

1. Which value do I start with to determine the value of c to create a perfect square?

a. Given $x^2 - 12 - 7$.

b. Given $5x^2 + 30x + 11$.

For the following questions, find the value of c that completes the square and then rewrite it as a perfect square.

2. $x^2 - 18x + c$

3. $x^2 + 2x + c$

4. $x^2 - 14x + c$

5. $x^2 + 9x + c$

For the following functions:

a. Rewrite the function in vertex form of $f(x) = a(x - h)^2 + k$

b. Determine the vertex.

c. Determine if the vertex is a maximum or a minimum and state the maximum or minimum value.

d. Determine the y-intercept. (Remember y-intercept is a point)

e. Determine the x-intercept(s). (Remember x-intercept is a point)

f. Sketch the graph of the function with its axis of symmetry (label the vertex and intercepts on the graph).

6. $f(x) = x^2 + 2x - 15$

7. $f(x) = -2x^2 - 4x + 6$

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

9. $f(x) = 2x^2 - 10x - 72$

10. A rock is thrown upward so that its distance, in feet, above the ground after t seconds is $h(t) = -14t^2 + 336t$.

a. Find the zeros of the function and explain the meaning in the context of the problem.

b. Find the vertex of the function and explain the meaning in the context of the problem.

11. John owns a hotdog stand. He has found that his profit is represented by the equation $P(x) = -x^2 + 68x + 77$, with P being the profit in dollars, and x the number of hotdogs sold. How many hotdogs must he sell to earn the *most* profit?

12. Bob owns a watch repair shop. He has found that the cost of operating his shop is given by

$C(x) = 4x^2 - 264x + 85$ where c is the cost in dollars, and x is the number of watches repaired. How many watches must he repair to have the *lowest* cost?

13. A projectile is thrown upward so that its distance above the ground after t seconds is $h(t) = -12t^2 + 540t$. When does it reach its maximum height? What is the maximum height?

14. The quadratic function $f(x) = 0.0042x^2 - 0.42x + 36.23$ models the average age at which US men were first married x years after 1900.

a. In which year was the average age at a minimum? (Round to the nearest year)

b. What was the average age at first marriage for that year? (Round to the nearest tenth)