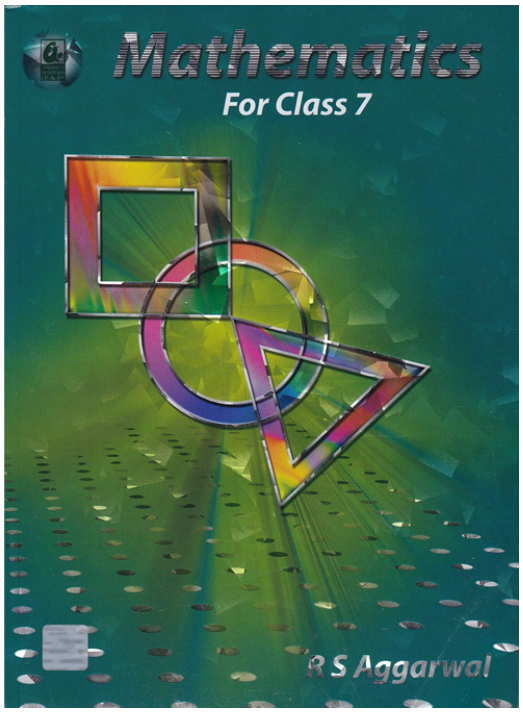
RS Aggarwal Solutions for Class 7 Maths Chapter 4–Rational Numbers

Class 7 - Chapter 4 Rational Numbers



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RS Aggarwal Solutions for Class 7 Maths Chapter 4–Rational Numbers

Class 7: Maths Chapter 4 solutions. Complete Class 7 Maths Chapter 4 Notes.

RS Aggarwal Solutions for Class 7 Maths Chapter 4–Rational Numbers

RS Aggarwal 7th Maths Chapter 4, Class 7 Maths Chapter 4 solutions

Ex 4A Solutions

Question 1.

Solution:

(i) Rational numbers: The numbers of the form pq where p and q are integers and q ≠ 0, are called rational numbers.

(*ii*) positive rational numbers : $\frac{3}{4}, \frac{7}{8}, \frac{15}{11}$,

$\frac{-3}{-5}, \frac{-9}{-4}$

(*iii*) Negative rational numbers : $\frac{-5}{7}, \frac{-3}{8}$,

$\frac{11}{-5}, \frac{13}{-7}, \frac{-8}{3}$

(iv) Yes, there is one rational number (0) which is neither positive nor negative.

Question 2.

Solution:

(*i*) $\frac{5}{-8}$ (*ii*) $\frac{-6}{11}$

(*iii*) $\frac{7}{15}$ (*iv*) $\frac{-8}{-12}$ (*v*) 6 (*vi*) −3

(*vii*) 0

(viii) 01 are all rational number but 10 and 00 are not rational number as their denominator is zero.

Question 3.

Solution:

(i) Numerator = 8, denominator =19

(ii) Numerator = 5, denominator = – 8

(iii) Numerator =-13, denominator =15

(iv) Numerator = – 8, denominator = -11

(v) Numerator = 9, denominator = 1

Question 4.

Solution:

$(i)\ 5 = \frac{5}{1}$, numerator $= 5$, denominator $= 1$

$(ii)\ -3 = \frac{-3}{1}$, numerator $= 1$,

denominator $= 1$

$(iii)\ 1 = \frac{1}{1}$, numerator $= 1$, denominator $= 1$

$(iv)\ 0 = \frac{0}{1}$, numberator $= 0$, deniminator $= 1$

$(v)\ -23 = \frac{-23}{1}$, numerator $= -23$,

denominator $= 1$

Question 5.

Solution:

According to the definition, a rational number is positive if both of numerator and denominator have same signs. Therefore

(iii), (iv) and (vi) 8 are positive rational numbers.

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Question 6.

Solution:

According to the definition, a rational number is negative if numerator and denominator have opposite sign. Therefore.

(iii), (iv), (v), (vi) are all negative rational numbers.

Question 7.

Solution:

Equivalent rational numbers of each are given below:

$(i)\ \frac{6}{11} = \frac{12}{22}, \frac{18}{33}, \frac{24}{44}, \frac{30}{55}$

$(ii)\ \frac{-3}{8} = \frac{-6}{16}, \frac{-9}{24}, \frac{-12}{32}, \frac{-15}{40}$

$(iii)\ \frac{7}{-15} = \frac{14}{-30}, \frac{21}{-45}, \frac{28}{-60}, \frac{35}{-75}$

$(iv)\ 8 \text{ or } \frac{8}{1} = \frac{16}{2}, \frac{24}{3}, \frac{32}{4}, \frac{40}{5}$

$(v)\ 1 \text{ or } \frac{1}{1} = \frac{2}{2}, \frac{3}{3}, \frac{4}{4}, \frac{5}{5}$

$(vi)\ -1 \text{ or } \frac{-1}{1} = \frac{-2}{2}, \frac{-3}{3}, \frac{-4}{4}, \frac{-5}{5}$

Question 8.

Solution:

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

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

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

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

Question 9.

Solution:

$$\text{Rational number} = \frac{5}{8}$$

(i) Numerator $= 15 = 5 \times 3$

$$\therefore \frac{5}{8} = \frac{5\times 3}{8\times 3} = \frac{15}{24}$$

(ii) Numerator $= -10 = 5 \times (-2)$

$$\therefore \frac{5}{8} = \frac{5\times(-2)}{8\times(-2)} = \frac{-10}{-16}$$

Question 10.

Solution:

$$\text{Rational number} = \frac{4}{7}$$

$(i)\ 21 = 7 \times 3$

$$\therefore \frac{4}{7} = \frac{4\times3}{7\times3} = \frac{12}{21}$$

$(ii)\ -35 = 7 \times (-5)$

$$\therefore \frac{4}{7} = \frac{4\times(-5)}{7\times(-5)} = \frac{-20}{-35}$$

Question 11.

Solution:

$$\text{Rational number} = \frac{-12}{13}$$

$(i)\ -48 = -12 \times 4$

$$\therefore \frac{-12}{13} = \frac{-12\times4}{13\times4} = \frac{-48}{52}$$

$(ii)\ 60 = -12 \times (-5)$

$$\therefore \frac{-12}{13} = \frac{-12\times(-5)}{13\times(-5)} = \frac{60}{-65}$$

Question 12.

Solution:

$$\text{Rational number} = \frac{-8}{11}$$

$(i)\ 22 = 11 \times 2$

$$\therefore \frac{-8}{11} = \frac{-8 \times 2}{11 \times 2} = \frac{-16}{22}$$

$(ii)\ -55 = 11 \times (-5)$

$$\therefore \frac{-8}{11} = \frac{-8 \times (-5)}{11 \times (-5)} = \frac{40}{-55}$$

Question 13.

Solution:

$$\text{Rational number} = \frac{14}{-5}$$

$(i)\ 56 = 14 \times 4$

$$\therefore \frac{14}{-5} = \frac{14 \times 4}{-5 \times 4} = \frac{56}{-20}$$

$(ii)\ -70 = 14 \times (-5)$

$$\therefore \frac{14}{-5} = \frac{14 \times (-5)}{-5 \times (-5)} = \frac{-70}{25}$$

Question 14.

Solution:

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$$\text{Rational number} = \frac{13}{-8}$$

(i) $-40 = -8 \times 5$

$$\therefore \frac{13}{-8} = \frac{13\times5}{-8\times5} = \frac{65}{-40}$$

(ii) $32 = -8 \times (-4)$

$$\therefore \frac{13}{-8} = \frac{13\times(-4)}{-8\times(-4)} = \frac{-52}{32}$$

Question 15.

Solution:

$$\text{Rational number} = \frac{-36}{24}$$

(i) $-9 = -36 \div 4$

$$\therefore \frac{-36}{24} = \frac{-36\div4}{24\div4} = \frac{-9}{6}$$

(ii) $6 = -36 \div (-6)$

$$\therefore \frac{-36}{24} = \frac{-36\div(-6)}{24\div(-6)} = \frac{6}{-4}$$

Question 16.

Solution:

$$\text{Rational number} = \frac{84}{-147}$$

(*i*) $7 = -147 \div (-21)$

$$\therefore \frac{84}{-147} = \frac{84 \div (-21)}{-147 \div (-21)} = \frac{-4}{7}$$

(*ii*) $-49 = -147 \div (3)$

$$\therefore \frac{84}{-147} = \frac{84 \div (3)}{-147 \div (3)} = \frac{28}{-49}$$

Question 17.

Solution:

$$(i)\ \frac{35}{49} = \frac{35 \div 7}{49 \div 7}$$

(HCF of 35 and 49 = 7)

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

$$(ii)\ \frac{8}{-36} = \frac{8 \div 4}{-36 \div 4}$$

(HCF of 8 and $-36 = 4$)

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

$$(iii)\ \frac{-27}{45} = \frac{-27 \div 9}{45 \div 9}$$

(HCF of -27 and $45 = 9$)

$$= \frac{-3}{5}$$

$$(iv)\ \frac{-14}{-49} = \frac{-14 \div (-7)}{-49 \div (-7)}$$

(HCF of -14 and $-49 = -7$)

$$= \frac{2}{7}$$

$$(v)\ \frac{91}{-78} = \frac{91 \div 13}{-78 \div 13}$$

(HCF of 91 and $-78 = 13$)

$$= \frac{7}{-6}$$

$$(vi)\ \frac{-68}{119} = \frac{-68 \div 17}{119 \div 17}$$

(HCF of 68 and 119 = 17)

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

$$(vii)\ \frac{-87}{116} = \frac{-87 \div 29}{116 \div 29}$$

(HCF of 87 and 116 = 29)

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

$$(viii)\ \frac{299}{-161} = \frac{299 \div 23}{-161 \div 23}$$

(HCF of 299 and 161 = 23)

$$= \frac{13}{-7}$$

Question 18.

Solution:

$$(i)\ \frac{-9}{5} = \frac{.....}{20} = \frac{27}{.....} = \frac{-45}{.....}$$

$\therefore \quad 20 = 5 \times 4$

$$\therefore \quad \frac{-9}{5} = \frac{-9\times4}{5\times4} = \frac{-36}{20}$$

$27 = -9 \times (-3)$

$$\therefore \quad \frac{-9}{5} = \frac{-9\times-3}{5\times-3} = \frac{27}{-15}$$

$-45 = -9 \times 5$

$$\therefore \quad \frac{-9}{5} = \frac{-9\times5}{5\times5} = \frac{-45}{25}$$

$$\therefore \quad \frac{-9}{5} = \frac{-36}{20} = \frac{27}{-15} = \frac{-45}{25}$$

$$(ii)\quad \frac{-6}{11} = \frac{-18}{....} = \frac{....}{44}$$

$-18 = -6 \times 3$

$$\therefore \quad \frac{-6}{11} = \frac{-6\times3}{11\times3} = \frac{-18}{33}$$

$44 = 11 \times 4$

$$\therefore \quad \frac{-6}{11} = \frac{-6\times4}{11\times4} = \frac{-24}{44}$$

$$\therefore \quad \frac{-6}{11} = \frac{-18}{33} = \frac{-24}{44}$$

Question 19.

Solution:

(*i*) $\frac{-13}{7}, \frac{39}{-21}$

$$\frac{39}{-21} = \frac{39 \div 3}{-21 \div 3} = \frac{13}{-7} = \frac{13 \times (-1)}{-7 \times (-1)} = \frac{-13}{7}$$

(HCF of 39 and 21 = 3)

$\therefore \frac{-13}{7}$ and $\frac{39}{-21}$ are equivalent rational numbers

(*ii*) $\frac{3}{-8}, \frac{-6}{16}$

$$\frac{-6}{16} = \frac{-6 \div (-2)}{16 \div (-2)} = \frac{3}{-8}$$ (HCF of 6 and 16 = 2)

$\therefore \frac{3}{-8}$ and $\frac{-6}{16}$ are equivalent rational numbers

(*iii*) $\frac{9}{4}, \frac{-36}{-16}$

$$\frac{-36}{-16} = \frac{-36 \div (-4)}{-16 \div (-4)} = \frac{9}{4}$$

(HCF of 36 and 16 = 4)

$\therefore \frac{9}{4}$ and $\frac{-36}{-16}$ are equivalent rational numbers

(*iv*) $\frac{7}{15}, \frac{-28}{60}$

$$\frac{-28}{60} = \frac{-28 \div (-4)}{60 \div (-4)} = \frac{7}{-15}$$

(HCF of 28 and 60 = 4)

$\therefore \frac{7}{-15}$ and $\frac{-28}{60}$ are not equivalent rational numbers

(v) $\frac{3}{12}, \frac{-1}{4}$

$$\frac{3}{12} = \frac{3 \div 3}{12 \div 3} = \frac{1}{4}$$

(HCF of 3 and 12 = 3) .

$\therefore$ $\frac{3}{12}$ and $\frac{1}{4}$ are not equivalent rational numbers

(vi) $\frac{2}{3}, \frac{3}{2}$

There are not equivalent rational numbers Ans.

Question 20.

Solution:

$$(i)\ \frac{-1}{5}=\frac{8}{x} \Rightarrow -1\times x=8\times 5$$

$\Rightarrow -x=40 \quad \Rightarrow x=-40$

$\therefore\ x=-40$.

$$(ii)\ \frac{7}{-3}=\frac{x}{6} \Rightarrow -3\times x=7\times 6$$

$$\Rightarrow -3x=42 \quad \Rightarrow x=\frac{42}{-3}=-14$$

$\therefore \quad x=-14$

$$(iii)\ \frac{3}{5}=\frac{x}{-25} \Rightarrow 5\times x=3\times(-25)$$

$$\Rightarrow x=\frac{3(-25)}{5}=3\times(-5)=-15$$

$\therefore\ x=-15$

$(iv)\ \frac{13}{6} = \frac{-65}{x} \Rightarrow 13 \times x = -65 \times 6$

$\Rightarrow x = \frac{-65 \times 6}{13} = -5 \times 6 = -30$

$\therefore\ x = -30$

$(v)\ \frac{16}{x} = -4 \Rightarrow -4 \times x = 16$

$\Rightarrow x = \frac{16}{-4} = -4$

$\therefore\ x = -4$

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

$\Rightarrow x = \frac{-48}{2} = -24$

Question 21.

Solution:

(*i*) $\frac{8}{-12}$ and $\frac{-10}{15}$ will be equal

if $8 \times 15 = (-10) \times (-12)$

if $120 = 120$ which is true

$\therefore \frac{8}{-12}$ and $\frac{-10}{15}$ are equal

(*ii*) $\frac{-3}{9}$ and $\frac{7}{-21}$ will be equal

if $-3 \times (-21) = 7 \times 9$

if $63 = 63$ which is true

$\therefore \frac{-3}{9}$ and $\frac{7}{-21}$ are equal

(*iii*) $\frac{-8}{-14}$ and $\frac{15}{21}$ are equal

if $-8 \times 21 = -14 \times 15$

if $-168 = -210$ which is not true

$\therefore \frac{-8}{-14}$ and $\frac{15}{21}$ are not equal.

Question 22.

Solution:

(i) False, as there is no end of smallest and largest rational number,

(ii) True.

(iii) False, as zero is a rational number but the division of zero is meaningless.

(iv) True.

(v) False, every rational is not a fraction

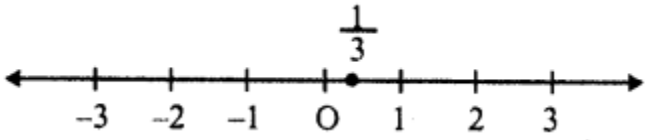
In a fraction, numerator and denominators is a whole number but the denominator can't be zero

Ex 4B Solutions

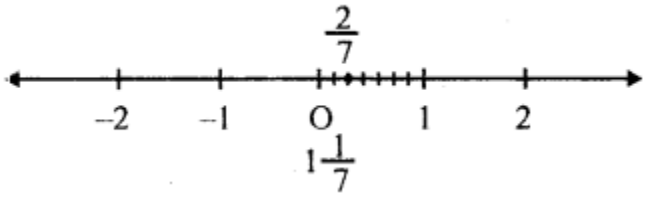
Question 1.

Solution:

(i) Draw a number line and locate a point O on it. Let it represent 0 Now 13 has been presented on the number line given below.

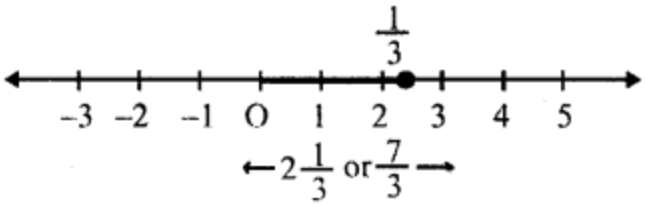


(ii) Draw a number line and locate a point O on it. Let it represent 0. The number 27 has been represented on the number line given below:



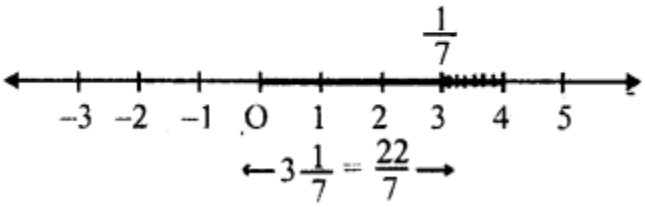
(iii) Draw a number line and locate a point O on it. Let it represent 0. The number 73 has been represented on the number line given below:

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



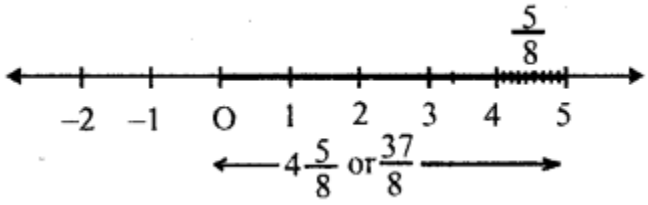
(iv) Draw a number line and locate a point O on it. Let it represent 0. The number 73 has been represented on it as given below:

$\frac{22}{7} = 3\frac{1}{7}$

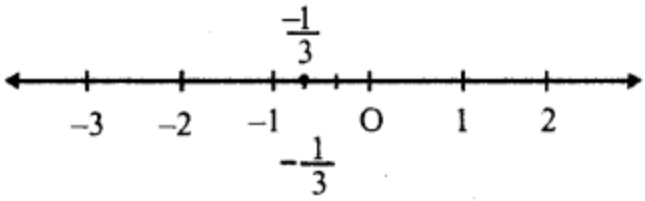


(v) Draw a number line and locate a point O on it. Let it represented 0. The number 378 has been represented on it as given below:

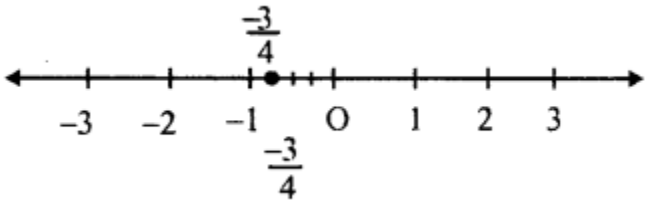
378 = 458



(vi) Draw a number line and locate a point O on it. Let it represent 0. The number −13 has been represented on it as given below:

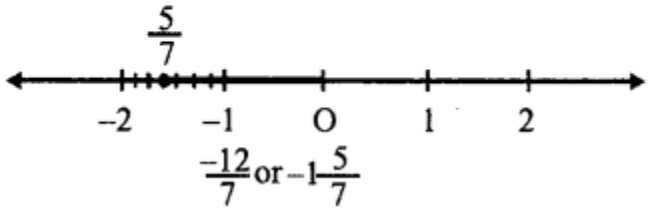


(vii) Draw a number line and locate a point O on it. Let it represent 0. The number −34 has been represented on it is as given below:



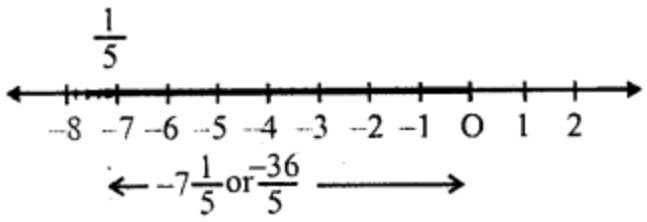
(viii) Draw a number line and locate a point on it. Let it represent 0. The number −127 has been represented on it as given below:

$$\frac{-12}{7} = -1\frac{5}{7}$$



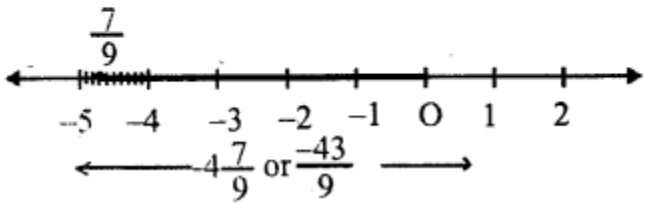
(ix) Draw a number line and locate a point O on it. Let it represent 0. The number 36−5 has been represented on it as given below:

$$\frac{36}{-5} = \frac{-36}{5} = -7\frac{1}{5}$$



(x) Draw a number line and locate is point O on it. Let is represent 0. The number −439 has been represented on it as given below:

$$\frac{-43}{9} = -4\frac{7}{9}$$



Question 2.

Solution:

(i) 56 or 0, 56 is greater as any positive number is always greater than 0.

(*ii*) $\frac{-3}{5}$ or 0, 0 is greater as any negative number is always less than 0.

(*iii*) $\frac{5}{8}$ or $\frac{3}{8}, \frac{5}{8}$ is greater as $5 > 3$

(*iv*) $\frac{7}{9}$ or $\frac{-5}{9}, \frac{7}{9}$ is greater as any positive number is greater than any negative number.

(*v*) $\frac{-6}{11}$ or $\frac{5}{-11} \Rightarrow \frac{-6}{11}$ or $\frac{5\times(-1)}{-11\times(-1)}$

(Making denominator positive)

$\Rightarrow \frac{-6}{11}$ or $\frac{-5}{11}$

$\frac{-5}{11}$ is greater as (-5) is greater than (-6)

$\therefore \frac{5}{-11} > \frac{-6}{11}$

(*vi*) $\frac{-15}{4}$ or $\frac{-17}{4}, \frac{-15}{4}$ is greater as $(-15) > (-17)$

Question 3.

Solution:

(*i*) $\frac{5}{9}$ or $\frac{-3}{-8}$ $\Rightarrow \frac{5}{9}$ or $\frac{-3\times(-1)}{-8\times(-1)}$

$\Rightarrow \frac{5}{9}$ or $\frac{3}{8}$

(Making denominator positive)

LCM of 9 and 8 = 72

$\therefore \quad \frac{5}{9} = \frac{5\times8}{9\times8} = \frac{40}{72}$

$\frac{3}{8} = \frac{3\times9}{8\times9} = \frac{27}{72}$

It is clear that $40 > 27$

$\therefore \quad \frac{40}{72}$ or $\frac{5}{9}$ is greater.

(*ii*) $\frac{4}{-3}$ or $\frac{-8}{7} \Rightarrow \frac{4\times(-1)}{-3\times(-1)}$ or $\frac{-8}{7}$

$\Rightarrow \quad \frac{-4}{3}$ or $\frac{-8}{7}$

LCM of 3 and 7 = 21

$\therefore \quad \frac{-4}{3} = \frac{-4\times7}{3\times7} = \frac{-28}{21}$

$\frac{-8}{7} = \frac{-8\times3}{7\times3} = \frac{-24}{21}$

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It is clear that $\frac{-24}{21}$ or $\frac{-8}{7}$ is greater.

(*iii*) $\frac{-12}{5}$ or -3

$$\frac{-12}{5} = \frac{-12}{5} \text{ (LCM of 5 and 1} \Rightarrow 5)$$

$$\frac{-3}{1} = \frac{-3\times5}{1\times5} = \frac{-15}{5}$$

It is clear that $\frac{-12}{5}$ is greater.

(*iv*) $\frac{7}{-9}$ or $\frac{-5}{8}$

$$\Rightarrow \frac{7\times(-1)}{-9\times(-1)} \text{ or } \frac{-5}{8} \quad \Rightarrow \frac{-7}{9} \text{ or } \frac{-5}{8}$$

(Making denominator positive)

LCM of 9 and 8 = 72

$$\therefore \quad \frac{-7}{9} = \frac{-7\times8}{9\times8} = \frac{-56}{72}$$

$$\frac{-5}{8} = \frac{-5\times9}{8\times9} = \frac{-45}{72}$$

It is clear that $\frac{-45}{72}$ or $\frac{-5}{8}$ is greater

$$(v) \quad \frac{4}{-5} \text{ or } \frac{-7}{8} \Rightarrow \frac{4\times(-1)}{-5\times(-1)} \text{ or } \frac{-7}{8}$$

$$\Rightarrow \quad \frac{-4}{5} \text{ or } \frac{-7}{8}$$

(Making denominator positive)

LCM of 5 and 8 = 40

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$$\therefore \quad \frac{-4}{5} = \frac{-4\times 8}{5\times 8} = \frac{-32}{40}$$

and $\frac{-7}{8} = \frac{-7\times 5}{8\times 5} = \frac{-35}{40}$

It is clear that $\frac{-32}{40}$ or $\frac{-4}{5}$ or $\frac{4}{-5}$ is greater.

(*vi*) $\frac{9}{-13}$ or $\frac{7}{-12}$

$$\Rightarrow \quad \frac{9\times(-1)}{-13\times(-1)} \text{ or } \frac{7\times(-1)}{-12\times(-1)}$$

$$\Rightarrow \quad \frac{-9}{13} \text{ or } \frac{-7}{12}$$

(Making denominator positive)

LCM of 13 and 12 = 156

$$\therefore \quad \frac{-9}{13} = \frac{-9\times 12}{13\times 12} = \frac{-108}{156}$$

$$\frac{-7}{12} = \frac{-7\times 13}{12\times 13} = \frac{-91}{156}$$

Ir is clear that $\frac{-91}{156}$ or $\frac{-7}{12}$ or $\frac{7}{-12}$ is greater.

Question 4.

Solution:

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(*i*) $\frac{-3}{7}, \frac{6}{-13}$

$$\frac{6}{-13} = \frac{6\times(-1)}{-13\times(-1)} = \frac{-6}{13}$$

(Making denominator positive)

LCM of 7 and 13 = 91

$$\therefore \quad \frac{-3}{7} = \frac{-3\times13}{7\times13} = \frac{-39}{91}$$

$$\frac{-6}{13} = \frac{-6\times7}{13\times7} = \frac{-42}{91}$$

It is clear that $\frac{-39}{91} > \frac{-42}{91}$

$$\therefore \quad \frac{-3}{7} > \frac{6}{-13}$$

(*ii*) $\frac{5}{-13}, \frac{-35}{91}$

$$\frac{5\times(-1)}{-13\times(-1)} = \frac{-5}{13}$$

(Making denominator positive)

Now LCM of 13 and 91 = 91

$$\therefore \quad \frac{-5}{13} = \frac{-5\times7}{13\times7} = \frac{-35}{91}$$

It is clear that $\frac{-35}{91} = \frac{-35}{91}$

$$\therefore \quad \frac{5}{-13} = \frac{-35}{91}$$

(*iii*) $-2, \frac{-13}{5}$

$$\frac{-2}{1} = \frac{-2\times5}{1\times5} = \frac{-10}{5}$$

It is clear that $\frac{-10}{5}$ is greater than $\frac{-13}{5}$

$$-2 > \frac{-13}{5}$$

(*iv*) $\frac{-2}{3}, \frac{5}{-8}$

$$\frac{5}{-8} = \frac{5\times(-1)}{-8\times(-1)} = \frac{-5}{8}$$

LCM of 3 and 8 = 24

$$\therefore \quad \frac{-2}{3} = \frac{-2\times8}{3\times8} = \frac{-16}{24}$$

$$\frac{-5}{8} = \frac{-5\times3}{8\times3} = \frac{-15}{24}$$

It is clear that $\frac{-16}{24} < \frac{-15}{24}$

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$\therefore \quad \frac{-2}{3} < \frac{5}{-8}$

(v) $0, \frac{-3}{-5}$

$\frac{-3}{-5} = \frac{-3\times(-1)}{-5\times(-1)} = \frac{3}{5}$

It is clear that $0 < \frac{3}{5}$

$0 < \frac{-3}{-5}$

(vi) $\frac{-8}{9}, \frac{-9}{10}$

LCM of 9 and 10 = 90

$\therefore \quad \frac{-8}{9} = \frac{-8\times10}{9\times10} = \frac{-80}{90}$ It is clear that $\frac{-80}{90} > \frac{-81}{90}$

$\frac{-9}{10} = \frac{-9\times9}{10\times9} = \frac{-81}{90}$ $\therefore \quad \frac{-8}{9} > \frac{-9}{10}$

Question 5.

Solution:

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

LCM of 5, 10, 15, 30 = 30

2	5, 10, 15, 30
5	5, 5, 15, 15
3	1, 1, 3, 3
	1, 1, 1, 1

$\therefore$ LCM = $2 \times 3 \times 5 = 30$

$\therefore \quad \frac{2}{5} = \frac{2\times6}{5\times6} = \frac{12}{30}$

$\frac{7}{10} = \frac{7\times3}{10\times3} = \frac{21}{30}$

$\frac{8}{15} = \frac{8\times2}{15\times2} = \frac{16}{30}$

$\frac{13}{30} = \frac{13}{30}$

Now, writing in ascending order we get :

$\frac{12}{30} < \frac{13}{30} < \frac{16}{30} < \frac{21}{30}$

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

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

Firstly, making positive denominators of $\frac{5}{-12}$

and $\frac{9}{-24}$

$$\frac{5}{-12} = \frac{5\times(-1)}{-12\times(-1)} = \frac{-5}{12}$$

$$\frac{9}{-24} = \frac{9\times(-1)}{-24\times(-1)} = \frac{-9}{24}$$

LCM of 4, 12, 16 and 24 = 48

2	4, 12, 16, 24
2	2, 6, 8, 12
2	1, 3, 4, 6
3	1, 3, 2, 3
	1, 1, 2, 1

$\therefore$ LCM = $2 \times 2 \times 2 \times 3 \times 2 = 48$

$$\frac{-3}{4} = \frac{-3\times12}{4\times12} = \frac{-36}{48}$$

$$\frac{-5}{12} = \frac{-5\times4}{12\times4} = \frac{-20}{48}$$

$$\frac{-7}{16} = \frac{-7\times3}{16\times3} = \frac{-21}{48}$$

$$\frac{-9}{24} = \frac{-9\times2}{24\times2} = \frac{-18}{48}$$

Now, writing in ascending order, we get :

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

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

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

Firstly, making positive denominator of $\frac{7}{-15}$

and $\frac{17}{-30}$

$$\frac{7}{-15} = \frac{7\times(-1)}{-15\times(-1)} = \frac{-7}{15}$$

$$\frac{17}{-30} = \frac{17\times(-1)}{-30\times(-1)} = \frac{-17}{30}$$

Now LCM of 10, 15, 20, 30 = 60

2	10, 15, 20, 30
3	5, 15, 10, 15
5	5, 5, 10, 5
2	1, 1, 2, 1
	1, 1, 1, 1

$\therefore$ LCM = $2 \times 3 \times 5 \times 2 = 60$

$\therefore$ $\frac{-3}{10} = \frac{-3\times6}{10\times6} = \frac{-18}{60}$

$\frac{-7}{15} = \frac{-7\times4}{15\times4} = \frac{-28}{60}$

$\frac{-11}{20} = \frac{-11\times3}{20\times3} = \frac{-33}{60}$

$\frac{-17}{30} = \frac{-17\times2}{30\times2} = \frac{-34}{60}$

Now writing in ascending order, we get :

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

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

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

Firstly, making positive denominator of $\frac{5}{-6}$

$$\frac{5}{-6} = \frac{5\times(-1)}{-6\times(-1)} = \frac{-5}{6}$$

LCM of 3, 4, 6, 12 = 12

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2	3, 4, 6, 12
2	3, 2, 3, 6
3	3, 1, 3, 3
	1, 1, 1

$\therefore$ LCM $= 2 \times 2 \times 3 = 12$

$\therefore \quad \frac{2}{3} = \frac{2\times4}{3\times4} = \frac{8}{12}$

$\frac{3}{4} = \frac{3\times3}{4\times3} = \frac{9}{12}$

$\frac{-5}{6} = \frac{-5\times2}{6\times2} = \frac{-10}{12}$

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

Now, writing in ascending order, we get :

$\frac{-10}{12} < \frac{-7}{12} < \frac{8}{12} < \frac{9}{12}$

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

Question 6.

Solution:

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

Making the positive denominators of $\frac{7}{-10}$ and $\frac{19}{-30}$

$$\frac{7}{-10} = \frac{7\times(-1)}{-10\times(-1)} = \frac{-7}{10}$$

$$\frac{19}{-30} = \frac{19\times(-1)}{-30\times(-1)} = \frac{-19}{30}$$

Now LCM of 5, 10, 15 and 30 = 30

2	5, 10, 15, 30
3	5, 5, 15, 15
5	5, 5, 5, 5
	1, 1, 1, 1

$\therefore$ LCM $= 2 \times 3 \times 5 = 30$

$\therefore$ $\frac{-2}{5} = \frac{-2\times6}{5\times6} = \frac{-12}{30}$

$$\frac{-7}{10} = \frac{-7\times3}{10\times3} = \frac{-21}{30}$$

$$\frac{-11}{15} = \frac{-11\times2}{15\times2} = \frac{-22}{30}$$

$$\frac{-19}{30} = \frac{-19}{30}$$

Now, writing in descending order, we get :

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

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

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

Making the positive denominators of $\frac{8}{-3}$

$$\frac{8}{-3} = \frac{8\times(-1)}{-3\times(-1)} = \frac{-8}{3}$$

Now LCM of 6, 3, 3 = 6

$$\therefore \quad \frac{-2}{1} = \frac{-2\times 6}{1\times 6} = \frac{-12}{6}$$

$$\frac{-13}{6} = \frac{-13}{6} \quad \frac{-8}{3} = \frac{-8\times 2}{3\times 2} = \frac{-16}{6}$$

$$\frac{1}{3} = \frac{1\times 2}{3\times 2} = \frac{2}{6}$$

Now, writing in descending order, we get :

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

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

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

Making the positive denominators of $\frac{5}{-12}$,

$\frac{2}{-3}$

$$\frac{5}{-12} = \frac{5\times(-1)}{-12\times(-1)} = \frac{-5}{12}$$

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

Now LCM of 9, 12, 18, 3 = 36

2	9, 12, 18, 13
3	9, 6, 9, 3
3	3, 2, 3, 1
	1, 2, 1, 1

$\therefore$ LCM = 2 × 3 × 3 × 2 = 36

$$\therefore \quad \frac{-4}{9} = \frac{-4\times4}{9\times4} = \frac{-16}{36}$$

$$\frac{-5}{12} = \frac{-5\times3}{12\times3} = \frac{-15}{36}$$

$$\frac{-7}{18} = \frac{-7\times2}{18\times2} = \frac{-14}{36}$$

$$\frac{-2}{3} = \frac{-2\times12}{3\times12} = \frac{-24}{36}$$

Writing in descending order, we get :

$$\frac{-14}{36} > \frac{75}{36} > \frac{-16}{36} > \frac{-24}{36}$$

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

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

Making the positive denominators of

$\frac{17}{-30}$ and $\frac{11}{-15}$

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$$\frac{17}{-30} = \frac{17\times(-1)}{-30\times(-1)} = \frac{-17}{30}$$

$$\frac{11}{-15} = \frac{1\times(-1)}{-15\times(-1)} = \frac{-11}{15}$$

Now LCM of 30, 15, 5 = 30

5	30, 15, 10, 5
2	6, 3, 2, 1
3	3, 3, 1, 1
	1, 1, 1, 1

$\therefore$ LCM = 5 × 2 × 3 = 30

$$\therefore \quad \frac{-17}{30} = \frac{-17}{30} \quad \frac{-11}{15} = \frac{-11\times2}{15\times2} = \frac{-22}{30}$$

$$\frac{-7}{10} = \frac{-7\times3}{10\times3} = \frac{-21}{30}$$

$$\frac{3}{5} = \frac{3\times6}{5\times6} = \frac{18}{30}$$

Now, writing in descending order, we get :

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

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

Question 7.

Solution:

(i) True: All negative numbers lie on the left of 0.

(ii) False: All negative numbers lie on the left of 0.

(iii) True: All positive numbers lie on the right of 0 and all negative numbers on the left of 0.

(iv) False: −18−13 = 1813 which is positive and positive number lie on the left of 0.

(v) True: −5−8 = 58 which is positive and all positive number lie on the right of negative numbers.

(i), (iii) and (iv) are true.

Question 8.

Solution:

5 rational numbers between -3 and -2.

We can write $-3 = \frac{-3\times6}{6} = \frac{-18}{6}$

and $-2 = \frac{-2\times6}{6} = \frac{-12}{6}$

and $\frac{-18}{6} < \frac{-12}{6}$

and $\frac{-18}{6} < \frac{-17}{6} < \frac{-16}{6} < \frac{-15}{6} <$

$\frac{-14}{6} < \frac{-13}{6} < \frac{-12}{6}$

∴ Five rational number between −3 and −2 will be

$\frac{-17}{6}, \frac{-16}{6}, \frac{-15}{6}, \frac{-14}{6}, \frac{-13}{6}$

Question 9.

Solution:

We can write $-1 = \frac{-3}{3}$ and $1 = \frac{3}{3}$

$$\frac{-3}{3} < \frac{-2}{3} < \frac{-1}{3} < \frac{0}{3} < \frac{1}{3} < \frac{2}{3} < \frac{3}{3}$$

$\therefore$ Five rational between -1 and 1 are $\frac{-2}{3} < \frac{-1}{3} < \frac{0}{3} < \frac{1}{3} < \frac{2}{3}$

Question 10.

Solution:

L.C.M. of 5 and 2 = 10

Now $\frac{-3}{5} = \frac{-3\times2}{5\times2} = \frac{-6}{10}$

$= \frac{-6\times6}{10\times6} = \frac{-36}{60}$

and $\frac{-1}{2} = \frac{-1\times5}{2\times5} = \frac{-5}{10}$

$= \frac{-5\times6}{10\times6} = \frac{-30}{60}$

and $\frac{-36}{60} < \frac{-35}{60} < \frac{-34}{60} < \frac{-33}{60} <$

$\frac{-32}{60} < \frac{-31}{60} < \frac{-30}{60}$

$\therefore$ Five rational numbers between $\frac{-3}{5}$ and

$\frac{-1}{2}$ are $\frac{-36}{60} < \frac{-34}{60} < \frac{-33}{60} < \frac{-32}{60}$

$< \frac{-31}{60}$

Ex 4C Solutions

Question 1.

Solution:

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(*i*) $\frac{12}{7}$ and $\frac{3}{7} = \frac{12}{7}+\frac{3}{7} = \frac{12+3}{7} = \frac{15}{7}$

(*ii*) $\frac{-2}{5}$ and $\frac{1}{5} = \frac{-2}{5}+\frac{1}{5} = \frac{-2+1}{5} = \frac{-1}{5}$

(*iii*) $\frac{3}{-8}$ and $\frac{1}{8} = \frac{3\times(-1)}{-8\times(-1)}+\frac{1}{8}$

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

$= \frac{-1}{4}$ (Dividing by 2)

(*iv*) $\frac{-5}{11}$ and $\frac{7}{-11}$

$\frac{7}{-11} = \frac{7\times(-1)}{-11\times(-1)} = \frac{-7}{11}$

$\therefore \quad \frac{-5}{11}+\frac{-7}{11} = \frac{-5-7}{11} = \frac{-12}{11}$

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$\therefore \quad \frac{-9}{13}+\frac{11}{13}=\frac{-9+11}{13}=\frac{2}{13}$

(vi) $\frac{-2}{9}$ and $\frac{-5}{9}=\frac{-2}{9}+\frac{-5}{9}$

$=\frac{-2-5}{9}=\frac{-7}{9}$

(vii) $\frac{-17}{9}$ and $\frac{-11}{9}=\frac{-17}{9}+\frac{-11}{9}$

$=\frac{-17-11}{9}=\frac{-28}{9}$

(v) $\frac{9}{-13}$ and $\frac{-11}{-13}$

$\frac{9}{-13}=\frac{9\times(-1)}{-13\times(-1)}=\frac{-9}{13}$

$\frac{-11}{-13}=\frac{-11\times(-1)}{-13\times(-1)}=\frac{11}{13}$

(viii) $\frac{-3}{7}$ and $\frac{5}{-7}$

$\frac{5}{-7}=\frac{5\times(-1)}{-7\times(-1)}=\frac{-5}{7}$

$\therefore \quad \frac{-3}{7}+\frac{-5}{7}=\frac{-3-5}{7}=\frac{-8}{7}$

Question 2.

Solution:

$$\therefore \quad \frac{-2}{5}+\frac{3}{4}=\frac{-8}{20}+\frac{15}{20}$$

$$=\frac{-8+15}{20}=\frac{7}{20}$$

(*ii*) $\frac{-5}{9}$ and $\frac{2}{3}$

$$\frac{2}{3}=\frac{2\times3}{3\times3}=\frac{6}{9}$$

(*i*) $\frac{-2}{5}$ and $\frac{3}{4}$

$$\frac{-2}{5}=\frac{-2\times4}{5\times4}=\frac{-8}{20} \qquad \therefore \quad \frac{-5}{9}+\frac{2}{3}=\frac{-5}{9}+\frac{6}{9}$$

$$\frac{3}{4}=\frac{3\times5}{4\times5}=\frac{15}{20} \qquad =\frac{-5+6}{9}=\frac{1}{9}$$

(*iii*) -4 and $\frac{1}{2}$

$$\frac{-4}{1} = \frac{-4\times 2}{1\times 2} = \frac{-8}{2}$$

$$\therefore \quad -4+\frac{1}{2} = \frac{-8}{2}+\frac{1}{2}$$

$$= \frac{-8+1}{2} = \frac{-7}{2}$$

(*iv*) $\frac{-7}{27}$ and $\frac{5}{18}$

$$\frac{-7}{27} = \frac{-7\times 2}{27\times 2} = \frac{-14}{54}$$

($\because$ LCM of 27, 18 = 54)

$$\frac{5}{18} = \frac{5\times 3}{18\times 3} = \frac{15}{54}$$

$$\therefore \quad \frac{-7}{27}+\frac{5}{18} = \frac{-14}{54}+\frac{15}{54}$$

$$= \frac{-14+15}{54} = \frac{1}{54}$$

(v) $\frac{-5}{36}$ and $\frac{-7}{12}$

$= \frac{-7}{12} = \frac{-7\times3}{12\times3} = \frac{-21}{36}$

($\because$ LCM of 36, 12 = 36)

$\therefore \quad \frac{-5}{36}+\frac{-5}{36} = \frac{-5}{36}+\frac{-21}{36}$

$= \frac{-5+(-21)}{36} = \frac{-5-21}{36}$

$= \frac{-26}{36}$ (Dividing by 2)

$= \frac{-13}{18}$

(*vi*) $\frac{1}{-9}$ and $\frac{4}{-27}$

$$\frac{-1}{9} = \frac{1\times(-1)}{-9\times(-1)} = \frac{-1}{9} = \frac{-1\times3}{9\times3} = \frac{-3}{27}$$

$$\frac{4}{-27} = \frac{4\times(-1)}{-27\times(-1)} = \frac{-4}{27}$$

$$= \frac{-3+(-4)}{27} = \frac{-3-4}{27}$$

$$= \frac{-7}{27}$$

(*vii*) $\frac{-9}{24}$ and $\frac{-1}{18}$

(LCM of 24 and 18 = 72)

$$\therefore \quad \frac{-9}{24} = \frac{-9\times3}{24\times3} = \frac{-27}{72}$$

$$\frac{-1}{18} = \frac{-1\times4}{18\times4} = \frac{-4}{72}$$

$$\therefore \quad \frac{-9}{24}+\frac{-1}{18}=\frac{-27}{72}+\frac{-4}{72}$$

$$=\frac{-27+(-4)}{72}=\frac{-27-4}{72}$$

$$=\frac{-31}{72}$$

(*viii*) $\frac{27}{-4}$ and $\frac{-15}{8}$

$$\frac{27}{-4}=\frac{27\times(-1)}{-4\times(-1)}=\frac{-27}{4}$$

$$\Rightarrow \quad \frac{-27}{4}\times\frac{2}{2}=\frac{-54}{8}$$

$$\therefore \quad \frac{-27}{4}+\frac{-15}{8}=\frac{-54}{8}+\frac{-15}{8}$$

$$=\frac{-54+(-15)}{8}$$

$$=\frac{-54-15}{8}=\frac{-69}{8}$$

Question 3.

Solution:

(ii) $\frac{-12}{7}+\frac{3}{7}+\frac{-2}{7}$

$=\frac{-12+3+(-2)}{7}=\frac{-12+3-2}{7}$

$=\frac{-12-2+3}{7}=\frac{-14+3}{7}$

$=\frac{-11}{7}$

(i) $\frac{-3}{5}+\frac{7}{5}+\frac{-1}{5}$

$=\frac{-3+7+(-1)}{5}=\frac{-3+7-1}{5}$

$=\frac{7-4}{5}=\frac{3}{5}$

(iii) $\frac{11}{-12}+\frac{3}{-8}+\frac{1}{4}$

$\frac{11}{-12}=\frac{11\times(-1)}{-12\times(-1)}=\frac{-11}{12}$

$\frac{3}{-8}=\frac{3\times(-1)}{-8\times(-1)}=\frac{-3}{8}$

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Now, LCM of 12, 8, 4 = 24

2	12, 8, 4
2	6, 4, 2
	3, 2, 1

LCM = 2 × 2 × 2 × 3 = 24

$$\therefore \quad \frac{-11}{12} = \frac{-11\times 2}{12\times 2} = \frac{-22}{24}$$

$$\frac{-3}{8} = \frac{-3\times 3}{8\times 3} = \frac{-9}{24}$$

$$\frac{1}{4} = \frac{1\times 6}{4\times 6} = \frac{6}{24}$$

$$\therefore \quad \frac{-11}{12}+\frac{-3}{8}+\frac{1}{4} = \frac{-22}{24}+\frac{-9}{24}+\frac{6}{24}$$

$$= \frac{-22+(-9)+6}{24}$$

$$= \frac{-22-9+6}{24} = \frac{-31+6}{24}$$

$$= \frac{-25}{24}$$

(*iv*) $\frac{-16}{9} + \frac{-5}{12} + \frac{7}{18}$

LCM of 9, 12, 18 = 36

2	9, 12, 18
3	9, 6, 9
3	3, 2, 3
	1, 2, 1

$\therefore$ LCM = 2 × 3 × 3 × 2 = 36

$$\frac{-16}{9} = \frac{-16 \times 4}{9 \times 4} = \frac{-64}{36}$$

$$\frac{-5}{12} = \frac{-5 \times 3}{12 \times 3} = \frac{-15}{36}$$

$$\frac{7}{18} = \frac{7 \times 2}{18 \times 2} = \frac{14}{36}$$

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$$\therefore \quad \frac{-16}{9}+\frac{-5}{12}+\frac{7}{18}=\frac{-64}{36}+\frac{-15}{36}+\frac{14}{36}$$

$$=\frac{-64+(-15)+14}{36}$$

$$=\frac{-64-15+14}{36}=\frac{-79+14}{36}$$

$$=\frac{-65}{36}$$

(v) $-3+\frac{1}{8}+\frac{-2}{5}$

LCM of 8, 5 = 40

$$\frac{-3}{1}=\frac{-3\times 40}{1\times 40}=\frac{-120}{40}$$

$$\frac{1}{8}=\frac{1\times 5}{8\times 5}=\frac{5}{40}$$

$$\frac{-2}{5} = \frac{-2\times 8}{5\times 8} = \frac{-16}{40}$$

$$\therefore \quad \frac{-3}{1}+\frac{1}{8}+\frac{-2}{5} = \frac{-120}{40}+\frac{5}{40}+\frac{-16}{40}$$

$$= \frac{-120+5+(-16)}{40}$$

$$= \frac{-120+5-16}{40} = \frac{-136+5}{40}$$

$$= \frac{-131}{40}$$

(*vi*) $\frac{-13}{8}+\frac{5}{16}+\frac{-1}{4}$

LCM of 8, 16, 4 = 16

$$\frac{-13}{8} = \frac{-13\times 2}{8\times 2} = \frac{-26}{16}$$

$$\frac{5}{16} = \frac{5}{16}$$

$$\frac{-1}{4} = \frac{-1\times 4}{4\times 4} = \frac{-4}{16}$$

$$\therefore \frac{-13}{8}+\frac{5}{16}+\frac{(-1)}{4}=\frac{-26}{16}+\frac{5}{16}+\frac{-4}{16}$$

$$=\frac{-26+5+(-4)}{16}$$

$$=\frac{-26+5-4}{16}=\frac{-30+5}{16}=\frac{-25}{16}$$

Question 4.

Solution:

$$(i)\ \frac{-8}{15}+\frac{2}{-3}=\frac{-8}{15}+\frac{2\times(-1)}{-3\times(-1)}$$

$$=\frac{-8}{15}+\frac{-2}{3}$$

LCM of 15, 3 = 15

$$\frac{-2}{3}=\frac{-2\times5}{3\times5}=\frac{-10}{15}$$

$$\therefore\quad \frac{-8}{15}+\frac{-2}{3}=\frac{-8}{15}+\frac{-10}{15}$$

$$=\frac{-8+(-10)}{15}=\frac{-8-10}{15}$$

$$=\frac{-18}{15}=\frac{-18\div3}{15\div3}=\frac{-6}{5}$$

$$(ii)\quad \frac{-7}{10}+\frac{13}{-15}+\frac{27}{20}$$

$$\frac{13}{-15}=\frac{13\times(-1)}{-15\times(-1)}=\frac{-13}{15}$$

Now LCM of 10, 15, 20 = 60

2	10, 15, 20
5	5, 15, 10
	1, 3, 2

$\therefore$ LCM $= 2 \times 5 \times 3 \times 2 = 60$

$$\frac{-7}{10} = \frac{-7 \times 6}{10 \times 6} = \frac{-42}{60}$$

$$\frac{-13}{15} = \frac{-13 \times 4}{15 \times 4} = \frac{-52}{60}$$

$$\frac{27}{20} = \frac{27 \times 3}{20 \times 3} = \frac{81}{60}$$

$$\therefore \frac{-7}{10} + \frac{-13}{15} + \frac{27}{20} = \frac{-42}{60} + \frac{-52}{60} + \frac{81}{60}$$

$$= \frac{-42+(-52)+81}{60}$$

$$= \frac{-42-52+81}{60} = \frac{-94+81}{60}$$

$$= \frac{-13}{60}$$

(*iii*) $-1+\frac{7}{-9}+\frac{11}{12}$

$$\frac{7}{-9} = \frac{7\times(-1)}{-9\times(-1)} = \frac{-7}{9}$$

LCM of 9 and 12 = 36

3	9, 12
	3, 4

LCM = 3 × 3 × 4 = 36

$$\frac{-1}{1}=\frac{-1\times 36}{1\times 36}=\frac{-36}{36}$$

$$\frac{-7}{9}=\frac{-7\times 4}{9\times 4}=\frac{-28}{36}$$

$$\frac{11}{12}=\frac{11\times 3}{12\times 3}=\frac{33}{36}$$

$$\therefore \quad \frac{-1}{1}+\frac{-7}{9}+\frac{11}{12}=\frac{-36}{36}+\frac{-28}{36}+\frac{33}{36}$$

$$=\frac{-36+(-28)+33}{36}$$

$$=\frac{-36-28+33}{36}$$

$$=\frac{-64+33}{36}=\frac{-31}{36}$$

(*iv*) $\frac{-11}{39}+\frac{5}{26}+\frac{2}{1}$

LCM of 39 and 26 = 78

$$\begin{array}{r|l} 13 & 39, 26 \\ \hline & 3, 2 \end{array}$$

$\therefore$ LCM $= 13 \times 3 \times 2 = 78$

$$\frac{-11}{39} = \frac{-11 \times 2}{39 \times 2} = \frac{-22}{78}$$

$$\frac{5}{26} = \frac{5 \times 3}{26 \times 3} = \frac{15}{78}$$

$$\frac{2}{1} = \frac{2 \times 78}{1 \times 78} = \frac{156}{78}$$

$$\therefore \quad \frac{-11}{39} + \frac{5}{26} + \frac{2}{1} = \frac{-22}{78} + \frac{15}{78} + \frac{156}{78}$$

$$= \frac{-22 + 15 + 156}{78} = \frac{-22 + 171}{78}$$

$$= \frac{149}{78}$$

(v) $2+\frac{-1}{2}+\frac{-3}{4}$

LCM of $2, 4 = 4$

$\therefore \quad \frac{2}{1} = \frac{2\times4}{1\times4} = \frac{8}{4}$

$\frac{-1}{2} = \frac{-1\times2}{2\times2} = \frac{-2}{4}$

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

$\therefore \quad 2+\frac{-1}{2}+\frac{-3}{4} = \frac{8}{4}+\frac{-2}{4}+\frac{-3}{4}$

$= \frac{8+(-2)+(-3)}{4}$

$= \frac{8-2-3}{4} = \frac{8-5}{4} = \frac{3}{4}$

(vi) $\frac{-9}{11}+\frac{2}{3}+\frac{-3}{4}$

LCM of 11, 3, 4 = 11 × 3 × 4 = 132

$\therefore \quad \frac{-9}{11}=\frac{-9\times12}{11\times12}=\frac{-108}{132}$

$\frac{2}{3}=\frac{2\times44}{3\times44}=\frac{88}{132}$

$\frac{-3}{4}=\frac{-3\times33}{4\times33}=\frac{-99}{132}$

$\therefore \frac{-9}{11}+\frac{2}{3}+\frac{-3}{4}=\frac{-108}{132}+\frac{88}{132}+\frac{-99}{132}$

$=\frac{-108+88+(-99)}{132}=\frac{-108+88-99}{132}$

$=\frac{-207+88}{132}=\frac{-119}{132}$

Question 5.

Solution:

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$$(i)\ \frac{12}{5} = 2\frac{2}{5} = 2+\frac{2}{5}$$

$$(ii)\ \frac{-11}{7} = \left(-1\frac{4}{7}\right) = -1+\left(\frac{-4}{7}\right)$$

$$(iii)\ \frac{-25}{9} = \left(-2\frac{7}{9}\right) = -2+\left(\frac{-7}{9}\right)$$

$$(iv)\ \frac{-103}{20} = \left(-5\frac{3}{20}\right) = -5+\left(\frac{-3}{20}\right)$$

Ex 4D Solutions

Question 1.

Solution:

(i) Additive inverse of 5 = -5

(ii) Additive inverse of -9 = – (-9) = 9

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(*iv*) Additive inverse of $\frac{-11}{15} = -\left(\frac{-11}{15}\right)$

$= \frac{11}{15}$

(*v*) $\frac{15}{-4} = \frac{15\times(-1)}{-4\times(-1)} = \frac{-15}{4}$

$\therefore$ Additive inverse of $\frac{-15}{4} = -\left(\frac{-15}{4}\right)$

$= \frac{15}{4}$

(*vi*) $\frac{-18}{-13} = \frac{-18\times(-1)}{-13\times(-1)} = \frac{18}{13}$

$\therefore$ Additive inverse of $\frac{18}{13} = -\left(\frac{18}{13}\right) = \frac{-18}{13}$

(*vii*) Additive inverse of 0 is 0

(*viii*) $\frac{1}{-6} = \frac{1\times(-1)}{-6\times(-1)} = \frac{-1}{6}$

$\therefore$ Additive inverse of $\frac{-1}{6} = -\left(-\frac{1}{6}\right)$

$= \frac{1}{6}$

Question 2.

Solution:

Solution : (*i*) $\frac{3}{4}$ from $\frac{1}{3}$

LCM of 4 and 3 = 12

$\therefore \quad \frac{3}{4} = \frac{3\times3}{4\times3} = \frac{9}{12}$

$\frac{1}{3} = \frac{1\times4}{3\times4} = \frac{4}{12}$

$\therefore \quad \frac{1}{3} - \frac{3}{4} = \frac{4}{12} - \frac{9}{12}$

$= \frac{4-9}{12} = \frac{-5}{12}$ Ans.

(*ii*) $\frac{-5}{6}$ from $\frac{1}{3}$

LCM of 6 and 3 = 6

$\therefore \quad \frac{1}{3} = \frac{1\times2}{3\times2} = \frac{2}{6}$

$\therefore \quad \frac{1}{3} - \left(\frac{-5}{6}\right) = \frac{1}{3} + \frac{5}{6}$

$= \frac{2}{6} + \frac{5}{6} = \frac{2+5}{6}$

$= \frac{7}{6}$ Ans.

(*iii*) $\frac{-8}{9}$ from $\frac{-3}{5}$

LCM of 9 and 5 = 45

$\therefore \quad \frac{-8}{9} = \frac{-8\times5}{9\times5} = \frac{-40}{45}$

$\frac{-3}{5} = \frac{-3\times9}{5\times9} = \frac{-27}{45}$

$\therefore \quad \frac{-3}{5} - \left(\frac{-8}{9}\right) = \frac{-3}{5} + \frac{8}{9}$

$= \frac{-27}{45} + \frac{40}{45}$

$= \frac{-27+40}{45} = \frac{13}{45}$

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$$\frac{1}{1}=\frac{1\times11}{1\times11}=\frac{11}{11}$$

$$\therefore\quad 1-\left(\frac{-18}{11}\right)=1+\frac{18}{11}$$

$$=\frac{11}{11}+\frac{18}{11}=\frac{11+18}{11}$$

$$=\frac{29}{11}\quad \text{Ans.}$$

(*vi*) $\frac{-13}{9}$ from 0

$$0-\left(\frac{-13}{9}\right)=0+\frac{13}{9}=\frac{13}{9}\ \text{Ans.}$$

(*iv*) $\frac{-9}{7}$ from -1

$$\frac{-1}{1}=\frac{-1\times7}{1\times7}=\frac{-7}{7}$$

$$\therefore\quad -1-\left(\frac{-9}{7}\right)=-1+\frac{9}{7}$$

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

(*v*) $\frac{-18}{11}$ from 1

(*vii*) $\frac{-32}{13}$ from $\frac{-6}{5}$

LCM of 13 and 5 = 65

$$\frac{-6}{5}=\frac{-6\times13}{5\times13}=\frac{-78}{65}$$

$$\frac{-32}{13}=\frac{-32\times5}{13\times5}=\frac{-160}{65}$$

$$\therefore\quad \frac{-6}{5}-\left(\frac{-32}{13}\right)=\frac{-6}{5}+\frac{32}{13}$$

$$=\frac{-78}{65}+\frac{160}{65}=\frac{-78+160}{65}$$

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$$\therefore \quad \frac{-4}{7}-\left(\frac{-7}{1}\right)=\frac{-4}{7}+\frac{7}{1}$$

$$=\frac{-4}{7}+\frac{49}{7}=\frac{-4+49}{7}=\frac{45}{7}$$

(*ix*) $\frac{5}{9}$ from $\frac{-2}{3}$

LCM of 9 and 3 = 9

$$\therefore \quad \frac{-2}{3}=\frac{-2\times3}{3\times3}=\frac{-6}{9}$$

$$\frac{-2}{3}-\frac{5}{9}=\frac{-6}{9}-\frac{5}{9}$$

$$=\frac{-6-5}{9}=\frac{-11}{9} \text{ Ans.}$$

(*x*) 5 from $\frac{-3}{5}$

$$\frac{5}{1}=\frac{5\times5}{1\times5}=\frac{25}{5}$$

$$\therefore \quad \frac{-3}{5}-\frac{5}{1}=\frac{-3}{5}-\frac{25}{5}$$

$$=\frac{-3-25}{5}=\frac{-28}{5} \text{ Ans.}$$

$$=\frac{82}{65} \text{ Ans.}$$

(*viii*) -7 from $\frac{-4}{7}$

$$\frac{-7}{1}=\frac{-7\times7}{1\times7}=\frac{-49}{7}$$

Question 3.

Solution:

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Solution : (*i*) $\frac{3}{4}-\frac{4}{5}$

LCM of 4 and 5 = 20

$$\frac{3}{4}=\frac{3\times5}{4\times5}=\frac{15}{20}$$

$$\frac{4}{5}=\frac{4\times4}{5\times4}=\frac{16}{20}$$

$$\therefore \quad \frac{3}{4}-\frac{4}{5}=\frac{15}{20}-\frac{16}{20}$$

$$=\frac{15-16}{20}=\frac{-1}{20} \text{ Ans.}$$

(*ii*) $-3-\frac{4}{7}$

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

LCM of 1 and 7 = 7

$$\therefore \quad \frac{-3}{1}=\frac{-3\times7}{1\times7}=\frac{-21}{7}$$

$$\therefore \quad \frac{-21}{7}-\frac{4}{7}$$

$$=\frac{-21-4}{7}=\frac{-25}{7} \text{ Ans.}$$

(*iii*) $\frac{7}{24}-\frac{19}{36}$

LCM of 24 and 36 = 72

$$\therefore \quad \frac{7}{24}=\frac{7\times3}{24\times3}=\frac{21}{72}$$

$$\frac{19}{36}=\frac{19\times2}{36\times2}=\frac{38}{72}$$

$$\therefore \quad \frac{7}{24}-\frac{19}{36}=\frac{21}{72}-\frac{38}{72}$$

$$= \frac{21-38}{72} = \frac{-17}{72}$$

(iv) $\frac{14}{15} - \frac{13}{20}$

LCM of 15, 20 = 60

$$\therefore \quad \frac{14}{15} = \frac{14\times4}{15\times4} = \frac{56}{60}$$

$$\frac{13}{20} = \frac{13\times3}{20\times3} = \frac{39}{60}$$

$$\therefore \quad \frac{14}{15} - \frac{13}{20} = \frac{56}{60} - \frac{39}{60}$$

$$= \frac{56-39}{60} = \frac{17}{60}$$

(v) $\frac{4}{9} - \frac{2}{-3}$

LCM of 9 and 3 = 9

$$\therefore \quad \frac{2}{-3} = \frac{2\times(-1)}{-3\times(-1)} = \frac{-2}{3}$$

$$= \frac{-2\times3}{3\times3} = \frac{-6}{9}$$

$$\therefore \quad \frac{4}{9} - \frac{2}{-3} = \frac{4}{9} - \left(\frac{-6}{9}\right)$$

$$= \frac{4}{9} + \frac{6}{9} = \frac{4+6}{9}$$

$$= \frac{10}{9}$$

(vi) $\frac{7}{11} - \frac{-4}{-11}$

$$\frac{-4}{-11} = \frac{-4\times(-1)}{-11\times(-1)} = \frac{4}{11}$$

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$\therefore \quad \frac{7}{11}-\frac{4}{11}$

$=\frac{7-4}{11}=\frac{3}{11}$ Ans.

(*vii*) $\frac{-5}{14}-\frac{-2}{7}$

LCM of 14 and 7 = 14

$\therefore \quad \frac{-2}{7}=\frac{-2\times 2}{7\times 2}=\frac{-4}{14}$

$\therefore \quad \frac{-5}{14}-\frac{-2}{7}=\frac{-5}{14}-\left(\frac{-4}{14}\right)$

$=\frac{-5}{14}+\frac{4}{14}=\frac{-5+4}{14}$

$=\frac{-1}{14}$ Ans.

(*viii*) $\frac{-5}{-8}-\frac{-3}{4}$

$\frac{-5}{-8}=\frac{-5\times(-1)}{-8\times(-1)}=\frac{5}{8}$

LCM of 8 and 4 = 8

$\therefore \quad \frac{-3}{4}=\frac{-3\times 2}{4\times 2}=\frac{-6}{8}$

$\therefore \quad \frac{-5}{-8}-\frac{-3}{4}=\frac{5}{8}-\left(\frac{-6}{8}\right)$

$=\frac{5}{8}+\frac{6}{8}=\frac{5+6}{8}=\frac{11}{8}$

Question 4.

Solution:

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$$\left(\frac{33}{8}+\frac{-19}{4}\right)-\left(\frac{-36}{11}+\frac{49}{22}\right)$$

$$=\left(\frac{33}{8}-\frac{19}{4}\right)-\left(\frac{-36}{11}+\frac{49}{22}\right)$$

$$=\left(\frac{33-38}{8}\right)-\left(\frac{-72+49}{22}\right)$$

$$=\left(\frac{-5}{8}\right)-\left(\frac{-23}{22}\right)=\frac{-5}{8}+\frac{23}{22}$$

LCM of 8 and 22 = 88

$$\therefore \quad \frac{-5}{8}=\frac{-5\times11}{8\times11}=\frac{-55}{88}$$

$$\frac{23}{22}=\frac{23\times4}{22\times4}=\frac{92}{88}$$

$$\therefore \quad \frac{-55}{88}+\frac{92}{88}$$

$$=\frac{-55+92}{88}=\frac{37}{88}$$

Question 5.

Solution:

$$\text{Sum of two numbers}=\frac{4}{21}$$

$$\text{One number}=\frac{5}{7}$$

$$\therefore \quad \text{Second number}=\frac{4}{21}-\frac{5}{7}$$

(LCM of 21 and 7 = 21)

$$=\frac{4-15}{21}=\frac{-11}{21}$$

Question 6.

Solution:

$$\text{Sum of two numbers} = \frac{-3}{8}$$

$$\text{One number} = \frac{3}{16}$$

$$\therefore \quad \text{Second number} = \frac{-3}{8} - \frac{3}{16}$$

(LCM of 8 and 16 = 16)

$$= \frac{-6-3}{16} = \frac{-9}{16}$$

Question 7.

Solution:

$$\text{Sum of two numbers} = -3$$

$$\text{One number} = \frac{-15}{7}$$

$$\therefore \quad \text{Second number} = -3 - \left(\frac{-15}{7}\right)$$

$$= \frac{-3}{1} + \frac{15}{7} = \frac{-21+15}{7} = \frac{-6}{7}$$

Question 8.

Solution:

Sum of two rational numbers $= \frac{-4}{3}$

One number $= -5$

Second number $= \frac{-4}{3} - (-5)$ $= \frac{-4}{3} + \frac{5}{1} = \frac{-4+15}{3} = \frac{11}{3}$

Question 9.

Solution:

$$\text{Required number} = \frac{5}{12} - \left(\frac{-3}{8}\right)$$

$$= \frac{5}{12} + \frac{3}{8} = \frac{10+9}{24} \quad (\text{LCM of } 12, 8 = 24)$$

$$= \frac{19}{24}$$

Question 10.

Solution:

$$\text{The required number} = 3 - \left(\frac{-12}{5}\right)$$

$$= \frac{3}{1} + \frac{12}{5} = \frac{15+12}{5} = \frac{27}{5}$$

Question 11.

Solution:

$$\text{The required number} = \frac{-2}{3} - \left(\frac{-5}{7}\right)$$

$$= \frac{-2}{3} + \frac{5}{7} = \frac{-14+15}{21} \quad (\text{LCM of } 3, 7 = 21)$$

$$= \frac{1}{21}$$

Question 12.

Solution:

The required number = −11 – 29

$$= \frac{-9-2}{9} = \frac{-11}{9}$$

Question 13.

Solution:

$$1 - \left(\frac{-13}{4} + \frac{-3}{8}\right)$$

LCM of 4 and 8 = 8

$$\therefore \quad 1 = \frac{1\times 8}{1\times 8} = \frac{8}{8}$$

$$\frac{-13}{4} = \frac{-13\times 2}{4\times 2} = \frac{-26}{8}$$

$$\therefore \quad 1 - \left(\frac{-13}{4} + \frac{-3}{8}\right) = \frac{8}{8} - \left(\frac{-26}{8} + \frac{-3}{8}\right)$$

$$= \frac{8}{8} + \frac{26}{8} + \frac{3}{8} = \frac{8+26+3}{8} = \frac{37}{8}$$

Question 14.

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Solution:

$$\text{The required number} = \frac{-3}{4} - \frac{5}{6}$$

$$(\text{LCM of } 4, 6 = 12)$$

$$= \frac{-9-10}{12} = -\frac{19}{12}$$

Question 15.

Solution:

$$\text{The required number} = \frac{-2}{3} - \left(\frac{-5}{6}\right)$$

$$= \frac{-2}{3} + \frac{5}{6} = \frac{-4+5}{6} \quad (\text{LCM of } 3, 6 = 6)$$

$$= \frac{1}{6}$$

Question 16.

Solution:

$$\text{Let } x \text{ be subtracted from } \frac{-3}{4}$$

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

$$\Rightarrow x = \frac{-3}{4} - 1 = \frac{-3-4}{4} = \frac{-7}{4}$$

$$\therefore \frac{-7}{4} \text{ is to be subtracted}$$

Ex 4E Solutions

Question 1.

Solution:

(*i*) $\frac{3}{4}$ by $\frac{5}{7} = \frac{3}{4} \times \frac{5}{7} = \frac{3\times5}{4\times7} = \frac{15}{28}$

(*ii*) $\frac{9}{8}$ by $\frac{32}{3} = \frac{9}{8} \times \frac{32}{3} = \frac{9\times32}{8\times3}$

$= \frac{3\times4}{1\times1} = \frac{12}{1} = 12$

(*iii*) $\frac{7}{6}$ by $24 = \frac{7}{6} \times \frac{24}{1} = \frac{7\times4}{1\times1} = \frac{28}{1} = 28$

(*iv*) $\frac{-2}{3}$ by $\frac{6}{7} = \frac{-2}{3} \times \frac{6}{7} = \frac{-2\times6}{3\times7}$

$= \frac{-2\times2}{1\times7} = \frac{-4}{7}$

(*v*) $\frac{-12}{5}$ by $\frac{10}{-3} = \frac{-12}{5} \times \frac{10}{-3}$

$= \frac{-12\times10}{5\times(-3)} = \frac{-4\times2}{1\times(-1)}$

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

(*vi*) $\frac{25}{-9}$ by $\frac{3}{-10} = \frac{25}{-9} \times \frac{3}{-10}$

$\frac{25}{-9} = \frac{25\times(-1)}{-9\times(-1)} = \frac{-25}{9}$

$\frac{3}{-10} = \frac{3\times(-1)}{-10\times(-1)} = \frac{-3}{10}$

$= \frac{(-25)\times(-3)}{9\times10} = \frac{(-5)\times(-1)}{3\times2} = \frac{5}{6}$

(*vii*) $\frac{-7}{10}$ by $\frac{-40}{21} = \frac{-7}{10} \times \frac{-40}{21}$

$$= \frac{(-7)\times(-40)}{10\times 21} = \frac{(-1)\times(-4)}{1\times 3} = \frac{4}{3}$$

(*viii*) $\frac{-36}{5}$ by $\frac{20}{-3}$

$$= \frac{20}{-3} = \frac{20\times(-1)}{-3\times(-1)} = \frac{-20}{3}$$

$$\therefore \quad \frac{-36}{5} \times \frac{20}{-3} = \frac{-36}{5} \times \frac{-20}{3}$$

$$= \frac{(-36)\times(-20)}{5\times 3}$$

$$= \frac{(-12)\times(-4)}{1\times 1} = \frac{48}{1} = 48$$

(*ix*) $\frac{-13}{15}$ by $\frac{-25}{26}$

$$= \frac{(-13)\times(-25)}{15\times 26} = \frac{(-1)\times(-5)}{3\times 2}$$

$$= \frac{5}{6}$$

Question 2.

Solution:

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(ii) $\frac{-7}{30}\times\frac{5}{14}=\frac{-7\times5}{30\times14}$

$=\frac{-1\times1}{6\times2}=\frac{-1}{12}$

(iii) $\frac{5}{-18}\times\frac{-9}{20}$

$\frac{5}{-18}=\frac{5\times(-1)}{-18\times(-1)}=\frac{-5}{18}$

$\therefore \quad \frac{-5}{18}\times\frac{-9}{20}=\frac{(-5)\times(-9)}{18\times20}$

$=\frac{(-1)\times(-1)}{2\times4}=\frac{1}{8}$

(iv) $\frac{-9}{8}\times\frac{-16}{3}=\frac{(-9)\times(-16)}{8\times3}$

$=\frac{(-3)\times(-2)}{1\times1}=\frac{6}{1}=6$

(i) $\frac{3}{20}\times\frac{4}{5}=\frac{3\times4}{20\times5}$

$=\frac{3\times1}{5\times5}=\frac{3}{25}$

(v) $-32\times\frac{-7}{36}=\frac{(-32)\times(-7)}{36}$

$=\frac{(-8)\times(-7)}{9}=\frac{56}{9}$

(vi) $\frac{16}{-21}\times\frac{-14}{5}$

$\frac{16}{-21}=\frac{16\times(-1)}{-21\times(-1)}=\frac{-16}{21}$

$\therefore \quad \frac{-16}{21}\times\frac{-14}{5}=\frac{(-16)\times(-14)}{21\times5}$

$=\frac{(-16)\times(-2)}{3\times5}=\frac{32}{15}$

Question 3.

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Solution:

$$(i)\ \frac{7}{24} \times -48 = \frac{7}{24} \times \frac{(-48)}{1}$$

$$= \frac{7\times(-48)}{24\times1} = \frac{7\times(-2)}{1\times1} = -14$$

$$(ii)\ \frac{-19}{36} \times 16 = \frac{-19}{36} \times \frac{16}{1} = \frac{-19\times16}{36\times1}$$

$$= \frac{-19\times4}{9\times1} = \frac{-76}{9}$$

$$(iii)\ \frac{-3}{4} \times \frac{4}{3} = \frac{-3}{4} \times \frac{4}{3} = \frac{-3\times4}{4\times3}$$

$$= \frac{-12}{12} = -1$$

$$(iv)\ -13 \times \frac{17}{26} = \frac{-13}{1} \times \frac{17}{26}$$

$$= \frac{-1\times17}{1\times2} = \frac{-17}{2}$$

$$(v)\ \frac{-13}{5} \times -10 = \frac{-13}{5} \times \frac{-10}{1}$$

$$= \frac{(-13)\times(-10)}{5\times1} = \frac{(-13)\times(-2)}{1\times1}$$

$$= 26$$

$$(vi)\ \frac{-9}{16} \times \frac{-64}{27} = \frac{-9\times-64}{16\times27} = \frac{-1\times-4}{1\times3}$$

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

Question 4.

Solution:

(*i*) $\left(\frac{13}{8}\times\frac{12}{13}\right)+\left(\frac{-4}{9}\times\frac{3}{-2}\right)$

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

$\left(\frac{13}{8}\times\frac{12}{13}\right)+\left(\frac{-4}{9}\times\frac{-3}{2}\right)$

$=\frac{13\times12}{8\times13}+\frac{(-4)\times(-3)}{9\times2}$

$=\frac{3}{2}+\frac{(-2)\times(-1)}{3\times1}=\frac{3}{2}+\frac{2}{3}$

(LCM of 2 and 3 = 6)

$=\frac{9+4}{6}=\frac{13}{6}$

(*ii*) $\left(\frac{16}{15}\times\frac{-25}{8}\right)+\left(\frac{-14}{27}\times\frac{6}{7}\right)$

$=\frac{16\times(-25)}{15\times8}+\frac{-14\times6}{27\times7}$

$=\frac{2\times(-5)}{3\times1}+\frac{-2\times2}{9\times1}$

$=\frac{-10}{3}+\frac{-4}{9}=\frac{-30+(-4)}{9}$

$=\frac{-30-4}{9}$ (LCM of 3, 9 = 9)

$=\frac{-34}{9}$

(*iii*) $\left(\frac{6}{55}\times\frac{-22}{9}\right)-\left(\frac{26}{125}\times\frac{-10}{39}\right)$

$=\frac{6\times(-22)}{55\times9}-\frac{26\times(-10)}{125\times39}$

$=\frac{2\times(-2)}{5\times3}-\frac{2\times(-2)}{25\times3}$

$=\frac{-4}{15}-\frac{-4}{75}=\frac{-4}{15}+\frac{4}{75}$

(LCM of 15 and 75 = 75)

$=\frac{-20+4}{75}=\frac{-16}{75}$

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(iv) $\left(\frac{-12}{7}\times\frac{-14}{27}\right)-\left(\frac{-8}{45}\times\frac{9}{16}\right)$

$=\frac{(-12)\times(-14)}{7\times27}-\frac{-8\times9}{45\times16}$

$=\frac{-4\times(-2)}{1\times9}-\frac{-1\times1}{5\times2}$

$=\frac{8}{9}-\frac{-1}{10}=\frac{8}{9}+\frac{1}{10}$

(LCM of 9 and 10 = 90)

$=\frac{80+9}{90}=\frac{89}{90}$

Question 5.

Solution:

Cost of 1 metre of cloth

$=\text{Rs. } 40\frac{1}{2}=\text{Rs. } \frac{81}{2}$

$\therefore$ Cost of $3\frac{1}{3}$ m cloth $=\text{Rs. } \frac{81}{2}\times3\frac{1}{3}$

$=\text{Rs. } \frac{81}{2}\times\frac{10}{3}=\text{Rs. } 135$

Question 6.

Solution:

$$\text{Speed of bus} = 46\frac{2}{3} \text{ km/hr}$$

$$= \frac{140}{3} \text{ km/hr}$$

$$\text{Distance covered in } 2\frac{2}{5} \text{ hours}$$

$$= \frac{140}{3} \times 2\frac{2}{5} \text{ km}$$

$$= \frac{140}{3} \times \frac{12}{5} \text{ km} = 112 \text{ km}$$

Ex 4F Solutions

Question 1.

Solution:

(i) Reciprocal of $18 = \frac{1}{18}$

(ii) Reciprocal of $-16 = \frac{1}{-16}$

$= \frac{1\times(-1)}{-16\times(-1)} = \frac{-1}{16}$

(iii) Reciprocal of $\frac{13}{25} = \frac{25}{13}$

(iv) Reciprocal of $\frac{-17}{12} = \frac{12}{-17}$

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

(v) Reciprocal of $\frac{-6}{19} = \frac{19}{-6} = \frac{19\times(-1)}{-6\times(-1)}$

$= \frac{-19}{6}$

(vi) Reciprocal of $\frac{-3}{-5} = \frac{-5}{-3}$

$= \frac{-5\times(-1)}{-3\times(-1)} = \frac{5}{3}$

(vii) Reciprocal of -1 = -1

(viii) Reciprocal of 0 does not exist.

Question 2.

Solution:

$$(i)\ \frac{4}{9}\div\left(\frac{-5}{12}\right)=\frac{4}{9}\times\left(\frac{12}{-5}\right)$$

$$=\frac{4}{9}\times\left(\frac{-12}{5}\right)\quad\left\{\because\frac{12}{-5}=\frac{12\times(-1)}{-5\times(-1)}=\frac{-12}{5}\right\}$$

$$=\frac{4\times(-12)}{9\times5}=\frac{4\times(-4)}{3\times5}$$

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

$$(ii)\ -8\div\left(\frac{-5}{16}\right)=\frac{-8}{1}\times\left(\frac{16}{-5}\right)$$

$$\left(\frac{-8}{1}\right)\times\left(\frac{-16}{5}\right)\left\{\because\frac{16}{-5}=\frac{16\times(-1)}{-5\times(-1)}=\frac{-16}{5}\right\}$$

$$=\frac{(-8)\times(-16)}{5}=\frac{128}{5}$$

$$(iii)\ \frac{-12}{7}\div(-18)=\frac{-12}{7}\times\frac{1}{-18}$$

$$=\left(\frac{-12}{7}\right)\times\left(\frac{-1}{18}\right)\qquad\left\{\because\frac{1}{-18}=\frac{1\times(-1)}{-18\times(-1)}=\frac{-1}{18}\right\}$$

$$=\frac{(-12)\times(-1)}{7\times18}=\frac{-2\times(-1)}{7\times3}$$

$$=\frac{2}{21}$$

$$(iv)\ \left(\frac{-1}{10}\right)\div\left(\frac{-8}{5}\right)=\left(\frac{-1}{10}\right)\times\left(\frac{5}{-8}\right)$$

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$$= \left(\frac{-1}{10}\right) \times \left(\frac{-5}{8}\right) \left\{\because \frac{5}{-8} = \frac{5 \times (-1)}{-8 \times (-1)} = \frac{-5}{8}\right\}$$

$$\frac{(-1) \times (-5)}{10 \times 8} = \frac{(-1) \times (-1)}{2 \times 8}$$

$$= \frac{1}{16}$$

$$(v) \left(\frac{-16}{35}\right) \div \left(\frac{-15}{14}\right) = \left(\frac{-16}{35}\right) \times \left(\frac{14}{-15}\right)$$

$$= \left(\frac{-16}{35}\right) \times \left(\frac{-14}{15}\right)$$

$$\left\{\because \frac{14}{-15} = \frac{14 \times (-1)}{-15 \times (-1)} = \frac{-14}{15}\right\}$$

$$\frac{(-16) \times (-14)}{35 \times 15} = \frac{(-16) \times (-2)}{5 \times 15}$$

$$= \frac{32}{75}$$

$$(vi) \left(\frac{-65}{14}\right) \div \left(\frac{13}{-7}\right) = \frac{-65}{14} \times \frac{-7}{13}$$

$$= \frac{(-65) \times (-7)}{14 \times 13} = \frac{(-5) \times (-1)}{2 \times 1}$$

$$= \frac{5}{2}$$

Question 3.

Solution:

$(i)\ (.....) \div \frac{-7}{5} = \frac{10}{19}$

$\text{Required number} = \frac{10}{19} \times \left(\frac{-7}{5}\right) = \frac{2 \times (-7)}{19}$

$= \frac{-14}{19}$

$\therefore \quad \left(\frac{-14}{19}\right) \div \frac{-7}{5} = \frac{10}{19}$

$(ii) \quad (.....) \div (-3) = \frac{-4}{15}$

$\text{Required number} = \frac{-4}{15} \times -3 = \frac{-4 \times (-3)}{15}$

$= \frac{4}{5}$

$\therefore \quad \left(\frac{4}{5}\right) \div (-3) = \frac{-4}{15}$

$(iii) \quad \frac{9}{8} \div (.....) = \frac{-3}{2}$

$\therefore \quad \text{Required number} = \frac{9}{8} \div \left(\frac{-3}{2}\right)$

$= \frac{9}{8} \times \frac{2}{-3} = \frac{9}{8} \times \frac{-2}{3}$

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

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

$\therefore \quad \frac{9}{8} \div \left(\frac{-3}{4}\right) = \frac{-3}{2}$

$(iv) \quad (-12) \div (.....) = \frac{-6}{5}$

$\therefore \quad \text{Required number} = -12 \div \left(\frac{-6}{5}\right)$

$= -12 \times \frac{5}{-6}$

$= -12 \times \left(\frac{-5}{6}\right) \quad \left\{\because \frac{5}{-6} = \frac{5 \times (-1)}{-6 \times (-1)} = \frac{-5}{6}\right\}$

$= (-2) \times (-5)$

$= 10$

$\therefore (-12) \div (10) = \frac{-6}{5}$

Question 5.

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Solution:

$$= \frac{-44}{9} \times \frac{3}{-11}$$

$$= \frac{-44 \times 3}{9 \times (-11)} = \frac{-4 \times 1}{3 \times (-1)} = \frac{-4}{-3}$$

$$\text{The required number} = \left(\frac{-44}{9}\right) \div \left(\frac{-11}{3}\right) \qquad = \frac{4}{3}$$

Question 6.

Solution:

$$\text{The required number} = 24 \div \left(\frac{-8}{15}\right)$$

$$= 24 \times \frac{15}{-8}$$

$$= 24 \times \frac{15 \times (-1)}{-8 \times (-1)}$$

$$= 24 \times \frac{(-15)}{8} = 3 \times (-15)$$

$$= -45$$

Question 7.

Solution:

Product of two number = 10

One number = -8

Second number = 10 ÷ (-8)

$$= 10 \times \frac{1}{-8} = 10 \times \frac{1 \times (-1)}{-8 \times (-1)}$$

$$= \frac{10 \times (-1)}{8} = \frac{-10}{8} - \frac{-5}{4}$$

Question 8.

Solution:

Product of two rational numbers = – 9

One number = -12

Second number = (-9) ÷ (-12)

$$= -9 \times \frac{1}{-12}$$

$$= -9 \times \frac{-1}{12} \left\{ \because \frac{1}{-12} = \frac{1 \times (-1)}{-12 \times (-1)} = \frac{-1}{12} \right\}$$

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

Question 9.

Solution:

$$\text{Product of two numbers} = \frac{-16}{9}$$

$$\text{One number} = \frac{-4}{3}$$

$$\therefore \text{Second number} = \left(\frac{-16}{9}\right) \div \left(\frac{-4}{3}\right)$$

$$= \frac{-16}{9} \times \frac{3}{-4} = \frac{-16 \times 3}{9 \times (-4)} = \frac{-4 \times 1}{3 \times (-1)}$$

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

Question 10.

Solution:

$$\therefore \text{Second required number} = \frac{5}{26} \div \left(\frac{-8}{39}\right)$$

$$\text{Product of two numbers} = \frac{5}{26} \qquad = \frac{5}{26} \times \frac{39}{-8} = \frac{5 \times 3}{2 \times (-8)}$$

$$\text{One number} = \frac{-8}{39} \qquad = \frac{15}{-16} = \frac{15 \times (-1)}{(-16) \times (-1)} = \frac{-15}{16}$$

Question 11.

Solution:

Cloth required for 24 pairs of trousers =54 m

Cloth required for one pair = (54 ÷ 24) m

$= 54 \times \frac{1}{24} = \frac{9}{4}$ m

$= 2\frac{1}{4}$ m

Question 12.

Solution:

Total length of rape = 30 m

$\text{Length of one piece} = 3\frac{3}{4} = \frac{15}{4}$ m

$\therefore$ No. of pieces of rope $= 30 \div \frac{15}{4}$

$= 30 \times \frac{4}{15} = 2 \times 4$

$= 8$ pieces

Question 13.

Solution:

$\text{Cost of } 2\frac{1}{2} \text{ m or } \frac{5}{2} \text{ m of cloth} = \text{Rs } 78\frac{3}{4}$

$= \text{Rs. } \frac{315}{4}$

$\therefore$ Cost of one metre of cloth $= \text{Rs } \frac{315}{4} \div \frac{5}{2}$

$= \text{Rs } \frac{315}{4} \times \frac{2}{5}$

$= \text{Rs } \frac{63}{2} = \text{Rs } 31\frac{1}{2}$

Ex 4G Solutions

OBJECTIVE QUESTIONS

Mark (✓) against the correct answer in each of the following:

Question 1.

Solution:

(b)

$$\because \frac{33}{-55} = \frac{33\times(-1)}{55\times(-1)} = \frac{-33}{55} = \frac{-33\div 11}{55\div 11} = \frac{-3}{5}$$

(HCF of 33 and 55 = 11)

Question 2.

Solution:

(b)

$$\frac{-102}{119} = \frac{-102\div 17}{119\div 17} = \frac{-6}{7}$$

(HCF of 102 and 119 = 17)

Question 3.

Solution:

(a)

$$\because \quad \frac{x}{6} = \frac{7}{-3}$$

$$\Rightarrow x \times (-3) = 7 \times 6$$

$$\Rightarrow -3x = 7 \times 6 \quad \Rightarrow \quad x = \frac{7 \times 6}{-3} = \frac{42}{-3}$$

$$\Rightarrow x = \frac{42 \times (-1)}{-3 \times (-)} = \frac{-42}{3} = -14$$

Question 4.

Solution:

(c)

$$\text{Required number} = 1 - \left(\frac{-5}{9}\right) = 1 + \frac{5}{9}$$

$$= \frac{9+5}{9} = \frac{14}{9}$$

Question 5.

Solution:

(b)

$$= \frac{-9-10}{12} \qquad (\text{LCM of } 4, 6 = 12)$$

$$\text{Required number} = \frac{-3}{4} - \frac{5}{6} \qquad = \frac{-19}{12}$$

Question 6.

Solution:

(a)

$$\frac{5}{-6} = \frac{5\times(-1)}{-6\times(-1)} = \frac{-5}{6}$$

LCM of 6 and 12 = 12

$$\therefore \quad \frac{-5}{6} = \frac{-5\times12}{6\times12} = \frac{-60}{72} = \frac{-10}{12}$$

and $\frac{-7}{12} = \frac{-7}{12}$

It is clear that $\frac{-10}{12}$ or $\frac{5}{-6}$ is smaller than

$\frac{-7}{12}$

Question 7.

Solution:

(a)

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

LCM of 3 and 5 = 15

$$\therefore \quad \frac{-2}{3} = \frac{-2\times5}{3\times5} = \frac{-10}{15}$$

$$\frac{-4}{5} = \frac{-4\times3}{5\times3} = \frac{-12}{15}$$

It is clear that $\frac{-10}{15}$ or $\frac{-2}{3}$ is larger than $\frac{-4}{5}$

Question 8.

Solution:

(c)

$$\text{Reciprocal of} = -6 = \frac{1}{-6} = \frac{1\times(-1)}{-6\times(-1)}$$

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

Question 9.

Solution:

(b)

$$\text{Multiplicative inverse of } \frac{-2}{3}$$

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

Question 10.

Solution:

$$-2\frac{1}{9} - 6 \qquad = \frac{-19-54}{9} = \frac{-73}{9}$$

$$= \frac{-19}{9} - 6 \qquad = -8\frac{1}{9} \qquad \text{(a)}$$

Question 11.

Solution:

$$\frac{-6}{13}-\left(\frac{-7}{15}\right)$$

$$=\frac{-6}{13}+\frac{7}{15}$$

$$=\frac{-90+91}{195}=\frac{1}{195} \qquad \text{(c)}$$

Question 12.

Solution:

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

$$=\frac{-7}{3}+\frac{23}{5}$$

$$=\frac{-35+69}{15}=\frac{34}{15}=2\frac{4}{15} \qquad \text{(b)}$$

Question 13.

Solution:

$$\frac{2}{3}-1\frac{5}{7}$$

$$=\frac{2}{3}-\frac{12}{7}$$

$$=\frac{14-36}{21}=\frac{-22}{21}=-1\frac{1}{21} \qquad \text{(b)}$$

Question 14.

Solution:

Which is greater of $\frac{-4}{9}$ and $\frac{-5}{12}$

L.C.M. of 9 and 12 = 36

$\therefore \frac{-4}{9} = \frac{-4\times4}{9\times4} = \frac{-16}{36}$

and $\frac{-5}{12} = \frac{-5\times3}{12\times3} = \frac{-15}{36}$

$\therefore \frac{-15}{36} > \frac{-16}{36}$

or $\frac{-5}{12} > \frac{-4}{9}$

or $\frac{-5}{12}$ is greater (b)

Question 15.

Solution:

$\frac{-9}{14} + ? = -1$

$-1 + \frac{9}{14} = ?$

$? = \frac{-14+9}{14} = \frac{-5}{14}$ (b)

Question 16.

Solution:

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

L.C.M. of 4, 6, 3 = 12

$\frac{5}{4} = \frac{5\times3}{4\times3} = \frac{15}{12}$

$\frac{7}{6} = \frac{7\times2}{6\times2} = \frac{14}{12}$

$\frac{-2}{3} = \frac{-2\times4}{3\times4} = \frac{-8}{12}$

Now $\frac{5}{4} - \frac{7}{6} - \frac{-2}{3} = \frac{15}{12} - \frac{14}{12} - \frac{-8}{12}$

$= \frac{15}{12} - \frac{14}{12} + \frac{8}{12}$

$= \frac{15-14+8}{12} = \frac{9}{12} = \frac{3}{4}$ (a)

Question 17.

Solution:

$1 \div \frac{1}{2}$

$= 1 \times \frac{2}{1} = 2$ (b)

Question 18.

Solution:

$\frac{-3}{14} \times ? = \frac{5}{12}$

$\Rightarrow ? = \frac{5}{12} \times \frac{14}{-3} = \frac{35}{-18} = \frac{-35}{18}$ (a)

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Question 19.

Solution:

$0 \div \frac{-7}{5} = 0$ (c)

(Zero divisible by any non-zero number is zero)

Question 20.

Solution:

$\frac{-3}{8} \div 0$ is not defined (d)

Division by 0 is not defined

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