COMPOSITE TEST SOLUTIONS 25-28

Question 25

Five identical black socks and five identical white socks are in a drawer. Two socks are picked at random. What is the probability that they will be of the same colour?

A. $\frac{1}{25}$ B. $\frac{1}{10}$ C. $\frac{4}{9}$ D. $\frac{1}{2}$

Solution

Choose the first sock. The probability of choosing any sock = 1.

Now there are 4 socks of the same colour left in the drawer.

And there are 9 socks in total left in the drawer.

Now choose the second sock.

Probability that it matches the first sock $= \frac{4}{9}$

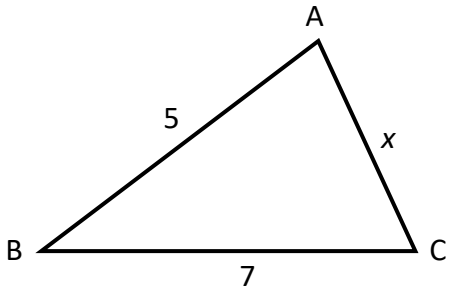
So, the correct answer is C.

Question 26

Triangle ABC has sides 5 cm, 7 cm and *x* cm. If *x* is an integer,

for how many values of *x* will $\triangle$ABC be obtuse-angled?

A. 2 B. 3 C. 5 D. 6



Solution

Assume first that angle B is obtuse.

$$\therefore \cos B = \frac{5^2 + 7^2 - x^2}{2 \times 5 \times 7} < 0$$

$$\therefore x^2 > 5^2 + 7^2 = 74$$

$$\therefore x \geq 9$$

But $x < 5 + 7 = 12$ (sides of triangle)

So, possible values of x are 9, 10 and 11.

Now assume that angle A is obtuse.

$$\therefore \cos A = \frac{5^2 + x^2 - 7^2}{2 \times 5 \times x} < 0$$

$$\therefore 5^2 + x^2 < 7^2$$

$$\therefore x < 5$$

But $x > 7 - 5 = 2$ (sides of triangle)

So, possible values of x are 3 and 4.

In total, possible values of x are 3, 4, 9, 10 and 11.

i.e., there are 5 possible values for x.

So, the correct answer is C.

Question 27

What does the expression $(x+y)^{-1}(x^{-1}+y^{-1})$ simplify to?

A. $x^{-2}+2x^{-1}y^{-1}+y^{-2}$ B. $x^{-2}+2^{-1}x^{-1}y^{-1}+y^{-2}$ C. $x^{-1}y^{-1}$ D. $(x^{-1}y^{-1})^{-1}$

Solution

Use $a^{-1} = \frac{1}{a}$

$$\therefore (x+y)^{-1}(x^{-1}+y^{-1}) = \frac{1}{x+y} \times \left(\frac{1}{x} + \frac{1}{y}\right)$$

$$= \frac{1}{x+y} \times \frac{y+x}{xy}$$

$$= \frac{1}{xy}$$

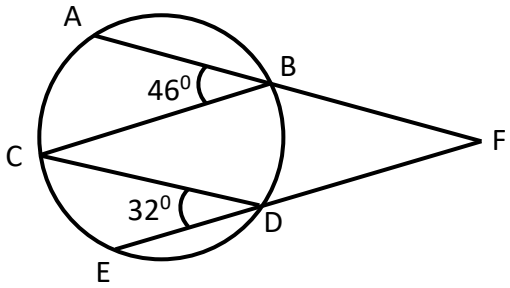
$$= x^{-1}y^{-1}$$

So, the correct answer is C.

Question 28

The points A, B, D, E and C lie on a circle, with $\angle ABC = 46^0$ and $\angle CDE = 32^0$. What is the value of $\angle C + \angle F$?

A. 64^0 B. 78^0 C. 88^0 D. 92^0



Solution

Construct line CF.

$\angle ABC = \angle BCF + \angle BFC$ (ext $\angle$ of ΔBCF)

$= 46^0$

$\angle EDC = \angle DCF + \angle DFC$ (ext $\angle$ of ΔDCF)

$= 32^0$

$\therefore \angle C + \angle F = 46^0 + 32^0 = 78^0$

So, the correct answer is B.