

Pythagorean Quadratic

Introduction:

This assignment is based on the Pythagorean Theorem; it introduces Pythagorean theorem in solving practical problem.

This problem is associated with finding the treasure using mathematical concept.

Pythagorean Theorem finds its extensive use in real life setting. For finding various dimensions and directions and finding civil, constructional and architectural calculation, the use of Pythagorean plays an important role.

Direction

Solution: Ahmed finds half of the treasure map and Vanessa finds the other half of the map. However, this map includes clues rather than clear indication of the specific location of the treasure. The clue can be solve mathematically to find the treasure

Pythagorean Theorem can be written in mathematical form as:

$$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Height})^2$$

As evident from the figure, the treasure can be found with reference to the castle rock. As per Vanessa's map the treasure can be found at a point, x paces to the east and $2x+4$ paces to the west of the castle rock. In addition, Ahmed's half of the map indicates the treasure is situated at a point $2x+6$ paces from the castle rock. These two directions together form a right angle triangle and Pythagorean Theorem can be applied as:

$$(2x+6)^2 = x^2 + (2x+4)^2$$

This quadratic equation can be solved for x :

$$(2x+6)^2 = x^2 + (2x+4)^2$$

$$4x^2 + 2 \cdot 2x \cdot 6 + 6^2 = x^2 + 4x^2 + 2 \cdot 2x \cdot 4 + 4^2$$

$$4x^2 + 24x + 36 = x^2 + 4x^2 + 16x + 16$$

$$4x^2 + 24x + 36 = 5x^2 + 16x + 16$$

$$4x^2 + 24x + 36 - 5x^2 - 16x - 16 = 0$$

$$-x^2 + 8x + 20 = 0$$

$$x^2 - 8x - 20 = 0$$

$$x^2 - 10x + 2x - 20 = 0 \quad [\text{factorization}]$$

$$x(x-10) + 2(x-10) = 0$$

$$(x-10)(x+2) = 0$$

So $x-10 = 0$ such that $x = 10$; or $x+2 = 0$ such that $x = -2$; but it cannot be acceptable, as distance cannot be a negative number.

So the value of x is found to be 10.

Conclusion:

This assignment gives an insight into the use of mathematical theorem in solving real life problem. This particular problem finds the value of x which helps finding the treasure at more ease and less effort.