

NAME: _____

P.I. A.A.8: Analyze and solve verbal problems that involve quadratic equations

1. Use any problem solving strategy to solve the following problem. A rectangular room has a length that is 4 feet greater than the width. Write a polynomial to describe the area of the room.
2. Cary told Tony that she wants to build a rectangular patio in her backyard with an area of $x^2 - 3x - 10$ square feet. If the width needs to be at least 4 feet, what are two sets of possible dimensions for Cary's patio?
3. The quadratic expression $4x^2 - 7x - 2$ represents the area of a rectangular garden. What expressions represent the dimensions of the garden?
4. Use any problem solving strategy to solve the following problem. Find the length of the side of a square whose area is twice its perimeter.
5. A flower garden has a length that is 4 ft shorter than twice its width. The area of the garden is 48 ft^2 . Find the dimensions of the garden.
6. The length of a rectangle is 6 feet greater than three times its width. Find the length and width of the rectangle if its area is 45 square feet.
7. The perimeter of a rectangular concrete slab is 96 feet and its area is 432 square feet. What is the length of the longer side of the slab?
8. A garden will be placed along a wall. 25 ft of fencing will be used for the other three sides. What should the length and width of the garden be if the area is to be 75 square feet?

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9. A farmer has 1478 feet of fencing available to enclose a rectangular field. One side of the field lies along a river, so only three sides require fencing.
- (a) Express the area A of the rectangle as a function of x , where x is the length of the side parallel to the river.
- (b) For what value of x is the area largest?
10. Use any problem solving strategy to solve the following problem. Suppose you have 50 ft of fencing to enclose a rectangular dog pen. The function $A = x^2 + x$ gives you the area of the dog pen in square feet where x is the width. What width and length gives you the maximum area? What is the maximum area? Assume the length and width will be whole numbers.
11. Mary has 24 meters of fencing. Find the dimensions of a rectangle that will give the maximum area when enclosed by this fence.
12. Use any problem solving strategy to solve the following problem. The length of a rectangular swimming pool is 3 m longer than its width. A sidewalk that is 3 m wide is added around the edge of the pool. If the area of the swimming pool and sidewalk is 154 m^2 , what is the area of the swimming pool?
13. A rectangular garden measuring 8 m by 12 m has its area increased by 224 m^2 by the addition of a walk of uniform width around all sides. What is the width of the walk?
14. The volume of a box is 1680 cubic feet. The width of the box is 8 feet and its height is 1 foot more than its length. Find the height of the box.
- [A] 13 ft [B] 14 ft [C] 12 ft [D] 15 ft

[1] $x^2 + 4x$ _____

Answers may vary. Sample: 4 feet by 11 feet,

[2] 5 feet by 12 feet _____

[3] $x - 2$ and $4x + 1$ _____

[4] 8 _____

[5] 6 ft by 8 ft _____

[6] length = 15 ft; width = 3 ft _____

[7] 36 ft _____

[8] 15 ft by 5 ft or 10 ft by 7.5 ft _____

(a) $A(x) = x\left(\frac{1478-x}{2}\right) = 739x - \frac{1}{2}x^2$

[9] (b) 739 feet _____

[10] width = 12 ft, length = 13 ft; 156 ft^2 _____

[11] length 6 m, width 6 m _____

[12] 40 m^2 _____

[13] 4 m _____

[14] D _____