## APPLICATIONS WITH PARABOLIC FUNCTIONS (DAY 7)

EX. 1 Using the graph at the right, It shows the **height** *h* in feet of a small rocket *t* **seconds** after it is launched. The path of the rocket is given by the equation:
**h = -16t² + 128t.**

1. How long is the rocket in the air? _____

2. What is the greatest height the rocket reaches? ____

3. About how high is the rocket after 1 second? _____

4. After 2 seconds,
    about how high is the rocket?_____

    is the rocket going up or going down? _____

5. After 6 seconds,
    about how high is the rocket? _____

    is the rocket going up or going down? _____

h (height (feet))

6. Do you think the rocket is traveling faster from 0 to 1 second or from 3 to 4 seconds? Explain your answer.
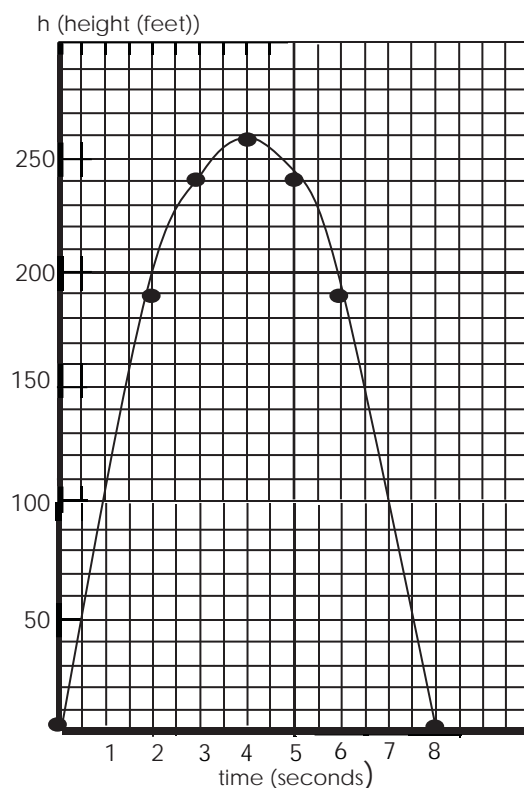
7. Using the equation, find the **exact** value of the height of the rocket at 2 seconds.

8. What is the domain of the graph?

9. What is the range of the graph?

10. Express the interval over which the graph is increasing.

11. Express the interval over which the graph is decreasing.

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height (meters)

EX2: A ball is thrown in the air. The path of the ball is represented by the equation $h = -t^2 + 8t$. Graph the equation over the interval $0 \leq t \leq 8$ on the accompanying grid.
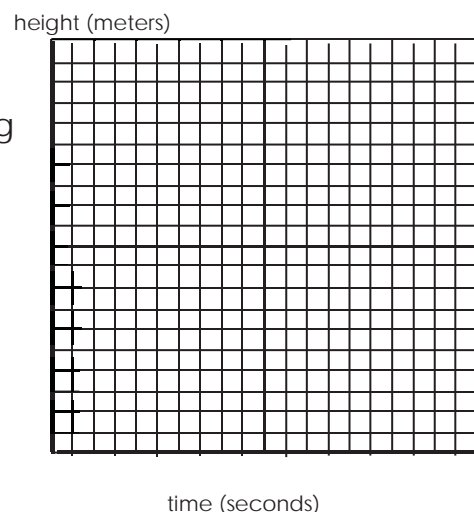
a) What is the maximum height of the ball?_____

b) What is the amount of time that the ball is above 7 meters? _____

time (seconds)

EX3: A swim team member performs a dive from a 14-foot high springboard. The parabola below shows the path of her dive.
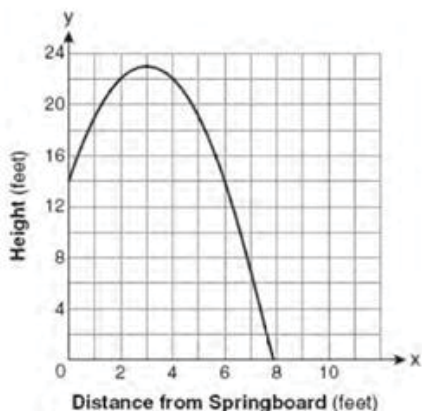
a) What is the axis of symmetry? _____

b) Find f(6) _____

EX4: Consider the graph of the equation $y = ax^2 + bx + c$, when $a \neq 0$. If a is multiplied by 3, what is true of the graph of the resulting parabola?

1) The vertex is 3 units above the vertex of the original parabola.
2) The new parabola is 3 units to the right of the original parabola
3) The new parabola is wider than the original parabola.
4) The new parabola is narrower than the original parabola.

EX5: Melissa graphed the equation $y = x^2$ and Dave graphed the equation $y = -3x^2$ on the same coordinate grid. What is the relationship between the graphs that Melissa and Dave drew?

EX6: The graph of a parabola is represented by the equation $y = ax^2$ where a is a positive integer. What happens to the new parabola if a is multiplied by 2? What if multiplied by $\dfrac{1}{2}$?

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