

EXERCISE 2A

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1. Write down a rational number whose numerator is the largest number of two digits and denominator is the smallest number of four digits.

Solution:

We know that the largest two digit number is 99

So the smallest four digit number is 1000

Numerator = 99

Denominator = 1000

Rational number = $99/1000$

2. Write the numerator of each of the following rational numbers:

(i) $-125/127$

(ii) $37/-137$

(iii) $-85/93$

(iv) 2

(v) 0

Solution:

(i) $-125/127$

Here the numerator = - 125

(ii) $37/-137$

Here the numerator = 37

(iii) $-85/93$

Here the numerator = - 85

(iv) $2 = 2/1$

Here the numerator = 2

(v) $0 = 0/1$

Here the numerator = 0

3. Write the denominator of each of the following rational numbers:

(i) $7/-15$

(ii) $-18/29$

(iii) $-3/4$

(iv) - 7

(v) 0

Solution:

(i) $7/-15$

Here the denominator = - 15

(ii) $-18/29$

Here the denominator = 29

(iii) $-3/4$

Here the denominator = 4

$$(iv) -7 = -7/1$$

Here the denominator = 1

$$(v) 0 = 0/1$$

Here the denominator = 1

4. Write down a rational number with numerator $(-5) \times (-4)$ and with denominator $(28 - 27) \times (8 - 5)$.

Solution:

It is given that

$$\text{Numerator} = (-5) \times (-4) = 20$$

$$\text{Denominator} = (28 - 27) \times (8 - 5) = 1 \times 3 = 3$$

$$\text{So the rational number} = 20/3$$

5. (i) $-15/1$ in integer form is

(ii) $23/-1$ in integer form is

(iii) If $18 = 18/a$ then $a = \dots\dots$

(iv) If $-57 = 57/a$ then $a = \dots\dots$

Solution:

(i) $-15/1$ in integer form is -15 .

(ii) $23/-1$ in integer form is -23 .

(iii) If $18 = 18/a$ then $a = 18/18 = 1$.

(iv) If $-57 = 57/a$ then $a = 57/-57 = -1$.

6. Separate positive and negative rational numbers from the following:

$-3/5, 3/-5, -3/-5, 3/5, 0, -13/-3, 15/-8, -15/8$

Solution:

Here the positive rational numbers are

$$-3/-5 = 3/5 \text{ as both are negative}$$

$$-13/-3 = 13/3 \text{ as both are negative and } 3/5$$

Similarly the negative rational numbers are

$$-3/5, 3/-5, 15/-8 \text{ and } -15/8$$

0 is neither positive nor negative integer.

7. Find three rational numbers equivalent to

(i) $3/5$

(ii) $4/-7$

(iii) $-5/9$

(iv) $8/-15$

Solution:

(i) $3/5$

It can be written as

$$3/5 = (3 \times 2) / (5 \times 2) = 6/10$$

$$3/5 = (3 \times 3) / (5 \times 3) = 9/15$$

$$3/5 = (3 \times 4) / (5 \times 4) = 12/20$$

Therefore, $6/10$, $9/15$ and $12/20$ are the rational numbers which are equivalent to the given rational number $3/5$.

(ii) $4/-7$

It can be written as

$$4/-7 = (4 \times 2) / (-7 \times 2) = 8/-14$$

$$4/-7 = (4 \times 3) / (-7 \times 3) = 12/-21$$

$$4/-7 = (4 \times 4) / (-7 \times 4) = 16/-28$$

Therefore, $8/-14$, $12/-21$ and $16/-28$ are the rational numbers which are equivalent to the given rational number $4/-7$.

(iii) $-5/9$

It can be written as

$$-5/9 = (-5 \times 2) / (9 \times 2) = -10/18$$

$$-5/9 = (-5 \times 3) / (9 \times 3) = -15/27$$

$$-5/9 = (-5 \times 4) / (9 \times 4) = -20/36$$

Therefore, $-10/18$, $-15/27$ and $-20/36$ are the rational numbers which are equivalent to the given rational number $-5/9$.

(iv) $8/-15$

It can be written as

$$8/-15 = (8 \times 2) / (-15 \times 2) = 16/-30$$

$$8/-15 = (8 \times 3) / (-15 \times 3) = 24/-45$$

$$8/-15 = (8 \times 4) / (-15 \times 4) = 32/-60$$

Therefore, $16/-30$, $24/-45$ and $32/-60$ are the rational numbers which are equivalent to the given rational number $8/-15$.

8. Which of the following are not rational numbers:

(i) -3

(ii) 0

(iii) $0/4$

(iv) $8/0$

(v) $0/0$

Solution:

(i) $-3 = -3/1$ is a rational number.

(ii) $0 = 0/1$ is a rational number.

(iii) $0/4$ is a rational number.

(iv) $8/0$ is not a rational number.

(v) $0/0$ is not a rational number as both numerator and denominator are zero.

9. Express each of the following integers as a rational number with denominator 7:

(i) 5

(ii) – 8

(iii) 0

(iv) – 16

(v) 7

Solution:

(i) 5

By multiplying and dividing by 7

$$= (5 \times 7)/7$$

$$= 35/7$$

(ii) – 8

By multiplying and dividing by 7

$$= (-8 \times 7)/7$$

$$= -56/7$$

(iii) 0

By multiplying and dividing by 7

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

$$= 0/7$$

(iv) – 16

By multiplying and dividing by 7

$$= (-16 \times 7)/7$$

$$= -112/7$$

(v) 7

By multiplying and dividing by 7

$$= (7 \times 7)/7$$

$$= 49/7$$

10. Express $3/5$ as a rational number with denominator:

(i) 20

(ii) – 20

(iii) 45

(iv) 25

(v) – 35

Solution:

(i) 20

It can be written as

$$3/5 = (3 \times 4)/(5 \times 4) = 12/20$$

(ii) – 20

It can be written as

$$3/5 = (3 \times -4)/(5 \times -4) = -12/-20$$

(iii) 45

It can be written as

$$3/5 = (3 \times 9) / (5 \times 9) = 27/45$$

(iv) 25

It can be written as

$$3/5 = (3 \times 5) / (5 \times 5) = 15/25$$

(v) - 35

It can be written as

$$3/5 = (3 \times -7) / (5 \times -7) = -21/-35$$

11. Express $4/7$ as a rational number with numerator:

(i) 12

(ii) - 12

(iii) - 16

(iv) - 20

(v) 20

Solution:

(i) 12

It can be written as

$$4/7 = (4 \times 3) / (7 \times 3) = 12/21$$

(ii) - 12

It can be written as

$$4/7 = (4 \times -3) / (7 \times -3) = -12/-21$$

(iii) - 16

It can be written as

$$4/7 = (4 \times -4) / (7 \times -4) = -16/-28$$

(iv) - 20

It can be written as

$$4/7 = (4 \times -5) / (7 \times -5) = -20/-35$$

(v) 20

It can be written as

$$4/7 = (4 \times 5) / (7 \times 5) = 20/35$$

12. Find x, such that:

(i) $-2/3 = 6/x$

(ii) $7/-4 = x/8$

(iii) $3/7 = x/-35$

(iv) $-48/x = 6$

(v) $36/x = 3$

(vi) $-27/x = 9$

Solution:

(i) $-2/3 = 6/x$

By cross multiplication

$$-2x = 6 \times 3$$

By further calculation

$$x = (6 \times 3) / -2$$

So we get

$$x = 18 / -2 = -9$$

Hence, $-2/3 = 6/-9$.

(ii) $7/-4 = x/8$

By cross multiplication

$$7 \times 8 = -4 \times x$$

On further calculation

$$56 = -4x$$

So we get

$$x = 56 / -4 = -14$$

Hence, $7/-4 = -14/8$.

(iii) $3/7 = x/-35$

By cross multiplication

$$7x = -35 \times 3$$

On further calculation

$$x = (-35 \times 3) / 7$$

So we get

$$x = -15$$

Hence, $3/7 = -15/-35$.

(iv) $-48/x = 6$

By cross multiplication

$$6x = -48$$

On further calculation

$$x = -48 / 6 = -8$$

Hence, $-48/-8 = 6$.

(v) $36/x = 3$

By cross multiplication

$$3x = 36$$

On further calculation

$$x = 12$$

Hence, $36/12 = 3$.

(vi) $-27/x = 9$

By cross multiplication

$$9x = -27$$

On further calculation

$$x = -27 / 9 = -3$$

Hence, $-27/-3 = 9$.

13. Express each of the following rational numbers to the lowest terms:

(i) $12/15$

(ii) $-120/144$

(iii) $-48/-72$

(iv) $14/-56$

Solution:

(i) $12/15$

$$\begin{array}{r} 12 \overline{) 15} \quad 1 \\ \underline{12} \\ 3 \overline{) 12} \quad 4 \\ \underline{12} \\ \hline x \end{array}$$

Here dividing by 3 which is the HCF of 12 and 15
 $(12 \div 3) / (15 \div 3) = 4/5$

(ii) $-120/144$

$$\begin{array}{r} 120 \overline{) 144} \quad 1 \\ \underline{120} \\ 24 \overline{) 24} \quad 1 \\ \underline{24} \\ \hline x \end{array}$$

Here dividing by 24 which is the HCF of -120 and 144
 $(-120 \div 24) / (144 \div 24) = -5/6$

(iii) $-48/-72$

$$\begin{array}{r} 48 \overline{) 72} \quad 1 \\ \underline{48} \\ 24 \overline{) 24} \quad 1 \\ \underline{24} \\ \hline x \end{array}$$

Here dividing by 24 which is the HCF of -48 and -72
 $(-48 \div 24) / (-72 \div 24) = -2/-3 = 2/3$

(iv) $14/-56$

$$\begin{array}{r} 14 \overline{) 56} \quad 4 \\ \underline{56} \\ \hline x \end{array}$$

Here dividing by 14 which is the HCF of 14 and -56
 $(14 \div 14) / (-56 \div 14) = 1/-4$ or $-1/4$

14. Express each of the following rational numbers in the standard form.

- (i) $-7/-8$
(ii) $5/-12$
(iii) $-7/-20$
(iv) $4/-9$

Solution:

Here a rational number is in standard form if its denominator is positive in lowest term.

(i) $-7/-8 = 7/8$

(ii) $5/-12 = -5/12$

(iii) $-7/-20 = 7/20$

(iv) $4/-9 = -4/9$

