EXERCISE 2A

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

1. 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

2. 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

Here the denominator = 4

(iv) – 7 = -7/1
Here the denominator = 1

(v) 0 = 0/1
Here the denominator = 1

3. Write down a rational number with numerator (-5) × (-4) and with denominator (28 – 27) × (8 – 5).
Solution:

It is given that
Numerator = (-5) × (-4) = 20
Denominator = (28 – 27) × (8 – 5) = 1 × 3 = 3
So the rational number = 20/3

4. (i) – 15/1 in integer form is …….
(ii) 23/-1 in integer form is ……..
(iii) If 18 = 18/a then a = …….
(iv) If – 57 = 57/a then a = ……
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.

5. 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 as both are negative
-13/-3 = 13/3 as both are negative and 3/5

Similarly the negative rational numbers are
-3/5, 3/ -5, 15/-8 and -15/8

0 is neither positive nor negative integer.

6. 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 × 2)/ (5 × 2) = 6/10
3/5 = (3 × 3)/ (5 × 3) = 9/15
3/5 = (3 × 4)/ (5 × 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 × 2)/ (-7 × 2) = 8/ -14
4/-7 = (4 × 3)/ (-7 × 3) = 12/-21
4/-7 = (4 × 4)/ (-7 × 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 × 2)/ (9 × 2) = -10/18
-5/9 = (-5 × 3)/ (9 × 3) = - 15/27
-5/9 = (-5 × 4)/ (9 × 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 × 2)/ (-15 × 2) = 16/-30
8/-15 = (8 × 3)/ (-15 × 3) = 24/ -45
8/-15 = (8 × 4)/ (-15 × 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.

7. 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.

8. 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 × 7)/ 7
= 35/7

(ii) – 8
By multiplying and dividing by 7
= (-8 × 7)/ 7
= - 56/7

(iii) 0
By multiplying and dividing by 7
= (0 × 7)/ 7
= 0/7

(iv) – 16
By multiplying and dividing by 7
= (-16 × 7)/ 7
= - 112/7

(v) 7
By multiplying and dividing by 7
= (7 × 7)/ 7
= 49/7

9. 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 × 4)/ (5 × 4) = 12/20

(ii) – 20
It can be written as
3/5 = (3 × -4)/ (5 × -4) = -12/-20

(iii) 45
It can be written as
3/5 = (3 × 9)/ (5 × 9) = 27/45

(iv) 25
It can be written as
3/5 = (3 × 5)/ (5 × 5) = 15/25

(v) – 35
It can be written as
3/5 = (3 × -7)/ (5 × -7) = -21/-35

10. 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 × 3)/ (7 × 3) = 12/21

(ii) – 12
It can be written as
4/7 = (4 × -3)/ (7 × -3) = -12/-21

(iii) – 16
It can be written as
4/7 = (4 × -4)/ (7 × -4) = - 16/-28

(iv) – 20
It can be written as
4/7 = (4 × -5)/ (7 × -5) = -20/-35

(v) 20
It can be written as
4/7 = (4 × 5)/ (7 × 5) = 20/35

11. 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 × 3
By further calculation
x = (6 × 3)/ -2
So we get
x = 18/-2 = -9

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

(ii) 7/-4 = x/8
By cross multiplication
7 × 8 = - 4 × 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 × 3
On further calculation
x = (-35 × 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

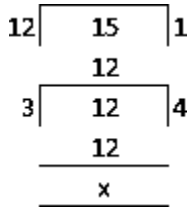
Hence, 36/12 = 3.

(vi) – 27/x = 9
By cross multiplication
9x = -27
On further calculation
x = -27/9 = - 3

Hence, -27/-3 = 9.

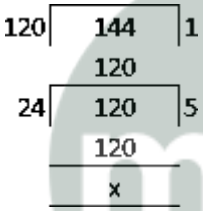
12. Express each of the following rational numbers to the lowest terms:
(i) 12/15
(ii) – 120/144
(iii) – 48/ - 72
(iv) 14/-56
Solution:

(i) 12/15



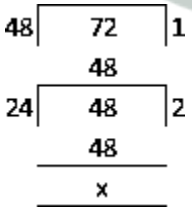
Here dividing by 3 which is the HCF of 12 and 15
(12 ÷ 3)/ (15 ÷ 3) = 4/5

(ii) – 120/144



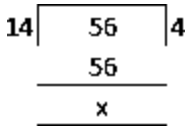
Here dividing by 25 which is the HCF of -120 and 144
(-120 ÷ 24)/ (144 ÷ 24) = - 5/6

(iii) – 48/ - 72



Here dividing by 24 which is the HCF of -48 and – 72
(-48 ÷ 24)/ (-72 ÷ 24) = -2/-3 = 2/3

(iv) 14/-56



Here dividing by 14 which is the HCF of 14 and - 56
(14 ÷ 14)/ (-56 ÷ 14) = 1/-4 or – 1/4

13. 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