6.1 Completing the Square Worksheet

Standard Form: $y = ax^2 + bx + c$ ----------> Vertex Form: $y = a(x-h)^2+k$

For each quadratic that is in standard form, determine the value of 'c' that makes each expression a perfect square trinomial (remember, the 'c' value is half of the 'b' value squared)

1) $y = x^2 + 4x + c$

2) $y = x^2 + 14x + c$

3) $y = x^2 - 20x + c$

4) $y = x^2 - 30x + c$

Find the vertex of each parabola by completing the square. State if the vertex is a maximum or minimum point [remember: the vertex of a parabola in vertex form is (h,k)]

5) $y = x^2 + 10x + 15$

6) $y = x^2 – 8x – 4$

vertex: _____ max or min: _____

vertex: _____ max or min: _____

7) $y = x^2 + 14x - 14$

vertex: _____ max or min: _____

8) $y = x^2 - 6x + 17$

vertex: _____ max or min: _____

9) $y = 2x^2 - 12x + 22$

vertex: _____ max or min: _____

10) $y = -x^2 + 2x + 4$

vertex: _____ max or min: _____

11) $y = 2x^2 + 12x + 17$

vertex: _____ max or min: _____

12) $y = -x^2 + 4x - 10$

vertex: _____ max or min: _____

13) $y = 4x^2 + 64x + 156$

vertex: _____ max or min: _____

14) The path of a rocket is given by the equation, $h = -3t^2 + 30t + 73$, where 'h' is the height in meters and 't' is the time in seconds.

a) What is the maximum height of the rocket?

b) At what time does the rocket reach its maximum height?

Answers:

1) 4
2) 49
3) 100
4) 225
5) (-5,-10) min
6) (4,-20) min
7) (-7,-63) min
8) (3,8) min
9) (3,4) min
10) (1,5) max
11) (-3,-1) min
12) (2,-6) max
13) (-8,-100)
14) a) 148 m b) 5 seconds