8}\right)^2$

$= \frac{\cancel{2}\times\cancel{2}\times\cancel{2}\times\cancel{2}}{\cancel{3}\times\cancel{3}\times\cancel{3}\times\cancel{3}}\times\frac{\cancel{-9}\times\cancel{-9}}{\cancel{8}\times\cancel{8}_{4}}$

$= \frac{-1\times -1}{4} = \left(\frac{1}{2}\right)^2$

(iii) $\left(\frac{7}{8}\right)^2 \times \left(-\frac{64}{49}\right)^2$

$= \frac{\cancel{7}}{\cancel{8}}\times\frac{\cancel{7}}{\cancel{8}}\times -\frac{64}{\cancel{49}}\times -\frac{\cancel{64}}{49}$

$= \frac{64}{49} \quad = \left(\frac{8}{7}\right)^2$

5. (i) Reciprocal of $(-7)^5 = \left(\frac{1}{-7}\right)^5$

(ii) " " $5^6 = \left(\frac{1}{5}\right)^6$

(iii) " " $\left(\frac{3}{10}\right)^8 = \left(\frac{10}{3}\right)^8$

(iv) " " $\left(-\frac{5}{11}\right)^7 = \left(\frac{11}{-5}\right)^7$

(v) " " $\left(\frac{8}{-15}\right)^{10} = \left(-\frac{15}{8}\right)^{10}$

(vi) " " $\left(-\frac{6}{7}\right)^5 = \left(\frac{7}{-6}\right)^5$

(vii) " " $\left(-\frac{4}{5}\right)^{14} = \left(\frac{5}{-4}\right)^{14}$

(viii) " " $\left(-\frac{1}{4}\right)^4 = \left(\frac{4}{-1}\right)^4$

6. $x = -2,\ y = 3$ (given)

(i) $\left(\frac{x}{y}\right)^x = \left(\frac{-2}{3}\right)^{-2}$

$= \left(\frac{3}{-2}\right)^2$

$= \frac{3}{-2}\times\frac{3}{-2} = \frac{9}{4}$

(ii) $\left(\frac{y}{x}\right)^y = \left(\frac{3}{-2}\right)^3$

$= \frac{-2\times -2\times -2}{3\times 3\times 3} = -\frac{8}{27}$

(iii) $\left(\frac{x}{y}\right)^y = \left(-\frac{2}{3}\right)^3 = \frac{-2\times -2\times -2}{3\times 3\times 3}$

$= -\frac{8}{27}$

(iv) $\left(\frac{y}{x}\right)^x = \left(\frac{3}{-2}\right)^{-2} = \left(-\frac{2}{3}\right)^2$

$= \frac{-2\times -2}{3\times 3} = \frac{4}{9}$

7. (i) $\left(-\frac{5}{3}\right)^4 \times \left(-\frac{1}{2}\right)^3$

$= \left(-\frac{5}{3}\times -\frac{5}{3}\times -\frac{5}{3}\times -\frac{5}{3}\right)$

$\times \left(-\frac{1}{2}\times -\frac{1}{2}\times -\frac{1}{2}\right)$

$= \left(\frac{625}{81}\right)\times\left(-\frac{1}{8}\right)$

$\therefore \quad \left(-\frac{5}{3}\right)^4 \times \left(-\frac{1}{2}\right)^3 = -\frac{-625}{648}$

(ii) $\left(-\frac{2}{3}\right)^3 \times \left(\frac{4}{-3}\right)^2$

$= \left(-\frac{2}{3}\times -\frac{2}{3}\times -\frac{2}{3}\right)\times\left(\frac{4}{-3}\times\frac{4}{-3}\right)$

$= \left(-\frac{8}{27}\right)\times\left(\frac{16}{9}\right)$

$\therefore \quad \left(-\frac{2}{3}\right)^3 \times \left(\frac{4}{-3}\right)^2 = -\frac{128}{243}$

(iii) $\left[\left(\frac{1}{2}\right)^4 + \left(\frac{1}{2}\right)^3\right]\times 10^5$

$= \left[\frac{1}{2\times 2\times 2\times 2} + \frac{1}{2\times 2\times 2}\right]\times 10^5$

$= \left[\frac{1}{16} + \frac{1}{8}\right]\times 100000$

$= \left(\frac{1+2}{16}\right)\times 100000$

$= \frac{3}{16}\times \overset{6250}{\cancel{100000}}$

$= 3\times 6250$

$= 18750$

$\therefore \quad \left[\left(\frac{1}{2}\right)^4 + \left(\frac{1}{2}\right)^3\right]\times 10^5 = 18750$

(iv) $\left[\left(\frac{1}{3}\right)^3 - \left(\frac{1}{3}\right)^3\right]\times 12^3$

$= \left(\frac{1}{27} - \frac{1}{27}\right)\times 12^3$

$= 0\times 12^3 = 0$

(v) $\left[\left(\frac{3}{5}\right)^2 \times \left(\frac{15}{3}\right)^2\right] \div 3^2$

$= \left[\frac{3\times 3}{\cancel{5}\times\cancel{5}}\times\frac{\overset{3}{\cancel{15}}\times\overset{3}{\cancel{15}}}{3\times 3}\right]\times\frac{1}{3^2}$

$= \cancel{3}\times\cancel{3}\times\frac{1}{\cancel{3}\times\cancel{3}} = 1$

$\therefore \quad \left[\left(\frac{3}{5}\right)^2 \times \left(\frac{15}{3}\right)^2\right] \div 3^2 = 1$

(vi) $(4^3 - 5^2)\times\left(\frac{2}{3}\right)^3$

$= (4\times 4\times 4 - 5\times 5)\times\frac{2\times 2\times 2}{3\times 3\times 3}$

$= (64-25)\times\frac{8}{27}$

$= \overset{13}{\cancel{39}}\times\frac{8}{\underset{9}{\cancel{27}}} = \frac{104}{9}$

$\therefore \quad (4^3 - 5^2)\times\left(\frac{2}{5}\right)^3 = \frac{104}{9}$

8. We have to find

$= (-2)^5 \times \left(-\frac{1}{5}\right)^4$

$= -2\times -2\times -2\times -2\times -2\times -\frac{1}{5}$

$\times -\frac{1}{5}\times -\frac{1}{5}\times -\frac{1}{5}$

$= -\frac{32}{625}$

9. We have to find

$= \left(\frac{4}{5}\right)^2 \times \left(\frac{-3}{8}\right)^3$

$= \frac{\cancel{4}}{5}\times\frac{\cancel{4}}{5}\times\frac{-3\times -3\times -3}{\underset{2}{\cancel{8}}\times\underset{2}{\cancel{8}}\times 8}$

$= \frac{-27}{25\times 32} = -\frac{27}{800}$

10. We have to find,

$$=\left(\frac{7}{-8}\right)^2 \times \frac{5}{7}$$

$$=\frac{7\times 7}{-8\times -8}\times\frac{5}{7}=\frac{35}{64}$$

Exercise-5.3

1. (i) $\left(-\frac{2}{3}\right)^3 \times \left(-\frac{2}{3}\right)^2 = \left(\frac{-2}{3}\right)^{3+2}$

$$=\left(\frac{-2}{3}\right)^5$$

(ii) $\left(\frac{6}{13}\right)^5 \times \left(\frac{6}{13}\right)^4 = \left(\frac{6}{13}\right)^{5+4} = \left(\frac{6}{13}\right)^9$

(iii) $\left(-\frac{3}{5}\right)^2 \times \left(-\frac{3}{5}\right)^3$

$$=\left(-\frac{3}{5}\right)^{2+3} = \left(-\frac{3}{5}\right)^5$$

(iv) $\left(\frac{2}{7}\right)^3 \times \left(\frac{2}{7}\right)^8 \times \left(\frac{2}{7}\right)^{11}$

$$=\left(\frac{2}{7}\right)^{3+8+11} = \left(\frac{2}{7}\right)^{22}$$

(v) $\left(-\frac{1}{5}\right)^4 \times \left(-\frac{1}{5}\right)^3 \times \left(-\frac{1}{5}\right)^4$

$$=\left(-\frac{1}{5}\right)^{4+3+4} = \left(-\frac{1}{5}\right)^{11}$$

(vi) $\left(-\frac{5}{6}\right)^{16} \times \left(-\frac{5}{6}\right)^3 = \left(-\frac{5}{6}\right)^{16+3}$

$$=\left(-\frac{5}{6}\right)^{19}$$

(vii) $\left(\frac{5^2}{7^3}\right) \times \left(\frac{5^2}{7^3}\right)^2 = \left(\frac{5^2}{7^3}\right)^{1+2}$

$$=\left(\frac{5^2}{7^3}\right)^3 = \frac{5^6}{7^9}$$

2. (i) $\left(\frac{4}{3}\right)^7 \div \left(\frac{4}{3}\right)^3 = \left(\frac{7}{3}\right)^{7-3}$

$$=\left(\frac{4}{3}\right)^4$$

(ii) $\left(-\frac{3}{5}\right)^7 \div \left(-\frac{3}{5}\right)^6 = \left(-\frac{3}{5}\right)^{7-6}$

$$=\left(-\frac{3}{5}\right)^1 = -\frac{3}{5}$$

(iii) $\left(-\frac{4}{10}\right)^3 \times \left(-\frac{4}{10}\right)$

$$=\left(-\frac{4}{10}\right)^{3-1} = \left(-\frac{4}{10}\right)^2$$

(iv) $\left(\frac{4}{5}\right)^7 \div \left(\frac{4}{5}\right)^5 = \left(\frac{4}{5}\right)^{7-5} = \left(\frac{4}{5}\right)^2$

(v) $\left(-\frac{5}{14}\right)^{10} \div \left(-\frac{5}{14}\right)^8$

$$=\left(-\frac{5}{14}\right)^{10-8} = \left(-\frac{5}{14}\right)^2$$

(vi) $\left(\frac{7}{10}\right)^{18} \div \left(\frac{7}{10}\right)^{15}$

$$=\left(\frac{7}{10}\right)^{18-15} = \left(\frac{7}{10}\right)^3$$

3. (i) $\left(-\frac{2}{11}\right)^{10} \div \left(-\frac{2}{11}\right)^{15}$

$$=\left(-\frac{2}{11}\right)^{10-15} = \left(-\frac{2}{11}\right)^{-5}$$

$$=\left(\frac{11}{-2}\right)^5$$

(ii) $\left(-\frac{3}{5}\right)^4 \div \left(-\frac{3}{5}\right)^6 = \left(-\frac{3}{5}\right)^{4-6}$

$$=\left(-\frac{3}{5}\right)^{-2} = \left(\frac{5}{-3}\right)^2 = \frac{25}{9}$$

(iii) $\left(\frac{2}{3}\right)^5 \div \left(\frac{2}{5}\right)^7 = \left(\frac{2}{3}\right)^{5-7} = \left(\frac{2}{3}\right)^{-2}$

$$=\left(\frac{3}{2}\right)^2 = \frac{9}{4}$$

4. (i) $[(-5)^4]^3 = (-5)^{4\times 3} = (-5)^{12}$

(ii) $[(-7)^4]^2 \times [(-7)^3]^2$

$$=(-7)^{4\times 2} \times (-7)^{3\times 2}$$

$$=(-7)^8 \times (-7)^6$$

$= (-7)^{8+6} = (-7)^{14}$

$\therefore \quad [(-7)^4]^2 \times [(-7)^3]^2 = (-7)^{14}$

(iii) $(2^3)^2 \times (2^5)^3 = 2^{3\times 2} \times 2^{5\times 3}$

$= 2^6 \times 2^{15}$

$= 2^{6+15} = 2^{21}$

(iv) $\left[\left(\frac{1}{3}\right)^7\right]^2 = \left(\frac{1}{3}\right)^{7\times 2} = \left(\frac{1}{3}\right)^{14}$

(v) $\left[\left(\frac{2}{3}\right)^4\right]^2 = \left(\frac{2}{3}\right)^{4\times 2} = \left(\frac{2}{3}\right)^{8}$

(vi) $\left[\left(-\frac{3}{4}\right)^3\right]^4 = \left(-\frac{3}{4}\right)^{3\times 4} = \left(-\frac{3}{4}\right)^{12}$

(vii) $\left[\left(-\frac{2}{11}\right)^4\right]^5 = \left(-\frac{2}{11}\right)^{4\times 5}$

$= \left(-\frac{2}{11}\right)^{20}$

(viii) $\left[\left(\frac{4}{5}\right)^3\right]^8 = \left(\frac{4}{5}\right)^{3\times 8} = \left(\frac{4}{5}\right)^{24}$

(ix) $\left[\frac{1}{3^2}\right]^3 = \frac{1}{3^{2\times 3}} = \frac{1}{3^6}$

5. (i) $(6^0 + 7^0) \times (6^0 - 7^0)$

$(1+1)\times(1-1)$

$2 \times 0 = 0$

(ii) $(3^0 - 4^0) \times 7^0$

$(1-1)\times 1 = 0 \times 1 = 0$

(iii) $\left(\frac{7}{8}\right)^0 - \left(-\frac{5}{7}\right)^0 + \left(\frac{4}{7}\right)^0 = 1-(1)+1$

$1-1+1=1$

(iv) $\left(\frac{3^0 \times 4^0 \times 5^0}{6^0 + 7^0}\right)$

$\frac{1\times 1\times 1}{1+1} = \frac{1}{2}$

6. (i) $\left(\frac{11}{3}\right)^2 \times \left(\frac{11}{3}\right) \times \left(\frac{11}{3}\right)^2$

$= \left(\frac{11}{3}\right)^{2+1+2} = \left(\frac{11}{3}\right)^5 = \frac{161051}{729}$

(ii) $\left(\frac{3}{5}\right)^0 \times \left(\frac{3}{5}\right)^2 \times \left(\frac{3}{5}\right)^3$

$= \left(\frac{3}{5}\right)^{0+2+3} = \left(\frac{3}{2}\right)^5 = \frac{243}{3125}$

(iii) $\left(-\frac{1}{2}\right) \times \left(-\frac{1}{2}\right)^2 \times \left(-\frac{1}{2}\right)^3$

$= \left(-\frac{1}{2}\right)^{1+2+3} = \left(-\frac{1}{2}\right)^6 = \frac{343}{3125}$

(iv) $\left(\frac{2}{7}\right)^0 \times \left(\frac{2}{7}\right)^1 \times \left(\frac{2}{7}\right)^3$

$= \left(\frac{2}{7}\right)^{0+1+3} = \left(\frac{2}{7}\right)^4 = \frac{16}{2401}$

7. Let $(-15)^{-1}$ should be divided by x

$\therefore \quad (-15)^{-1} \div x = (-5)^{-1}$

$(-15)^{-1} \times \frac{1}{x} = (-5)^{-1}$

$\frac{1}{-15} \times \frac{1}{x} = \frac{1}{(-5)^1}$

$\frac{-5}{-15} = x$

$\frac{1}{3} = x$

$\therefore$ $(-15)^{-1}$ should be divided by $\frac{1}{3}$ to get $(-5)^{-1}$.

8. Let $(-8)^{-1}$ should be multiplied by x

$\therefore \quad (-8)^{-1} \times x = 10^{-1}$

$x = 10^{-1} \div (-8)^{-1}$

$= 10^{-1} \times \frac{1}{(-8)^{-1}}$

$= 10^{-1} \times (-8)^1$

$= \frac{1}{10} \times -8$

$x = -\frac{4}{5}$

$\therefore$ $(-8)^{-1}$ should be multiplied by $\left(-\frac{4}{5}\right)$ to get 10^{-1}.

9. Let 3^{-9} should be multiplied by x

$\therefore \quad 3^{-9} \times x = 3$

$$x = 3 \div 3^{-9} = 3 \times \frac{1}{3^{-9}}$$
$$= 3 \times 3^{9} = 3^{1+9}$$
$$x = 3^{10}$$

$\therefore$ 3^{-9} should be multiplied by 3^{10} to get 3.

10. (i) $\left(\frac{1}{5}\right)^{3} \times \left(\frac{1}{5}\right)^{7} = \left(\frac{1}{5}\right)^{2m}$ (given)

$$\left(\frac{1}{5}\right)^{3+7} = \left(\frac{1}{5}\right)^{2m}$$
$$\left(\frac{1}{5}\right)^{10} = \left(\frac{1}{5}\right)^{2m}$$
$$\therefore \quad 2m = 10$$
$$m = 5$$

(ii) $5^{6x} = (625)^{3}$ (given)

$$5^{6x} = (5^{4})^{3}$$
$$5^{6x} = 5^{12}$$
$$\therefore \quad 6x = 12$$

(equating the exponent having same base)

$$x = 2$$

MCQs

1. (c) **2.** (b) **3.** (b) **4.** (b) **5.** (d) **6.** (b)

Mental Maths

1. The reciprocal of $\left(\frac{1}{7}\right)^{4}$ is $\mathbf{(7)^{4}}$.
2. $\left(\frac{-4}{5}\right)^{-1}$ is equal to $\left(\frac{\mathbf{-5}}{\mathbf{4}}\right)$.
3. The value of $\left(\frac{1}{4}\right)^{0}$ is **1**.
4. The square of $\left(\frac{-2}{3}\right)$ is $\left(\frac{\mathbf{-2}}{\mathbf{3}}\right)^{\mathbf{2}} = \frac{\mathbf{4}}{\mathbf{9}}$.
5. The cube of $\left(\frac{-1}{9}\right)$ is $\left(\frac{\mathbf{-1}}{\mathbf{9}}\right)^{\mathbf{3}} = \frac{\mathbf{-1}}{\mathbf{729}}$
6. The value of $8^{0} \times 8^{0} \times 8^{0} \times (8^{0} - 8^{0})$ is **0**.
7. $\left(\frac{-14}{19}\right)^{-1}$ is equal to $\frac{\mathbf{19}}{\mathbf{-14}}$.
8. The cube of $\left(\frac{-1}{5}\right)$ is $\left(\frac{\mathbf{-1}}{\mathbf{5}}\right)^{\mathbf{3}} = \frac{\mathbf{-1}}{\mathbf{125}}$.

6 Algebraic Expressions

Exercise-6.1

1. (i) $7x + x^{2}$ (ii) $xy + (x - y)$
(iii) $(x + y) + xy$ (iv) $x + 6$
(v) $3x + y$ (vi) $6 + xy$
(vii) $3(3 + y)$ (viii) $(7 - 5y)$

2. (i) Binomial (ii) Monomial
(iii) Binomial (iv) Binomial
(v) Monomial (vi) Monomial
(vii) Trinomial

3.

		Numerical Coefficient	**Literal Coefficient**
(i)	$-9p^{2}q^{3}r^{2}$	-9	$p^{2}q^{2}r$
(ii)	$-\frac{7}{2}xy^{2}$	$-\frac{7}{2}$	xy^{2}
(iii)	$\frac{4}{9}a^{2}b^{2}cd$	$\frac{4}{9}$	$a^{2}b^{2}cd$
(iv)	$\frac{3}{4x^{2}y}$	$\frac{3}{4}$	$\frac{1}{x^{2}y}$
(v)	$3x^{2}y \div 2z$	$\frac{3}{2}$	$\frac{x^{2}y}{z}$
(vi)	$-\frac{2}{3}\frac{ax}{by}$	$-\frac{2}{3}$	$\frac{ax}{by}$

4. Like terms are

(i) $\left(3abc, -\frac{2}{3}cab, 7bac\right)$

$\left(-5ab^{2}, \frac{2}{7}b^{2}a\right)$

(ii) $\left(7pq^{2}, \frac{2}{3}q^{2}p\right)$,

$(-3p^{2}q, \sqrt{5}qp^{2}, -\pi qp^{2}, (\sqrt{5}\,qp, 4pq)$

(iii) $(3x^{2}yz, -\sqrt{5}\,yzx^{2})$,

$\left(\sqrt{7}\,myz^{2}, -\frac{4}{3}z^{2}xy\right)$

$= \left(\frac{2}{5}y^{2}xz, 9xzy^{2}\right)$