1. Which of the following are positive rational numbers?
5/8, -3/11, 0/5, 7, -4, -3/-13, -17/-6, 9/-20.
Solution:
The positive rational numbers are:
5/8, 0/5, 7, -3/-13, -17/-6.

2. Which of the following are negative rational numbers?
-5/7, 4/-3, -3/-11, -6, 9, 0, -28/5, 31/7.
Solution:
The negative rational numbers are:
-5/7, 4/-3, -6, -28/5.

3. Find four rational numbers equivalent to each of the following rational numbers:
(i) 3/-7
(ii) -5/-9
Solution:
(i) 3/-7
Let us find the equivalent numbers:
Firstly multiply and divide by 2,
(3/-7) × (2/2) = 6/-14

Similarly, multiply and divide by 3,
(3/-7) × (3/3) = 9/-21

Multiply and divide by 4,
(3/-7) × (4/4) = 12/-28

Multiply and divide by 5,
(3/-7) × (5/5) = 15/-35

Hence, four equivalent rational numbers are:
6/-14, 9/-21, 12/-28, 15/-35

(ii) -5/-9
Let us find the equivalent numbers:
Firstly multiply and divide by 2,
(-5/-9) × (2/2) = -10/-18 = 10/18

Similarly, multiply and divide by 3,
(-5/-9) × (3/3) = -15/-27 = 15/27

Multiply and divide by 4,
(-5/-9) × (4/4) = -20/-36 = 20/36

Multiply and divide by 5,
(-5/-9) × (5/5) = -25/-45 = 25/45

Hence, four equivalent rational numbers are:
10/18, 15/27, 20/36, 25/45

4. Write each of the following rational numbers with positive denominators:
(i) 4/-9
(ii) 17/-33
(iii) -15/-38
Solution:
(i) 4/-9 = -4/9

(ii) 17/-33 = -17/33

(iii) -15/-38 = 15/38

5. Write next four rational numbers in each of the following patterns:
(i) -1/4, -2/8, -3/12, -4/16, ….
(ii) 2/-3, -4/6, -6/9, -8/12, …..
Solution:
(i) -1/4, -2/8, -3/12, -4/16, ….
The next four rational numbers in the same patterns are:
-1/4, -2/8, -3/12, -4/16, -5/20, -6/24, -7/28, -8/32

(ii) 2/-3, -4/6, -6/9, -8/12, …..
The next four rational numbers in the same patterns are:
2/-3, -4/6, -6/9, -8/12, -10/15, -12/18, -14/21, -16/24

6. Which of the following pairs of rational numbers are equal?
(i) -3/-7 and 15/35
(ii) -6/8 and 10/-15
(iii) 6/-10 and -12/20

Solution:
(i) -3/-7 and 15/35
Let us simplify, we get
-3/-7 and 15/35
(-3/-7) = (15/35)
Let us cross multiply, we get
(-3×35) = (15×-7)
-105 = -105
∴ -3/-7 and 15/35 are equal pairs.

(ii) -6/8 and 10/-15
Let us simplify, we get
-6/8 and 10/-15
(-6/8) = (10/-15)
Let us cross multiply, we get
(-6×-15) = (10×8)
90 = 80
∴ -6/8 and 10/-15 are not equal pairs.

(iii) 6/-10 and -12/20
Let us simplify, we get
6/-10 and -12/20
(6/-10) = (-12/20)
Let us cross multiply, we get
(6×20) = (-12×-10)
120 = 120
∴ 6/-10 and -12/20 are equal pairs.

7. Which of the following pairs represent the same rational number?
(i) -7/21, 3/9
(ii) -16/20, 20/-25
(iii) -3/5, -12/20
(iv) 8/-5, -24/15
Solution:
(i) -7/21, 3/9
Let us simplify, we get
(-7/21) = (3/9)
(-1/3) = (1/3)
(-1/3) ≠ (1/3)

∴ -7/21, 3/9 are not same rational numbers.

(ii) -16/20, 20/-25
Let us simplify, we get
(-16/20) = (20/-25)
(-4/5) = (4/-5)
(-4/5) = (-4/5)
∴ -16/20, 20/-25 are same rational numbers.

(iii) -3/5, -12/20
Let us simplify, we get
(-3/5) = (-12/20)
(-3/5) = (-3/5)
∴ -3/5, -12/20 are same rational numbers.

(iv) 8/-5, -24/15
Let us simplify, we get
8/-5, -24/15
(8/-5) = (-24/15)
(8/-5) = (-8/5)
(-8/5) = (-8/5)
∴ 8/-5, -24/15 are same rational numbers.