EXERCISE 1.8

1. Find a rational number between -3 and 1.
Solution:
Let us consider two rational numbers x and y
We know that between two rational numbers x and y where x < y there is a rational number (x+y)/2
x < (x+y)/2 < y
(-3+1)/2 = -2/2 = -1
So, the rational number between -3 and 1 is -1
∴ -3 < -1 < 1

2. Find any five rational numbers less than 2.
Solution:
Five rational numbers less than 2 are 0, 1/5, 2/5, 3/5, 4/5

3. Find two rational numbers between -2/9 and 5/9
Solution:
The rational numbers between -2/9 and 5/9 is
(-2/9 + 5/9)/2
(1/3)/2
1/6
The rational numbers between -2/9 and 1/6 is
(-2/9 + 1/6)/2
((-2×2 + 1×3)/18)/2
(-4+3)/36
-1/36
∴ the rational numbers between -2/9 and 5/9 are -1/36, 1/6

4. Find two rational numbers between 1/5 and 1/2
Solution:
The rational numbers between 1/5 and 1/2 is
(1/5 + 1/2)/2
((1×2 + 1×5)/10)/2
(2+5)/20 = 7/20
The rational numbers between 1/5 and 7/20 is
(1/5 + 7/20)/2
((1×4 + 7×1)/20)/2
(4+7)/40

11/40
∴ the rational numbers between 1/5 and 1/2 are 7/20, 11/40

5. Find ten rational numbers between 1/4 and 1/2.
Solution:
Firstly convert the given rational numbers into equivalent rational numbers with same denominators.
The LCM for 4 and 2 is 4.
1/4 = 1/4
1/2 = (1×2)/4 = 2/4
1/4 = (1×20 / 4×20) = 20/80
1/2 = (2×20 / 4×20) = 40/80
So, we now know that 21, 22, 23,…39 are integers between numerators 20 and 40.
∴ the rational numbers between 1/4 and 1/2 are 21/80, 22/80, 23/80, …., 39/80

6. Find ten rational numbers between -2/5 and 1/2.
Solution:
Firstly convert the given rational numbers into equivalent rational numbers with same denominators.
The LCM for 5 and 2 is 10.
-2/5 = (-2×2)/10 = -4/10
1/2 = (1×5)/10 = 5/10
-2/5 = (-4×2 / 10×2) = -8/20
1/2 = (5×2 / 10×2) = 10/20
So, we now know that -7, -6, -5,…10 are integers between numerators -8 and 10.
∴ the rational numbers between -2/5 and 1/2 are -7/20, -6/20, -5/20, …., 9/20

7. Find ten rational numbers between 3/5 and 3/4.
Solution:
Firstly convert the given rational numbers into equivalent rational numbers with same denominators.
The LCM for 5 and 4 is 20.
3/5 = 3× 20 / 5×20 = 60/100
3/4 = 3×25 / 4×25 = 75/100
So, we now know that 61, 62, 63,..74 are integers between numerators 60 and 75.
∴ the rational numbers between 3/5 and 3/4 are 61/100, 62/100, 63/100, …., 74/100