Additional Problems: Functions & Their Graphs

**Quadradic Functions from Situations**

1. A basketball is thrown by a 5-foot player at an initial upward velocity of 40 feet per second. The situation is modeled by the equation h = -16t^2 + 40t + 5, where *h* represents the height in feet and *t* represents the time in seconds. Using this equation, define the domain of the ball when it reaches its maximum height.
   1. 1.25 seconds
   2. 30.25 feet
   3. 2.50 seconds
   4. 1.25 seconds
2. A tennis ball is hit by a 4-foot player at an initial upward velocity of 25 feet per second. The situation is modeled by the equation h = -16t^2 + 25t + 4, where *h* represents the height in feet and *t* represents the time in seconds. Using this equation, define the domain of the ball when it reaches its maximum height.
   1. 0.78 seconds
   2. 15.63 feet
   3. 1.56 seconds
   4. 78 seconds
3. A falcon dives from a height of 40 feet to catch a rabbit. It follows the function h = 8t^2 - 32t + 40, where *t* is the time in seconds and *h* is the height in feet. Which of the following best interprets the vertex?
   1. (0, 40)
   2. (2, 8)
   3. (4, 0)
   4. (8, 2)
4. A squirrel jumps from a branch 20 feet high to reach the ground. It follows the function h = 5t^2 - 20t + 20, where *t* is the time in seconds and *h* is the height in feet. Which of the following best interprets the vertex?
   1. (0, 20)
   2. (2, 0)
   3. (2, -5)
   4. (1, -5)
5. Rosa is designing a rectangular play area for her children. She has enough materials for a fence with 80 feet around the perimeter. This function is represented by the formula A = -w^2 + 40w, where *A* is the area and *w* is the width. Which of the following correctly identifies the x-intercept(s)?
   1. (0, 0) and (80, 0)
   2. (0, 0) and (40, 0)
   3. (40, 0) and (20, 400)
   4. (80, 0)
6. Yuri is setting up a rectangular dog run in his backyard. He has enough materials for a fence with 100 feet around the perimeter. This function is represented by the formula A = -w^2 + 50w, where *A* is the area and *w* is the width. Which of the following correctly identifies the x-intercept(s)?
   1. (0, 0) and (50, 0)
   2. (0, 0) and (100, 0)
   3. (50, 0) and (25, 625)
   4. (100, 0)
7. The profit (in thousands of dollars) of a startup is represented as P = -3x^2 + 600x + 2,000, where *P* represents the profit and *x* represents the amount spent on marketing (in thousands of dollars). How much spending in the thousands will be directed toward marketing to achieve the maximum profit?

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1. The profit (in thousands of dollars) of a tech company is represented as \P = -4x^2 + 800x + 3,000, where *P* represents the profit and *x* represents the amount spent on marketing (in thousands of dollars). How much spending in the thousands will be directed toward marketing to achieve the maximum profit?

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1. Graph the function f(x) = 3x^2 - 4x. What is the y-value that corresponds to the x-value of -1?
2. Graph the function f(x) = -2x^2 + 5x. What is the y-value that corresponds to the x-value of -1?