

UNIT 9**LESSON 9**

DO NOW: The function $f(x) = 3x^2 + 12x + 11$ can be written in vertex form as

1) $f(x) = (3x + 6)^2 - 25$

2) $f(x) = 3(x + 6)^2 - 25$

3) $f(x) = 3(x + 2)^2 - 1$

4) $f(x) = 3(x + 2)^2 + 7$

AIM: ANALYZING QUADRATIC FUNCTIONS

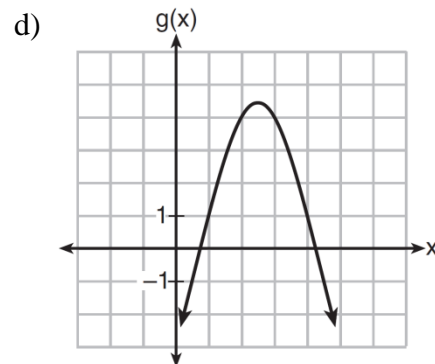
1. Which quadratic function has the largest maximum?

a) $h(x) = (3 - x)(2 + x)$

b) $k(x) = -5x^2 - 12x + 4$

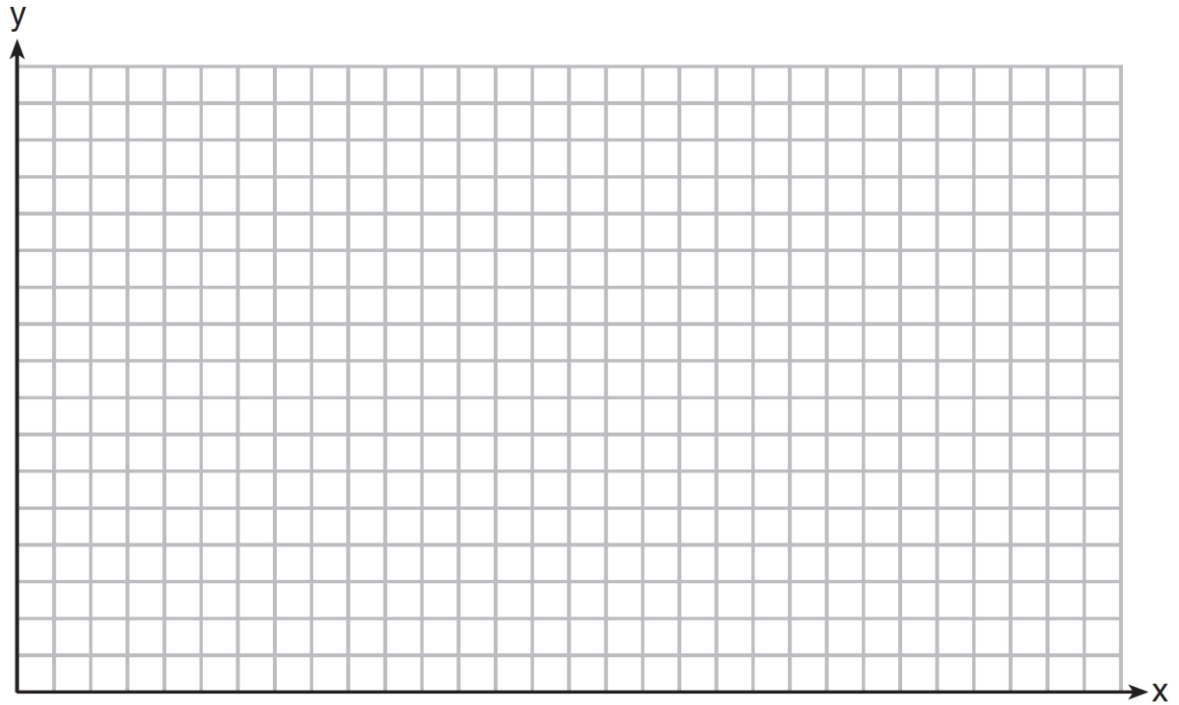
c)

x	f(x)
-1	-3
0	5
1	9
2	9
3	5
4	-3



2. A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where t is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

3. A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet. On the set of axes below, graph the function $y = h(x)$ over the interval $0 \leq x \leq 150$.

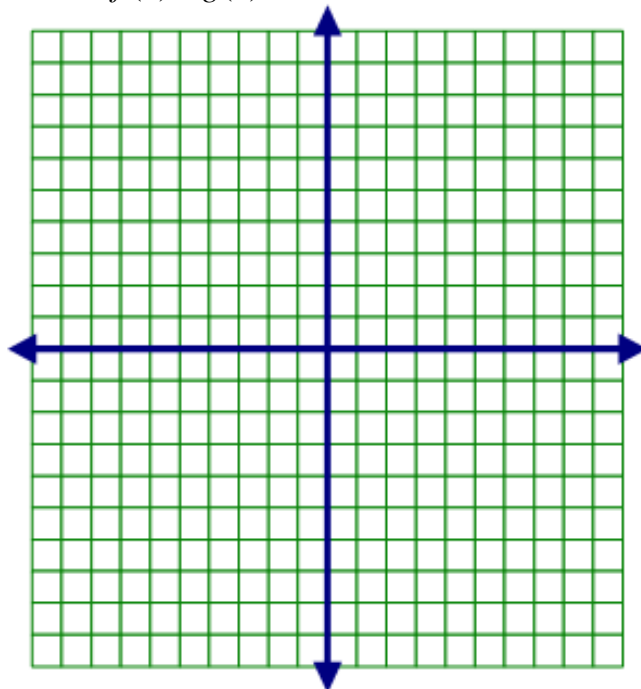


- a) Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.
- b) The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

4. Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds.
- Determine the number of seconds it takes to achieve its maximum height. Justify your answer.
 - State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

1. Write the quadratic equation in vertex form by completing the square. Then, identify the quadratic equation's turning point. $f(x) = 4x^2 - 32x + 20$

2. Given $f(x) = x^2 - 4x + 9$ and $g(x) = 2x + 1$. Graphically determine $f(x) = g(x)$.



3. Ms. Cronin and her friends are going to an amusement park. Their favorite ride is The Giant Trampoline. However, The Giant Trampoline is only allowed to be jumped once, per person. If the motion of Ms. Cronin's jump is represented by the equation: $y = -12x^2 + 54x$. Where x represents the time, in seconds and y represents the height, in inches.



- a) To the *nearest hundredth* of a second, how long does it take for Ms. Cronin to reach her maximum height? Show how you arrived at your answer.
- b) To the *nearest hundredth* of an inch, what is the maximum height that Ms. Cronin jumped? Show how you arrived at your answer.
- c) To the *nearest tenth* of a second, how much time does it take Ms. Cronin to return to the trampoline after her jump? Show how you arrived at your answer.

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