

X Test - 8

④ 1) 2 women and 5 men can together finish a piece of work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work and that taken by 1 man alone.

2) Determine the values of a and b so that the following system of linear equations have infinitely many solutions:

④ $(2a-1)x + 3y - 5 = 0$

$$3x + (b-1)y - 2 = 0$$

④ 3) Solve by cross multiplication: $x + y = a + b$
 $ax - by = a^2 - b^2$

④ 4) A peacock is sitting on the top of a pillar which is 9m high. From a point 27m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake, the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught?

5) If the roots of the equation:

$$(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0 \text{ are equal, then}$$

④ P.T $\frac{a}{b} = \frac{c}{d}$

✗ Test-8 (Answers)

1) Let the time taken by 1 woman alone to finish the work be x days and that by 1 man alone be y days

$$\text{ATA, } \frac{2}{x} + \frac{5}{y} = \frac{1}{4} \rightarrow (1)$$

$$\frac{3}{x} + \frac{5}{y} = \frac{1}{3} \rightarrow (2)$$

$$\text{Put } \frac{1}{x} = a; \frac{1}{y} = b$$

$$\text{Then, } 2a + 5b = \frac{1}{4} \rightarrow (3)$$

$$3a + 6b = \frac{1}{3} \rightarrow (4)$$

$$(3) \times 3, \quad 6a + 15b = \frac{3}{4}$$

$$(4) \times 2, \quad 6a + 12b = \frac{2}{3}$$

$$(-), \quad \underline{\quad\quad\quad} \quad 3b = \frac{3 \times 3}{4 \times 3} - \frac{2 \times 4}{3 \times 4} = \frac{9-8}{12}$$

$$b = \frac{1}{36} //$$

$$(3), \quad 2a = \frac{1 \times 9}{4 \times 9} - \frac{5}{36} = \frac{4}{36} //$$

$$a = \frac{1}{18} //$$

$$\therefore x = 18, y = 36$$

Hence time taken by 1 woman to complete the work

= 18 days

time taken by 1 man = 36 days.

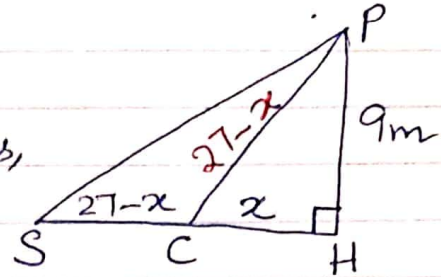
$$\frac{x}{-a^2+b^2-ab-b^2} = \frac{y}{-ab-b^2} = \frac{1}{-(a+b)}$$

$$x = \frac{-a(a+b)}{-(a+b)} = \underline{\underline{a}}$$

$$y = \frac{-b(a+b)}{-(a+b)} = \underline{\underline{b}}$$

4) Since peacock and snake are moving with same speeds, the distance covered by them will be the same.

Thus $PC = SC$



Let x be the distance from the hole at which the snake is caught.

In rt. ΔPCH , using Pythagoras Theorem,

$$PC^2 = PH^2 + CH^2$$

$$(27-x)^2 = 81 + x^2$$

$$729 + x^2 - 54x = 81 + x^2$$

$$729 - 81 = 54x$$

$$x = \frac{648}{54} = \underline{\underline{12}}$$

Hence the required distance is 12m.

5) Let the given eq: be of the form $Ax^2 + Bx + C = 0$;

where $A = a^2 + b^2$, $B = -2(ac + bd)$; $C = c^2 + d^2$

For equal roots,

$$B^2 - 4AC = 0$$

$$4(ac+bd)^2 - 4(a^2+b^2)(c^2+d^2) = 0$$

$$4ac^2 + 4bd^2 + 8abcd - 4a^2c^2 - 4a^2d^2 - 4b^2c^2 - 4b^2d^2 = 0$$

$$-4(a^2d^2 + b^2c^2 - 2abcd) = 0$$

$$(ad - bc)^2 = 0$$

$$ad - bc = 0$$

$$ad = bc$$

$$\underline{\underline{\frac{a}{b} = \frac{c}{d}}}$$