

## SELF ASSESSMENT TEST SOLUTIONS

1. (d)
2. (C)
3. (C)

4.  $x = 3$  and  $y = 2$

5. For infinitely many solutions,  $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$   
 $\Rightarrow \frac{2}{4} = \frac{3}{a} = \frac{7}{14} \Rightarrow a = 6$

6. For unique solution,  $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$   
 i.e.,  $\frac{2}{5} \neq \frac{1}{-c}$   
 $\Rightarrow c \neq \frac{-5}{2}$

For all values of  $c$  except  $\frac{-5}{2}$ , the pair of linear equations have unique solution.

7. Let  $\frac{1}{x} = p$  and  $\frac{1}{y} = q$   
 $2p + 3q = 13$  ..... (i)  
 $5p - 4q = -2$  ..... (ii)  
 (i)  $\times 5 \Rightarrow 10p + 15q = 65$  ..... (iii)  
 (ii)  $\times 2 \Rightarrow 10p - 8q = -4$  ..... (iv)  
 (iii) - (iv)  $\Rightarrow 23q = 69$   
 $q = 3$   
 (i)  $\Rightarrow 2p + 3 \times 3 = 13$   
 $\Rightarrow p = 2$

$q = 3 \Rightarrow \frac{1}{y} = 3 \Rightarrow y = \frac{1}{3}$   
 $p = 2 \Rightarrow \frac{1}{x} = 2 \Rightarrow x = \frac{1}{2}$

8. Let the man can finish the work in  $x$  days and the boy can finish the same work in  $y$  days.

Work done by one man in one day =  $\frac{1}{x}$

work done by one boy in one day =  $\frac{1}{y}$

According to the problem,  $\frac{2}{x} + \frac{7}{y} = \frac{1}{4}$  and  $\frac{4}{x} + \frac{4}{y} = \frac{1}{3}$

## SELF ASSESSMENT TEST SOLUTIONS

$$\text{Let } \frac{1}{x} = A, \frac{1}{y} = B$$

$$2A + 7B = \frac{1}{4} \quad \rightarrow(1)$$

$$4A + 4B = \frac{1}{3} \quad \rightarrow(2)$$

$$(1) \times 2 \Rightarrow 4A + 14B = \frac{1}{2} \quad \rightarrow(3)$$

$$4A + 4B = \frac{1}{3} \quad \rightarrow(2)$$

$$(3) - (2) \Rightarrow \begin{array}{r} 4A + 14B = \frac{1}{2} \\ - \quad - \quad - \\ 4A + 4B = \frac{1}{3} \\ \hline 10B = \frac{1}{2} - \frac{1}{3} = \frac{1}{6} \end{array}$$

$$\boxed{B = \frac{1}{60}}$$

$$\text{i.e., } \frac{1}{y} = \frac{1}{60}$$

$$\Rightarrow y = 60$$

$$(1) \Rightarrow 2A + 7 \times \frac{1}{60} = \frac{1}{4}$$

$$2A = \frac{1}{4} - \frac{7}{60}$$

$$2A = \frac{8}{60}$$

$$A = \frac{8}{120}$$

$$\boxed{A = \frac{1}{15}}$$

$$\text{i.e., } \frac{1}{x} = \frac{1}{15}$$

$$\Rightarrow x = 15$$

i.e., one man can finish it in 15 days and a boy can finish it in 60 days.

9.  $\text{Let } \frac{1}{y} = a$

$$\text{Then equations become, } 4x + 6a = 15 \quad \rightarrow(1)$$

$$6x - 8a = 14 \quad \rightarrow(2)$$

$$(1) \times 4 \Rightarrow 16x + 24a = 60 \quad \rightarrow(3)$$

$$(2) \times 3 \Rightarrow 18x - 24a = 42 \quad \rightarrow(4)$$

$$(3) + (4) \Rightarrow 34x = 102 \quad \Rightarrow x = 3$$

$$(1) \Rightarrow 4 \times 3 + 6a = 15$$

$$6a = 3 \quad \Rightarrow a = \frac{1}{2}$$

$$\text{i.e., } \frac{1}{y} = \frac{1}{2} \quad \Rightarrow y = 2$$

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$$\text{Now, } y = px - 2 \quad (\text{given})$$

$$\text{i.e., } 2 = 3p - 2$$

$$4 = 3p \Rightarrow p = \frac{4}{3}$$

10. Let  $\frac{1}{x+y} = A$ ;  $\frac{1}{x-y} = B$ , then equations become

$$10A + 2B = 4 \quad \rightarrow(1)$$

$$15A - 5B = -2 \quad \rightarrow(2)$$

$$(1) \times 3 \Rightarrow 30A + 6B = 12 \quad \rightarrow(3)$$

$$(2) \times 2 \Rightarrow 30A - 10B = -4 \quad \rightarrow(4)$$

$$\begin{array}{r} - \quad + \quad + \\ \hline \end{array}$$

$$(3) - (4) \Rightarrow 16B = 16$$

$$\boxed{B = 1} \Rightarrow \frac{1}{x-y} = 1, x-y = 1 \rightarrow(a)$$

$$(1) \Rightarrow 10A + 2 \times 1 = 4$$

$$10A = 2$$

$$\boxed{A = \frac{1}{5}} \Rightarrow \frac{1}{x+y} = \frac{1}{5}, x+y = 5 \rightarrow(b)$$

$$(a) + (b) \Rightarrow 2x = 6$$

$$\boxed{x = 3}$$

$$(b) \Rightarrow \boxed{y = 2}$$