1) Answer: B

Explanation: Note that from our discussion about the isosceles right triangle theorem, we have derived that the length of the diagonal of a square can be determined using the formula:

$$d = s\sqrt{2}$$

Where *s* is the length of the side of the square. Take note that the formula above was derived using the properties of an isosceles right triangle.

In the given problem, the diagonal of the square is $5\sqrt{2}$ cm. Using the formula above, let us solve for the length of the square's side:

$d = s\sqrt{2}$

$5\sqrt{2} = s\sqrt{2}$ *($d = 5\sqrt{2}$ since "d" means diagonal)*

$\frac{5\sqrt{2}}{\sqrt{2}} = \frac{s\sqrt{2}}{\sqrt{2}}$ *Dividing both sides by $\sqrt{2}$*

$5 = s$

$s = 5$

Since *s* represents the length of the side of the square, then the side has a length of 5 cm.

We can now compute for the area of the square using s = 5. The formula for the area of the square is $A = s^2$.

$A = s^2$

$A = (5)^2$

$A = 5 \times 5 = 25$

Thus, the area of the square is 25 cm^2.

2) Answer: A

Explanation: The length of the hypotenuse can be determined using the Pythagorean theorem:

The Pythagorean theorem states that $a^2 + b^2 = c^2$ where *a* and *b* are the measurements of the legs of the right triangle and *c* is the measurement of the hypotenuse of the right triangle.

The length of the legs of the right triangle are 6 cm and 8 cm. Thus, we have a = 6 and b = 8. We need to compute for c (which is the length of the hypotenuse).

Let us plug these values into the equation of the Pythagorean theorem:

$a^2 + b^2 = c^2$

$(6)^2 + (8)^2 = c^2$

$36 + 64 = c^2$

$100 = c^2$

$c^2 = 100$ *Symmetric property of equality*

$\sqrt{c^2} = \sqrt{100}$ *Take the square root of both sides of the equation*

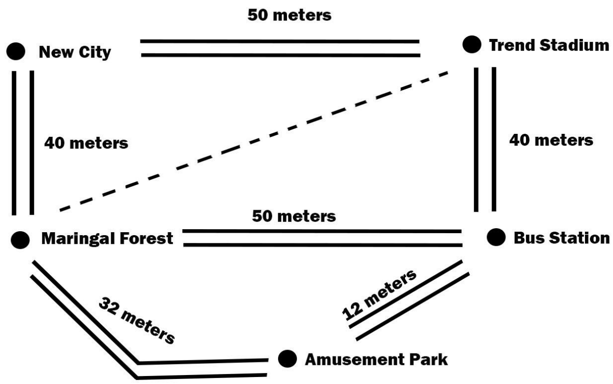
$c = \pm 10$

We reject the negative value of c (which is -10) and take c = 10 only.

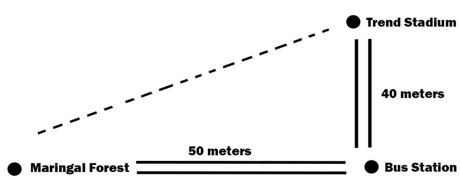
Since c represents the length of the hypotenuse, then the length of the hypotenuse in the problem is 10 cm.

3) Answer: A

Explanation: The shortest distance from Trend Stadium to Maringal forest can be represented by a diagonal line that connects these two places. We illustrate it in the illustration on the next page.



As we draw this diagonal line, note that we have formed a right triangle such that the roads from Trend Stadium to Bus station and Bus station to Maringal forest are the legs while the diagonal line is the hypotenuse:



Thus, we can apply the Pythagorean theorem to determine the distance from Trend Stadium to Maringal Forest.

We have a = 50 and b = 40. We are going to solve for the value of c.

$a^2 + b^2 = c^2$
$(50)^2 + (40)^2 = c^2$
$2500 + 1600 = c^2$
$4100 = c^2$
$c^2 = 4100$
$\sqrt{c^2} = \sqrt{4100}$
$c = \pm 10\sqrt{41}$

We reject the negative value of c and take c = $10\sqrt{41}$ only.

Thus, the shortest path from Trend Stadium to Maringal Forest is $10\sqrt{41}$ meters long.

4) Answer: D

Explanation: All statements in the given options are true. *m, n,* and *p* are Pythagorean triples since they satisfy the condition that the sum of the squares of *m* and *n* is equal to the square of *p*. Statements II and IV pertain to qualified Pythagorean triples, and statement III is just a direct consequence of statement I.

5) Answer: C

Explanation: In a 30° - 60° - 90° right triangle, the measure of the longer leg is $\sqrt{3}$ times as long as the shorter leg. Thus, if the shorter leg is 2 meters long, then the longer leg is $2\sqrt{3}$ meters long.