Operations on Rational Numbers

Exercise 48:

Solution 1(1):

$$\frac{9}{7}+\frac{5}{7}$$
$$=\frac{9+5}{7}$$
$$=\frac{14}{7}$$
$$=2$$

Solution 1(2):

$$\frac{9}{7}-\frac{5}{7}$$
$$=\frac{9-5}{7}$$
$$=\frac{4}{7}$$

Solution 1(3):

$$\frac{3}{5}+\frac{11}{8}$$
$$=\frac{3\times 8}{5\times 8}+\frac{11\times 5}{8\times 5}$$
$$=\frac{24}{40}+\frac{55}{40}$$
$$=\frac{24+55}{40}$$
$$=\frac{79}{40}$$

Solution 1(4):

$$\frac{13}{18}+\frac{5}{6}$$
$$=\frac{13}{18}+\frac{5\times 3}{6\times 3}$$
$$=\frac{13}{18}+\frac{15}{18}$$
$$=\frac{13+15}{18}$$
$$=\frac{28}{18}$$
$$=\frac{14}{9}$$

Solution 1(5):

$$\frac{9}{2}-\frac{17}{6}$$
$$=\frac{9\times 3}{2\times 3}-\frac{17}{6}$$
$$=\frac{27}{6}-\frac{17}{6}$$
$$=\frac{27-17}{6}$$
$$=\frac{10}{6}$$
$$=\frac{5}{3}$$

Solution 1(6):

$$\frac{1}{4}+\frac{3}{8}$$
$$=\frac{1\times 2}{4\times 2}+\frac{3}{8}$$
$$=\frac{2}{8}+\frac{3}{8}$$
$$=\frac{2+3}{8}$$
$$=\frac{5}{8}$$

Solution 1(7):

$$\frac{15}{8} - \frac{23}{16}$$
$$= \frac{15 \times 2}{8 \times 2} - \frac{23}{16}$$
$$= \frac{30}{16} - \frac{23}{16}$$
$$= \frac{30 - 23}{16}$$
$$= \frac{7}{16}$$

Solution 1(8):

$$\frac{7}{5} \times \frac{4}{3}$$
$$= \frac{7 \times 4}{5 \times 3}$$
$$= \frac{28}{15}$$

Solution 1(9):

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

Solution 1(10):

$$\frac{6}{7} \div \frac{8}{7}$$
$$= \frac{6}{7} \times \frac{7}{8}$$
$$= \frac{6 \times 7}{7 \times 8}$$
$$= \frac{6}{8}$$
$$= \frac{3}{4}$$

Solution 1(11):

$$\frac{12}{35} \times \frac{14}{9}$$
$$= \frac{3 \times 4}{7 \times 5} \times \frac{7 \times 2}{3 \times 3}$$
$$= \frac{4}{5} \times \frac{2}{3}$$
$$= \frac{8}{15}$$

Solution 1(12):

$$\frac{18}{7} \times \frac{7}{18}$$
$$= \frac{18 \times 7}{7 \times 18}$$
$$= 1$$

Solution 1(13):

$$\frac{6}{5} \div \frac{5}{6}$$
$$= \frac{6}{5} \times \frac{6}{5}$$
$$= \frac{36}{25}$$

Solution 1(14):

$$\frac{35}{16} \div \frac{21}{8}$$
$$= \frac{35}{16} \times \frac{8}{21}$$
$$= \frac{35 \times 8}{16 \times 21}$$
$$= \frac{7 \times 5 \times 8}{8 \times 2 \times 7 \times 3}$$
$$= \frac{5}{2 \times 3}$$
$$= \frac{5}{6}$$

Solution 1(15):

$$\frac{9}{14} \div \frac{3}{7}$$
$$= \frac{9}{14} \times \frac{7}{3}$$
$$= \frac{9 \times 7}{14 \times 3}$$
$$= \frac{3 \times 3 \times 7}{7 \times 2 \times 3}$$
$$= \frac{3}{2}$$

Solution 1(16):

$$\frac{7}{11} \times \frac{5}{6}$$
$$= \frac{7 \times 5}{11 \times 6}$$
$$= \frac{35}{66}$$

Exercise 49:

Solution 1(1):

$$\frac{5}{9} + \frac{8}{9}$$
$$= \frac{5+8}{9}$$
$$= \frac{13}{9}$$

Solution 1(2):

$$\frac{13}{8} - \frac{7}{8}$$
$$= \frac{13-7}{8}$$
$$= \frac{6}{8}$$
$$= \frac{3}{4}$$

Solution 1(3):

$$\frac{4}{5}+\frac{-7}{10}$$
$$=\frac{4\times 2}{5\times 2}+\frac{-7}{10}$$
$$=\frac{8}{10}+\frac{-7}{10}$$
$$=\frac{8+(-7)}{10}$$
$$=\frac{1}{10}$$

Solution 1(4):

$$\frac{-10}{7}-\frac{1}{2}$$
$$=\frac{-10\times 2}{7\times 2}-\frac{1\times 7}{2\times 7}$$
$$=\frac{-20}{14}-\frac{7}{14}$$
$$=\frac{-20-7}{14}$$
$$=\frac{-27}{14}$$

Solution 1(5):

$$\frac{-13}{4}+\frac{-3}{4}$$
$$=\frac{-13+(-3)}{4}$$
$$=\frac{-16}{4}$$
$$=-4$$

Solution 1(6):

$$\frac{-13}{4} - \frac{-3}{4}$$
$$= \frac{-13-(-3)}{4}$$
$$= \frac{-13+3}{4}$$
$$= \frac{-10}{4}$$
$$= \frac{-5}{2}$$

Solution 1(7):

$$\frac{2}{5} - \frac{7}{9}$$
$$= \frac{2\times 9}{5\times 9} - \frac{7\times 5}{9\times 5}$$
$$= \frac{18}{45} - \frac{35}{45}$$
$$= \frac{18-35}{45}$$
$$= \frac{-17}{45}$$

Solution 1(8):

$$\frac{-3}{5} + \frac{2}{7}$$
$$= \frac{-3\times 7}{5\times 7} + \frac{2\times 5}{7\times 5}$$
$$= \frac{-21}{35} + \frac{10}{35}$$
$$= \frac{-21+10}{35}$$
$$= \frac{-11}{35}$$

Solution 2:

1. The additive inverse of $\frac{5}{9}$ is $\frac{-5}{9}$.
2. The additive inverse of $\frac{-8}{3}$ is $\frac{8}{3}$.
3. The additive inverse of $\frac{-10}{17}$ is $\frac{10}{17}$.
4. The additive inverse of $\frac{9}{2}$ is $\frac{-9}{2}$.
5. The additive inverse of -1 is 1.
6. The additive inverse of 7 is -7.
7. The additive inverse of -25 is 25.
8. The additive inverse of 0 is 0.

Exercise 50:

Solution 1(1):

$$\frac{15}{8} \times \frac{16}{25}$$
$$= \frac{5 \times 3}{4 \times 2} \times \frac{4 \times 2 \times 2}{5 \times 5}$$
$$= \frac{5 \times 3 \times 4 \times 2 \times 2}{4 \times 2 \times 5 \times 5}$$
$$= \frac{3 \times 2}{5}$$
$$= \frac{6}{5}$$

Solution 1(2):

$$\frac{15}{8} \times \frac{-16}{25}$$
$$= \frac{5 \times 3}{4 \times 2} \times \frac{-4 \times 4}{5 \times 5}$$
$$= \frac{5 \times 3 \times (-2) \times 2 \times 4}{4 \times 2 \times 5 \times 5}$$
$$= \frac{3 \times (-2)}{5}$$
$$= \frac{-6}{5}$$

Solution 1(3):

$$\frac{-15}{8} \times \frac{-16}{25}$$
$$= \frac{5 \times (-3)}{4 \times 2} \times \frac{-4 \times 4}{5 \times 5}$$
$$= \frac{5 \times (-3) \times (-2) \times 2 \times 4}{4 \times 2 \times 5 \times 5}$$
$$= \frac{(-3) \times (-2)}{5}$$
$$= \frac{6}{5}$$

Solution 1(4):

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

Solution 1(5):

$$\frac{-14}{9} \times \frac{12}{7}$$
$$= \frac{7 \times (-2)}{3 \times 3} \times \frac{4 \times 3}{7}$$
$$= \frac{(-2) \times 4}{3}$$
$$= \frac{-8}{3}$$

Solution 1(6):

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

Solution 1(7):

$$\frac{18}{5} \times \frac{-5}{9}$$
$$= \frac{9 \times 2}{5} \times \frac{-5}{9}$$
$$= \frac{2}{5} \times (-5)$$
$$= \frac{(-2) \times 5}{5}$$
$$= -2$$

Solution 1(8):

$$\frac{-13}{5} \times \frac{2}{7}$$
$$= \frac{-13 \times 2}{5 \times 7}$$
$$= \frac{-26}{35}$$

Solution 1(9):

$$\frac{3}{8} \times (-6)$$
$$= \frac{3}{4 \times 2} \times 2 \times (-3)$$
$$= \frac{3}{4} \times (-3)$$
$$= \frac{-9}{4}$$

Solution 1(10):

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

Solution 1(11):

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

Solution 1(12):

$$\frac{-8}{5} \times \frac{-5}{8}$$
$$= \frac{(-8) \times (-5)}{5 \times 8}$$
$$= \frac{40}{40}$$
$$= 1$$

Solution 2:

S. No.	Number	Multiplicative inverse
1.	$\frac{13}{4}$	$\frac{4}{13}$
2.	$\frac{4}{13}$	$\frac{13}{4}$
3.	$\frac{-3}{8}$	$\frac{-8}{3}$
4.	$\frac{-8}{3}$	$\frac{-3}{8}$
5.	$\frac{-16}{7}$	$\frac{-7}{16}$
6.	$\frac{7}{6}$	$\frac{6}{7}$
7.	5	$\frac{1}{5}$
8.	-2	$\frac{-1}{2}$
9.	1	1
10.	11	$\frac{1}{11}$

Exercise 51:

Solution 1(1):

$$\frac{20}{9} \div \frac{10}{3}$$
$$= \frac{20}{9} \times \frac{3}{10}$$
$$= \frac{2 \times 10 \times 3}{3 \times 3 \times 10}$$
$$= \frac{2}{3}$$

Solution 1(2):

$$\frac{-20}{9} \div \frac{10}{3}$$
$$= \frac{-20}{9} \times \frac{3}{10}$$
$$= \frac{(-2) \times 10 \times 3}{3 \times 3 \times 10}$$
$$= \frac{-2}{3}$$

Solution 1(3):

$$\frac{-20}{9} \div \frac{-10}{3}$$
$$= \frac{-20}{9} \times \frac{-3}{10}$$
$$= \frac{(-2) \times 10 \times (-3)}{3 \times 3 \times 10}$$
$$= \frac{2}{3}$$

Solution 1(4):

$$\frac{20}{9} \div \frac{-10}{3}$$
$$= \frac{20}{9} \times \frac{-3}{10}$$
$$= \frac{2 \times 10 \times (-3)}{3 \times 3 \times 10}$$
$$= \frac{-2}{3}$$

Solution 1(5):

$$2 \div \frac{3}{5}$$
$$= 2 \times \frac{5}{3}$$
$$= \frac{10}{3}$$

Solution 1(6):

$$\frac{18}{7} \div (-3)$$
$$= \frac{18}{7} \times \frac{-1}{3}$$
$$= \frac{6 \times 3 \times (-1)}{7 \times 3}$$
$$= \frac{6 \times (-1)}{7}$$
$$= \frac{-6}{7}$$

Solution 1(7):

$$\frac{-9}{10} \div \frac{-9}{10}$$
$$= \frac{-9}{10} \times \frac{-10}{9}$$
$$= \frac{(-9) \times (-10)}{10 \times 9}$$
$$= \frac{90}{90}$$
$$= 1$$

Solution 1(8):

$$\frac{-13}{6} \div \frac{13}{6}$$
$$= \frac{-13}{6} \times \frac{6}{13}$$
$$= -1$$

Solution 1(9):

$$\frac{15}{4} \div \frac{5}{8}$$
$$= \frac{15}{4} \times \frac{8}{5}$$
$$= \frac{5 \times 3}{4} \times \frac{4 \times 2}{5}$$
$$= \frac{5 \times 3 \times 4 \times 2}{4 \times 5}$$
$$= 3 \times 2$$
$$= 6$$

Solution 1(10):

$$6 \div \frac{-1}{3}$$
$$= 6 \times \frac{(-3)}{1}$$
$$= -18$$

Solution 1(11):

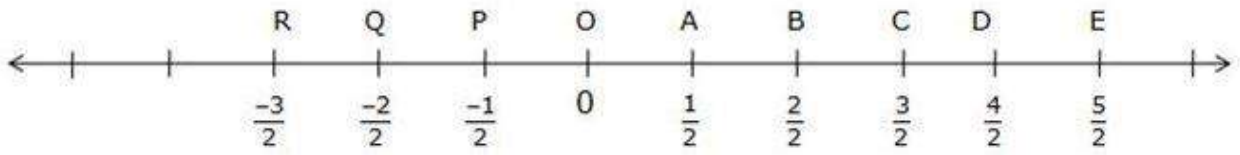
$$\frac{2}{3} \div 6$$
$$= \frac{2}{3} \times \frac{1}{6}$$
$$= \frac{2}{3} \times \frac{1}{2 \times 3}$$
$$= \frac{1}{9}$$

Solution 1(12):

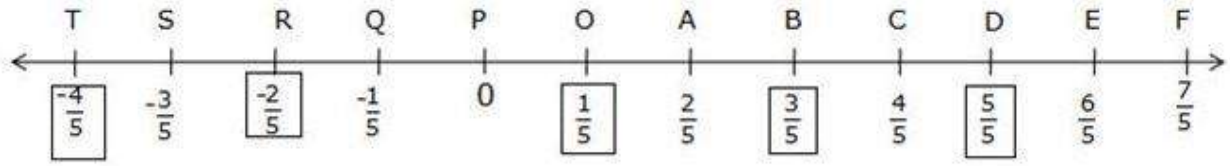
$$\frac{3}{2} \div \frac{-5}{6}$$
$$= \frac{3}{2} \times \frac{-6}{5}$$
$$= \frac{3}{2} \times \frac{-3 \times 2}{5}$$
$$= \frac{3 \times (-3) \times 2}{2 \times 5}$$
$$= \frac{-9}{5}$$

Exercise 52:

Solution 1(1):



Solution 1(2):



Exercise 53:

Solution 1:

(1) Number (-5) is to the left of number (-1) on the number line.

$\therefore -5 < -1$

(2) The number 0 (zero) is greater than any negative number.

$\therefore 0 > \frac{-8}{7}$

(3) Any positive number is greater than zero.

$\therefore \frac{4}{3} > 0$

(4) Any negative number is smaller than the positive number.

$\therefore \frac{-3}{2} < \frac{1}{4}$

(5) Between any two rational numbers with the same denominator, the number having a smaller numerator is smaller than the other.

Now, $-11 < -7$.

$\therefore \frac{-11}{6} < \frac{-7}{6}$

(6) Between any two rational numbers with the same denominator, the number having smaller numerator is smaller than the other.

Now, $25 < 28$.

$\therefore \frac{25}{37} < \frac{28}{37}$

(7) Any negative number is smaller than the positive number.

$\therefore \frac{25}{37} > \frac{-28}{37}$

(8) Between any two rational numbers with the same denominator, the number having a smaller numerator is smaller than the other.

Now, $-7 < -5$.

$\therefore \frac{-7}{10} < \frac{-5}{10}$

Solution 2(1):

The L.C.M. of the denominators 7 and 9 is 63.
Therefore make their denominators 63.

$$\frac{3}{7}=\frac{3\times 9}{7\times 9}=\frac{27}{63},\ \frac{4}{9}=\frac{4\times 7}{9\times 7}=\frac{28}{63}$$

Now, $27 < 28$

$$\therefore \frac{27}{63}<\frac{28}{63}$$

$$\therefore \frac{3}{7}<\frac{4}{9}$$

Solution 2(2):

The L.C.M. of the denominators 8 and 4 is 8.
Therefore make their denominators 8.

$$\frac{15}{8}=\frac{15}{8}$$

$$\frac{9}{4}=\frac{9\times 2}{4\times 2}=\frac{18}{8}$$

Now, $15 < 18$

$$\therefore \frac{15}{8}<\frac{18}{8}$$

$$\therefore \frac{15}{8}<\frac{9}{4}$$

Solution 2(3):

The L.C.M. of the denominators 8 and 4 is 8.
Therefore make their denominators 8.

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

$$\frac{-9}{4}=\frac{-9\times 2}{4\times 2}=\frac{-18}{8}$$

Now, $-15 > -18$

$$\therefore \frac{-15}{8}>\frac{-18}{8}$$

$$\therefore \frac{-15}{8}>\frac{-9}{4}$$

Solution 2(4):

The L.C.M. of the denominators 5 and 15 is 15.
Therefore make their denominators 15.

$$\frac{12}{15} = \frac{12}{15}$$

$$\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$$

Now, $12 > 9$

$$\therefore \frac{12}{15} > \frac{9}{15}$$

$$\therefore \frac{12}{15} > \frac{3}{5}$$

Solution 2(5):

The L.C.M. of the denominators 3 and 4 is 12.
Therefore make their denominators 12.

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

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

Now, $-8 > -9$

$$\therefore \frac{-8}{12} > \frac{-9}{12}$$

$$\therefore \frac{-2}{3} > \frac{-3}{4}$$

Solution 2(6):

The L.C.M. of the denominators 3 and 4 is 12.
Therefore make their denominators 12.

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

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

Now, $8 < 9$

$$\therefore \frac{8}{12} < \frac{9}{12}$$

$$\therefore \frac{2}{3} < \frac{3}{4}$$

Solution 2(7):

The L.C.M. of the denominators 19 and 7 is 133.

Therefore make their denominators 133.

$$\frac{11}{19} = \frac{11 \times 7}{19 \times 7} = \frac{77}{133}$$

$$\frac{4}{7} = \frac{4 \times 19}{7 \times 19} = \frac{76}{133}$$

Now, $77 > 76$

$$\therefore \frac{77}{133} > \frac{76}{133}$$

$$\therefore \frac{11}{19} > \frac{4}{7}$$

Solution 2(8):

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

The L.C.M. of the denominators 1 and 4 is 4.

Therefore make their denominators 4.

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

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

Now, $-20 < -15$

$$\therefore \frac{-20}{4} < \frac{-15}{4}$$

$$\therefore \frac{-5}{1} < \frac{-15}{4}$$

$$\therefore -5 < \frac{-15}{4}$$

Solution 3(1):

Let $\frac{-13}{8} = \frac{a}{b}$ and $\frac{5}{3} = \frac{c}{d}$

Then,

$a \times d = -13 \times 3 = -39$

$b \times c = 8 \times 5 = 40$

As $-39 < 40$, $a \times d < b \times c$

$$\therefore \frac{a}{b} < \frac{c}{d}$$

$$\therefore \frac{-13}{8} < \frac{5}{3}$$

Solution 3(2):

Let $\frac{7}{11} = \frac{a}{b}$ and $\frac{3}{4} = \frac{c}{d}$

Then,

$a \times d = 7 \times 4 = 28$

$b \times c = 11 \times 3 = 33$

As $28 < 33$, $a \times d < b \times c$

$\therefore \frac{a}{b} < \frac{c}{d}$

$\therefore \frac{7}{11} < \frac{3}{4}$

Solution 3(3):

Let $\frac{-7}{11} = \frac{a}{b}$ and $\frac{-3}{4} = \frac{c}{d}$

Then,

$a \times d = (-7) \times 4 = -28$

$b \times c = 11 \times (-3) = -33$

As $-28 > -33$, $a \times d > b \times c$

$\therefore \frac{a}{b} > \frac{c}{d}$

$\therefore \frac{-7}{11} > \frac{-3}{4}$

Solution 3(4):

Let $10 = \frac{10}{1} = \frac{a}{b}$ and $\frac{83}{9} = \frac{c}{d}$

Then,

$a \times d = 10 \times 9 = 90$

$b \times c = 1 \times 83 = 83$

As $90 > 83$, $a \times d > b \times c$

$\therefore \frac{a}{b} > \frac{c}{d}$

$\therefore 10 > \frac{83}{9}$

Solution 3(5):

Let $-10 = \frac{-10}{1} = \frac{a}{b}$ and $\frac{-83}{9} = \frac{c}{d}$

Then,

$a \times d = -10 \times 9 = -90$

$b \times c = 1 \times (-83) = -83$

As $-90 < -83$, $a \times d < b \times c$

$\therefore \frac{a}{b} < \frac{c}{d}$

$\therefore -10 < \frac{-83}{9}$

Solution 3(6):

Let $\frac{19}{15} = \frac{a}{b}$ and $\frac{4}{3} = \frac{c}{d}$

Then,

$a \times d = 19 \times 3 = 57$

$b \times c = 15 \times 4 = 60$

As $57 < 60$, $a \times d < b \times c$

$\therefore \frac{a}{b} < \frac{c}{d}$

$\therefore \frac{19}{15} < \frac{4}{3}$

Solution 3(7):

Let $\frac{27}{18} = \frac{a}{b}$ and $\frac{5}{4} = \frac{c}{d}$

Then,

$a \times d = 27 \times 4 = 108$

$b \times c = 18 \times 5 = 90$

As $108 > 90$, $a \times d > b \times c$

$\therefore \frac{a}{b} > \frac{c}{d}$

$\therefore \frac{27}{18} > \frac{5}{4}$

Solution 3(8):

Let $\frac{13}{9} = \frac{a}{b}$ and $\frac{13}{10} = \frac{c}{d}$

Then,

$a \times d = 13 \times 10 = 130$

$b \times c = 9 \times 13 = 117$

As $130 > 117$, $a \times d > b \times c$

$\therefore \frac{a}{b} > \frac{c}{d}$

$\therefore \frac{13}{9} > \frac{13}{10}$

Exercise 54:

Solution 1:

$$(1)\frac{-5}{7}+\frac{10}{3}=\frac{-5\times 3}{7\times 3}+\frac{10\times 7}{3\times 7}=\frac{-15}{21}+\frac{70}{21}=\frac{-15+70}{21}=\frac{55}{21}$$

$$(2)\frac{-7}{6}-\frac{13}{8}=\frac{-7\times 4}{6\times 4}-\frac{13\times 3}{8\times 3}=\frac{-28}{24}-\frac{39}{24}=\frac{-28-39}{24}=\frac{-67}{24}$$

$$(3)\frac{15}{16}\times\frac{20}{9}=\frac{15\times 20}{16\times 9}=\frac{3\times 5\times 4\times 5}{4\times 4\times 3\times 3}=\frac{5\times 5}{4\times 3}=\frac{25}{12}$$

$$(4)\frac{-26}{35}\div\frac{-39}{28}=\frac{-26}{35}\times\frac{28}{-39}=\frac{-26\times 28}{35\times(-39)}=\frac{(-13)\times 2\times 7\times 4}{7\times 5\times(-13)\times 3}=\frac{2\times 4}{5\times 3}=\frac{8}{15}$$

$$(5)\frac{8}{9}\times 1=\frac{8}{9}$$

$$(6)\frac{-17}{12}\times 1=\frac{-17}{12}$$

$$(7)\frac{11}{18}+0=\frac{11}{18}$$

$$(8)\frac{-13}{10}+0=\frac{-13}{10}$$

$$(9)\frac{-4}{1}\times 0=0$$

$$(10)0\times 7=0$$

$$(11)\frac{1}{5}\times 7=\frac{7}{5}$$

$$(12)0\times 0=0$$

$$(13)\frac{9}{4}+\frac{1}{7}=\frac{9\times 7}{4\times 7}+\frac{1\times 4}{7\times 4}=\frac{63}{28}+\frac{4}{28}=\frac{67}{28}$$

$$(14)\frac{1}{7}+\frac{9}{4}=\frac{1\times 4}{7\times 4}+\frac{9\times 7}{4\times 7}=\frac{4}{28}+\frac{63}{28}=\frac{67}{28}$$

$$(15)\frac{12}{25}\times 7=\frac{84}{25}$$

$$(16)\frac{-10}{9}\times\frac{12}{25}=\frac{-10\times 12}{9\times 25}=\frac{5\times(-2)\times 3\times 4}{3\times 3\times 5\times 5}=\frac{(-2)\times 4}{3\times 5}=\frac{-8}{15}$$

Solution 2(1):

$$\left(\frac{3}{2}+\frac{5}{6}\right)+\frac{-4}{5}$$
$$=\left(\frac{3\times 3}{2\times 3}+\frac{5}{6}\right)+\frac{-4}{5}$$
$$=\left(\frac{9}{6}+\frac{5}{6}\right)+\frac{-4}{5}$$
$$=\left(\frac{9+5}{6}\right)+\frac{-4}{5}$$
$$=\frac{14}{6}+\frac{-4}{5}$$
$$=\frac{14\times 5}{6\times 5}+\frac{(-4)\times 6}{5\times 6}$$
$$=\frac{70}{30}+\frac{-24}{30}$$
$$=\frac{70-24}{30}$$
$$=\frac{46}{30}$$
$$=\frac{23}{15}$$

Solution 2(2):

$$\frac{3}{2}+\left(\frac{5}{6}+\frac{-4}{5}\right)$$
$$=\frac{3}{2}+\left(\frac{5\times 5}{6\times 5}+\frac{(-4)\times 6}{5\times 6}\right)$$
$$=\frac{3}{2}+\left(\frac{25}{30}+\frac{-24}{30}\right)$$
$$=\frac{3}{2}+\left(\frac{25-24}{30}\right)$$
$$=\frac{3}{2}+\frac{1}{30}$$
$$=\frac{3\times 15}{2\times 15}+\frac{1}{30}$$
$$=\frac{45}{30}+\frac{1}{30}$$
$$=\frac{46}{30}$$
$$=\frac{23}{15}$$

Solution 2(3):

$$\left(\frac{9}{7}\times\frac{-14}{15}\right)\times\frac{2}{3}$$
$$=\left(\frac{9\times(-14)}{7\times15}\right)\times\frac{2}{3}$$
$$=\left(\frac{3\times3\times7\times(-2)}{7\times3\times5}\right)\times\frac{2}{3}$$
$$=\frac{3\times(-2)}{5}\times\frac{2}{3}$$
$$=\frac{(-2)\times2}{5}$$
$$=\frac{-4}{5}$$

Solution 2(4):

$$\frac{9}{7}\times\left(\frac{-14}{15}\times\frac{2}{3}\right)$$
$$=\frac{9}{7}\times\left(\frac{-7\times2}{5\times3}\times\frac{2}{3}\right)$$
$$=\frac{3\times3}{7}\times\frac{7\times(-2)}{5\times3}\times\frac{2}{3}$$
$$=\frac{3\times3\times7\times(-2)\times2}{7\times5\times3\times3}$$
$$=\frac{(-2)\times2}{5}$$
$$=\frac{-4}{5}$$

Solution 2(5):

$$\frac{3}{5}\times\left(\frac{10}{9}+\frac{4}{3}\right)$$
$$=\frac{3}{5}\times\frac{10}{9}+\frac{3}{5}\times\frac{4}{3}$$
$$=\frac{3\times 10}{5\times 9}+\frac{3\times 4}{5\times 3}$$
$$=\frac{30}{45}+\frac{12}{15}$$
$$=\frac{30}{45}+\frac{12\times 3}{15\times 3}$$
$$=\frac{30}{45}+\frac{36}{45}$$
$$=\frac{30+36}{45}$$
$$=\frac{66}{45}$$
$$=\frac{22\times 3}{15\times 3}$$
$$=\frac{22}{15}$$

Solution 2(6):

$$\frac{3}{5}\times\frac{10}{9}+\frac{3}{5}\times\frac{4}{3}$$
$$=\frac{3\times 10}{5\times 9}+\frac{3\times 4}{5\times 3}$$
$$=\frac{30}{45}+\frac{12}{15}$$
$$=\frac{30}{45}+\frac{12\times 3}{15\times 3}$$
$$=\frac{30}{45}+\frac{36}{45}$$
$$=\frac{30+36}{45}$$
$$=\frac{66}{45}$$
$$=\frac{22\times 3}{15\times 3}$$
$$=\frac{22}{15}$$

Exercise 55:

Solution 1(1):

$$
\begin{array}{r}
3.25 \\
4\overline{)\,13.00} \\
-12 \\
\hline
10 \\
-8 \\
\hline
20 \\
-20 \\
\hline
00
\end{array}
$$

$\therefore \frac{13}{4} = 3.25$

Solution 1(2):

$$
\begin{array}{r}
0.5 \\
2\overline{)\,1.0} \\
-10 \\
\hline
00
\end{array}
$$

$\therefore \frac{1}{2} = 0.5$

Solution 1(3):

$$
\begin{array}{r}
0.875 \\
8\overline{)\ 7.000} \\
-64 \\
\hline
60 \\
-56 \\
\hline
40 \\
-40 \\
\hline
00
\end{array}
$$

$\therefore \frac{7}{4} = 0.875$

$\therefore \frac{-7}{4} = -0.875$

Solution 1(4):

$$
\begin{array}{r}
2.1875 \\
16\overline{)\ 35.0000} \\
-32 \\
\hline
30 \\
-16 \\
\hline
140 \\
-128 \\
\hline
120 \\
-112 \\
\hline
80 \\
-80 \\
\hline
00
\end{array}
$$

$\therefore \frac{35}{16} = 2.1875$

Solution 1(5):

$$
\begin{array}{r}
0.8 \\
5\overline{)\,4.0} \\
-4\,0 \\
\hline
00
\end{array}
$$

$\therefore \frac{4}{5} = 0.8$

$\therefore \frac{-4}{5} = -0.8$

Solution 1(6):

$$
\begin{array}{r}
1.92 \\
25\overline{)\,48.00} \\
-25 \\
\hline
230 \\
-225 \\
\hline
50 \\
-50 \\
\hline
00
\end{array}
$$

$\therefore \frac{48}{25} = 1.92$

Solution 1(7):

$$
\begin{array}{r}
2.33.. \\
3\overline{)\ 7.00} \\
-6 \\
\hline
10 \\
-\ 9 \\
\hline
10 \\
-\ 9 \\
\hline
1
\end{array}
$$

$\therefore \frac{7}{3} = 2.33.. = 2.\dot{3}$

Solution 1(8):

$$
\begin{array}{r}
0.66.. \\
3\overline{)\ 2.00} \\
-18 \\
\hline
20 \\
-18 \\
\hline
2
\end{array}
$$

$\therefore \frac{2}{3} = 0.66... = 0.\dot{6}$

$\therefore \frac{-2}{3} = -0.\dot{6}$

Solution 1(9):

$$
\begin{array}{r}
1.88\ldots \\
9\overline{)\ 17.00} \\
-\ 9 \\
\hline
80 \\
-72 \\
\hline
80 \\
-72 \\
\hline
8
\end{array}
$$

$\therefore \frac{17}{9} = 1.88\ldots = 1.\dot{8}$

Solution 1(10):

$$
\begin{array}{r}
0.22\ldots \\
9\overline{)\ 2.00} \\
-18 \\
\hline
20 \\
-18 \\
\hline
2
\end{array}
$$

$\therefore \frac{2}{9} = 0.22\ldots = 0.\dot{2}$

Solution 1(11):

$$
\begin{array}{r}
1.7272\ldots \\
11\overline{)\ 19.000} \\
-11 \\
\hline
80 \\
-77 \\
\hline
30 \\
-22 \\
\hline
80 \\
-77 \\
\hline
30 \\
-22 \\
\hline
8
\end{array}
$$

$\therefore \frac{19}{11} = 1.7272 = 1.\overline{72}$

Solution 1(12):

$$
\begin{array}{r}
0.592592.. \\
27\overline{)\ 16.000000} \\
-135 \\
\hline
250 \\
-243 \\
\hline
70 \\
-54 \\
\hline
160 \\
-135 \\
\hline
250 \\
-243 \\
\hline
70 \\
-54 \\
\hline
16
\end{array}
$$

$\therefore \frac{16}{27} = 0.592592\ldots = 0.\overline{592}$