

Practice: Interpreting Various Forms of Quadratic Functions**B**

Use the given functions to complete all parts of problems 1–3.

1. $f(x) = x^2 - 8x + 12$

- a. Identify the y -intercept.

- b. Identify the vertex.

- c. Identify whether the function has a maximum or minimum.

2. $f(x) = -2(x - 3)(x + 5)$

- a. Identify the x -intercepts.

- b. Identify the y -intercept.

- c. Identify the axis of symmetry.

- d. Identify the vertex.

3. $f(x) = -16(x - 3)^2$

- a. Identify the vertex.

- b. Identify whether the function has a maximum or minimum.

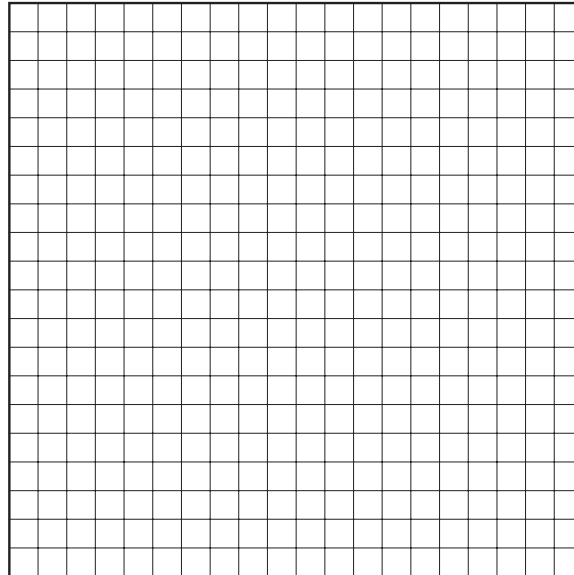
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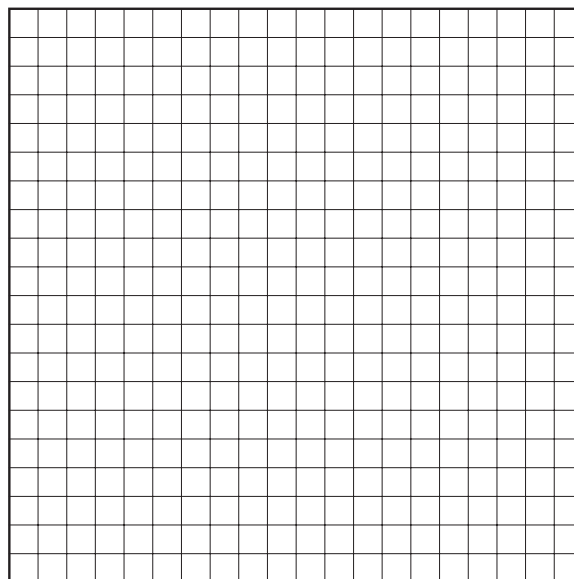
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Use the given information in each scenario that follows to complete the remaining problems.

4. A butterfly descends toward the ground and then flies back up. The butterfly's descent can be modeled by the equation $h(t) = t^2 - 10t + 26$, where $h(t)$ is the butterfly's height above the ground in feet and t is the time in seconds since you saw the butterfly. Graph the function and identify the vertex. What is the meaning of the vertex in the context of the problem?



5. A cliff diver jumps upward from the edge of a cliff then begins to descend, so that his path follows a parabola. The diver's height, $h(t)$, above the water in feet is given by $h(t) = -2(t - 1)^2 + 52$, where t represents the time in seconds. Graph the function. What is the vertex and what does it represent in the context of the problem? How many seconds after the start of the dive does the diver reach the initial height?

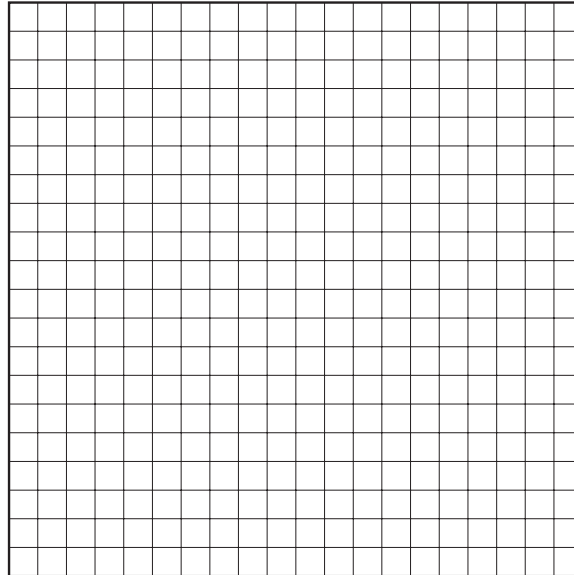


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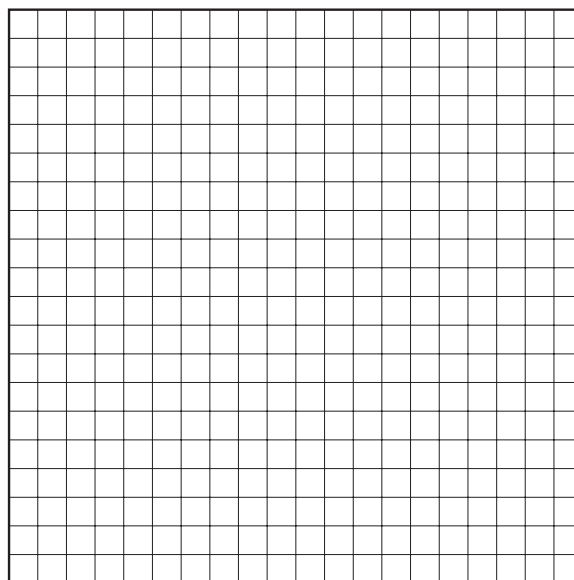
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6. The revenue of producing and selling widgets is given by the function $R(x) = -8(x - 50)(x - 2)$, where x is the number of widgets produced and $R(x)$ is the amount of revenue in dollars. Graph the function. What are the x -intercepts and what do they represent in the context of the problem? What number of widgets maximizes the revenue?



7. A football is kicked and follows a path given by $y = -0.03x^2 + 1.2x$, where y represents the height of the ball in feet and x represents the horizontal distance in feet. Graph the function. What is the vertex and what does it mean in the context of the problem? How far does the ball travel in the horizontal direction?

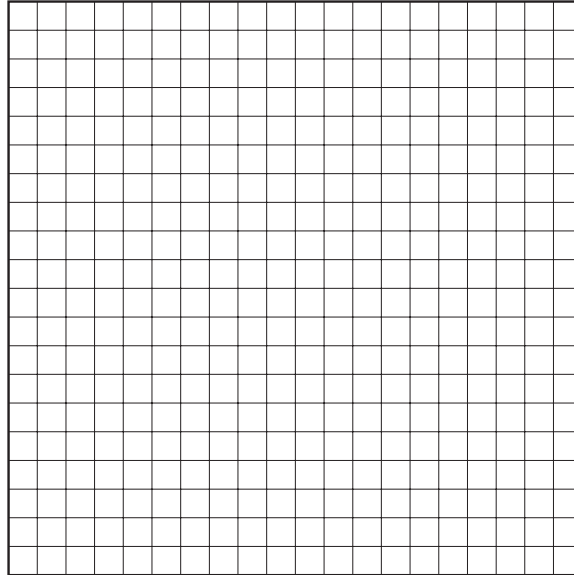


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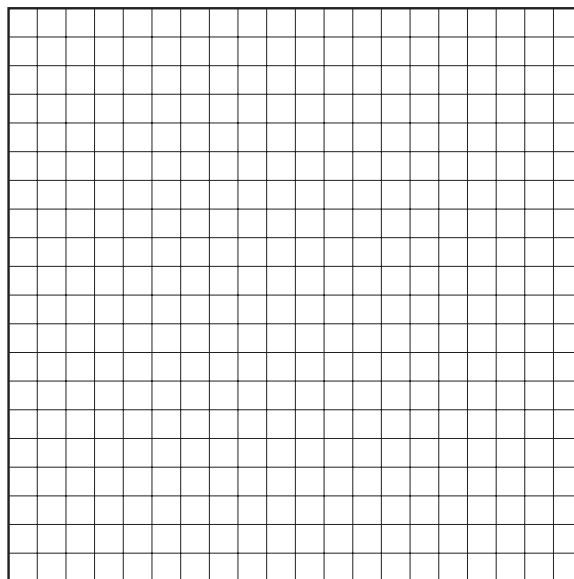
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8. A frog hops from the bank of a creek onto a lily pad. The path of the jump can be modeled by the equation $h(x) = -\frac{1}{2}(x-2)^2 + 4$, where $h(x)$ is the frog's height in feet above the water and x is the number of seconds since the frog jumped. Graph the function. What does the vertex represent in the context of the problem? What is the axis of symmetry? After how many seconds does the height of the frog reach the initial height?



9. The revenue, $R(x)$, generated by an increase in price of x dollars for an item is represented by the equation $R(x) = -2x^2 + 20x + 150$. Graph the function and identify the vertex. What does the vertex represent in the context of the problem? What is the axis of symmetry? What increase in price results in the same revenue as not increasing the price at all?



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10. Reducing the cost of an item can result in a greater number of sales. The revenue function that predicts the revenue in dollars, $R(x)$, for each \$1 decrease in price, x , for a certain item is $R(x) = -(x - 26)(x + 10)$. Graph the function. Identify the x -intercepts. What do the x -intercepts represent in the context of the problem? What is the axis of symmetry? What increase in price results in the same revenue as not increasing the price at all?

