

Name: _____
Early Due Date (for +5 points): _____

Class Period: _____
Due Date: _____

Quadratic Project

The project may be done on a single sheet of graph paper, or on a poster board if you wish, but the graph MUST be exact. Up to 5 extra points will be awarded for creativity.

Willie Crash's Rocket Problem: Version A

Willie Crash was out Sunday flying in his spaceship. As he approached Mars, he changed his mind, and decided that he did not wish to visit that planet and fired his retro-rocket. The spaceship slowed down, and if all went well (or did it?), stopped for an instant then started pulling away. While the rocket motor was firing, Willie's distance, d , from the surface of Mars depended by a quadratic function on the number of minutes, t , since he started firing the rocket.

- a. Willie finds that at times $t = 1, 2,$ and 3 minutes, his distances were $d = 425, 356,$ and 293 kilometers, respectfully. Find the particular equation expressing d in terms of t . (15 pts)
- b. Find the d -intercept and tell what this number represents in the real world. (15 pts)
- c. Draw the graph of this quadratic function (on graph paper). Label the vertex. (Use a scale of 20 on the y -axis and a scale of 1 on the x -axis.) (40 pts)
- d. Does your model tell you that Willie crashed into the surface of Mars, just touched the surface, or pulled away safely before reaching the surface? Explain. (15 pts)
- e. According to the equation, where was Willie when $t = 15$? When $t = 16$? Does this tell you he is pulling away from Mars when $t = 16$, or still approaching? (15 pts)

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Willie Crash's Rocket Problem: Version B

Willie Crash was out Sunday flying in his spaceship. As he approached Mars, he changed his mind, and decided that he did not wish to visit that planet and fired his retro-rocket. The spaceship slowed down, and if all went well (or did it?), stopped for an instant then started pulling away. While the rocket motor was firing, Willie's distance, d , from the surface of Mars depended by a quadratic function on the number of minutes, t , since he started firing the rocket.

- a. Willie finds that at times $t = 1, 2,$ and 3 minutes, his distances were $d = 450, 381,$ and 318 kilometers, respectfully. Find the particular equation expressing d in terms of t . (15 pts)
- b. Find the d -intercept and tell what this number represents in the real world. (15 pts)
- c. Draw the graph of this quadratic function (on graph paper). Label the vertex. (Use a scale of 20 on the y -axis and a scale of 1 on the x -axis.) (40 pts)
- d. Does your model tell you that Willie crashed into the surface of Mars, just touched the surface, or pulled away safely before reaching the surface? Explain. (15 pts)
- e. According to the equation, where was Willie when $t = 15$? When $t = 16$? Does this tell you he is pulling away from Mars when $t = 16$, or still approaching? (15 pts)

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Willie Crash's Rocket Problem: Version C

Willie Crash was out Sunday flying in his spaceship. As he approached Mars, he changed his mind, and decided that he did not wish to visit that planet and fired his retro-rocket. The spaceship slowed down, and if all went well (or did it?), stopped for an instant then started pulling away. While the rocket motor was firing, Willie's distance, d , from the surface of Mars depended by a quadratic function on the number of minutes, t , since he started firing the rocket.

- Willie finds that at times $t = 1, 2,$ and 3 minutes, his distances were $d = 432, 363,$ and 300 kilometers, respectfully. Find the particular equation expressing d in terms of t . (15 pts)
- Find the d -intercept and tell what this number represents in the real world. (15 pts)
- Draw the graph of this quadratic function (on graph paper). Label the vertex. (Use a scale of 20 on the y -axis and a scale of 1 on the x -axis.) (40 pts)
- Does your model tell you that Willie crashed into the surface of Mars, just touched the surface, or pulled away safely before reaching the surface? Explain. (15 pts)
- According to the equation, where was Willie when $t = 15$? When $t = 16$? Does this tell you he is pulling away from Mars when $t = 16$, or still approaching? (15 pts)