Exercise 2.6

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Solve the following equations.

1. $(8x - 3)/3x = 2$

Solution:

$(8x - 3)/3x = 2$

$\Rightarrow 8x/3x - 3/3x = 2$

$\Rightarrow 8/3 - 1/x = 2$

$\Rightarrow 8/3 - 2 = 1/x$

$\Rightarrow (8 - 6)/3 = 1/x$

$\Rightarrow 2/3 = 1/x$

$\Rightarrow x = 3/2$

2. $9x/(7 - 6x) = 15$

Solution:

$9x/(7 - 6x) = 15$

$\Rightarrow 9x = 15(7 - 6x)$

$\Rightarrow 9x = 105 - 90x$

$\Rightarrow 9x + 90x = 105$

$\Rightarrow 99x = 105$

$\Rightarrow x = 105/99 = 35/33$

3. $z/(z + 15) = 4/9$

Solution:

$z/(z + 15) = 4/9$

$\Rightarrow z = 4/9\ (z + 15)$

$\Rightarrow 9z = 4(z + 15)$

$\Rightarrow 9z = 4z + 60$

$\Rightarrow 9z - 4z = 60$

$\Rightarrow 5z = 60$

$\Rightarrow z = 12$

4. $(3y + 4)/(2 - 6y) = -2/5$

Solution:

$(3y + 4)/(2 - 6y) = -2/5$

$\Rightarrow 3y + 4 = -2/5\ (2 - 6y)$

$\Rightarrow 5(3y + 4) = -2(2 - 6y)$

$\Rightarrow 15y + 20 = -4 + 12y$

$\Rightarrow 15y - 12y = -4 - 20$

$\Rightarrow 3y = -24$

$\Rightarrow y = -8$

5. $(7y + 4)/(y + 2) = -4/3$

Solution:

$(7y + 4)/(y + 2) = -4/3$
$\Rightarrow 7y + 4 = -4/3\ (y + 2)$
$\Rightarrow 3(7y + 4) = -4(y + 2)$
$\Rightarrow 21y + 12 = -4y - 8$
$\Rightarrow 21y + 4y = -8 - 12$
$\Rightarrow 25y = -20$
$\Rightarrow y = -20/25 = -4/5$

6. The ages of Hari and Harry are in the ratio 5:7. Four years from now the ratio of their ages will be 3:4. Find their present ages.

Solution:

Let the age of Hari be 5x and Harry be 7x. 4 years later,
Age of Hari $= 5x + 4$ Age of Harry $= 7x + 4$
According to the question,
$(5x + 4)/(7x + 4) = ¾$
$\Rightarrow 4(5x + 4) = 3(7x + 4)$
$\Rightarrow 20x + 16 = 21x + 12$
$\Rightarrow 21x - 20x = 16 - 12$
$\Rightarrow x = 4$
Hari age $= 5x = 5 \times 4 = 20$ years
Harry age $= 7x = 7 \times 4 = 28$ years

7. The denominator of a rational number is greater than its numerator by 8. If the numerator is increased by 17 and the denominator is decreased by 1, the number obtained is 3/2. Find the rational number.

Solution:

Let the numerator be x then denominator will be $(x + 8)$
According to the question,
$(x + 17)/(x + 8 - 1) = 3/2$
$\Rightarrow (x + 17)/(x + 7) = 3/2$
$\Rightarrow 2(x + 17) = 3(x + 7)$
$\Rightarrow 2x + 34 = 3x + 21$
$\Rightarrow 34 - 21 = 3x - 2x$
$\Rightarrow 13 = x$
The rational number is $x/(x + 8) = 13/21$