Precalculus Name_____

Find the vertex of the graph specified in the given equation by completing the square to write the equation in the form $y=a(x-h)^2+k$.

1) $y = x^2 - 6x + 11$

2) $y = x^2 + 16x + 61$

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

4) $y = 3x^2 - 18x + 29$

5) $y = -3x^2 - 12x - 13$

6) $y = 3x^2 - 21x + 8$

7) $y = 2x^2 + 6x - 3$

8) $y = \frac{1}{2}x^2 - 2x + 5$

9) $y = \frac{2}{3}x^2 - 4x + 13$

10) $y = \frac{2}{5}x^2 - 4x + 4$

Find the roots by factoring or by the Quadratic Formula.

1) $x^2 + 14x + 48 = 0$

2) $5x^2 + 45x = -70$

3) $x^2 + 7x - 55 = -25$

4) $x^2 - 9x + 20 = 0$

5) $-x^2 + 6x + 7 = 0$

6) $x^2 + 24 = -11x$

7) $4x^2 - 16x + 15 = 0$

8) $5x^2 - 24x + 16 = 0$

9) $2x^2 - 25x + 33 = 0$

10) $8x^2 - 97x + 12 = 0$

11) $5x^2 + 13x = 3x^2 + 24$

12) $5x^2 + 11x - 12 = 0$