Linear Equations in One Variable: Exercise 2.6

Solve the following linear equations.

Q.1 $\frac{8x-3}{3x}=2$

***Sol.* Given equation:** $\frac{8x-3}{3x}=2$

By cross multiplying,

$(8x - 3) = 2 \times 3x$

$(8x - 3) = 6x$

Taking all the variable terms in left side and constant term in right side,

$8x - 6x = 3$

$2x = 3$

$x = \frac{3}{2}$

Q.2 $\frac{9x}{7-6x}=15$

***Sol.* Given equation:** $\frac{9x}{7-6x}=15$

By cross multiplying,

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

$9x = 105 - 90x$

Taking all the variable terms in left side and constant term in right side,

$9x + 90x = 105$

$99x = 105$

$x = \frac{105}{99}$

$x = \frac{35}{33}$

Q.3 $\frac{z}{z+15}=\frac{4}{9}$

***Sol.* Given Equation:** $\frac{z}{z+15}=\frac{4}{9}$

By cross multiplying,

$9z = 4(z + 15)$

$9z = 4z + 60$

Taking all the variable terms in left side and constant term in right side,

$9z - 4z = 60$

$5z = 60$

$z = \frac{60}{5} = 15$

Q.4 $\frac{3y+4}{2-6y}=\frac{-2}{5}$

Sol. Given, $\frac{3y+4}{2-6y}=\frac{-2}{5}$

By cross multiplying,
5(3y + 4) = -2 (2 - 6y)
15y + 20 = -4 + 12y
Taking all the variable terms in left side and constant term in right side,
15y - 12y = -4 -20
3y = -24
y= $\frac{-24}{3}$
y = -8

Q.5 $\frac{7y+4}{y+2}=\frac{-4}{3}$

Sol. Given, $\frac{7y+4}{y+2}=\frac{-4}{3}$

By cross multiplying,
3 (7y + 4) = -4 (y + 2)
21y + 12 = -4y – 8
Taking all the variable terms in left side and constant term in right side,
21y + 4y = -8-12
25y = -20
y = $\frac{-20}{25}=\frac{-4}{5}$

Q.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.

Sol. **Given:** ratio of the ages of Hari and Harry = 5 : 7
Let 5x be the ages of Hari and 7x be the age of Harry 7*x*.
After 4 years, the ages of Hari and Harry will be (5*x* + 4) and (7*x* + 4) respectively.
And their ration, $\frac{(5x+4)}{(7x+4)}=\frac{3}{4}$

By cross multiply,
4(5x + 4) = 3(7x + 4)
20x +16 = 21x + 12
Taking all the variable terms in left side and constant term in right side,
20x - 21x =12 - 16
-x = -4
x = 4
So, age of Hari, 5*x* = 5 x 4 = 20
And age of Harry, 7*x* = 7 x 4 = 28
Hence, the present ages of Hari is 20 years and Harry is 28 years.

Q.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 $\frac{3}{2}$. Find the rational number.

Sol. Let x be the numerator of a rational number. so, denominator will be x + 8.

So, rational number = $\frac{x}{x+8}$

Now, if the numerator is increased by 17 and the denominator is decreased by 1. Then, number obtained is $\frac{3}{2}$.

So, $\frac{x+17}{x+8-1}=\frac{3}{2}$

By cross multiply,

$2(x + 17) = 3(x + 7)$

$2x + 34 = 3x + 21$

Taking all the variable terms in left side and constant term in right side,

$2x - 3x = 21 - 34$

$-x = -13$

$x = 13$

Therefore, the required rational is $\frac{x}{x+8} = \frac{13}{13+8} = \frac{13}{21}$