Name: _____   Date: _____

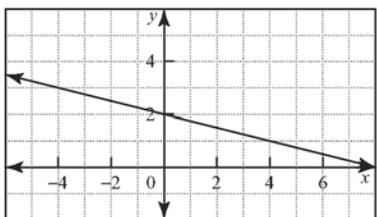## Chapter 1 Prerequisite Skills

Graphs and Lines

1. Graph each linear relation.
   a) $y = -2x + 4$ b) $x = 3$
   c) $3x - 4y - 12 = 0$ d) $y = \dfrac{1}{3}x + 4$

2. For the graph of a linear relation, determine the equation in slope y-intercept form.

3. Determine the equation in the form $y = mx + b$ for the line passing through each pair of points.
   a) $(-2, -6)$ and $(4, -3)$ b) $(3, 2)$ and $(1, -4)$
   c) $(3, -1)$ and $(6, -3)$

4. Use elimination to find the point of intersection of each pair of linear relations.
   a) $2x - 3y = -6$ and $x + y = 7$
   b) $x - 2y = -6$ and $3x - y = -8$

5. Use substitution to find the point of intersection of each pair of linear relations.
   a) $x + y = 2$ and $y = 4x + 1$
   b) $2x - y = 17$ and $x + 2y = -4$

Working With Polynomials

6. Expand and simplify each expression.
   a) $(2x - 1)(3x + 4)$ b) $(2t - 3)^2$
   c) $5(n + 4)(n - 3)$ d) $\dfrac{3}{4}(2x - 5)(6x + 1)$

7. Factor completely.
   a) $x^2 - 2x + 1$ b) $x^2 + x - 20$
   c) $3x^2 + 3x - 6$ d) $-8x^2 - 8x + 6$

8. Identify if each quadratic expression is a perfect square trinomial. For the perfect square trinomials, write the factored form.
   a) $x^2 + 2x + 12$ b) $4n^2 - 4n + 1$
   c) $x^2 + 8x + 16$ d) $3x^2 + 6x + 9$

9. Determine the value of k that makes each expression a perfect square trinomial.
   a) $x^2 + 4x + k$ b) $x^2 - 12x + k$
   c) $x^2 - x + k$ d) $x^2 - 5x + k$

10. Factor the rational coefficient of the x^2-term in each expression.
   a) $-\dfrac{2}{3}x^2 + 3x$ b) $\dfrac{1}{4}x^2 - \dfrac{5}{4}x$
   c) $\dfrac{3}{4}x^2 + 12x$ d) $-\dfrac{3}{5}x^2 + 4x$

Quadratic Relations

11. For each quadratic relation, state
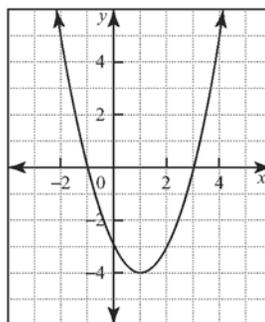   i)   the coordinates of the vertex
   ii) the equation of the axis of symmetry
   iii) the direction of opening
   iv) the y-intercept
   Then, sketch a graph of the relation.
   a) $y = -3(x + 2)^2 + 7$ b) $y = \dfrac{1}{2}(x - 4)^2 - 5$

12. Determine the equation of the quadratic relation that corresponds to the graph. It has the same shape as $y = x^2$.

13. Complete the square to express each quadratic relation in the form $y = a(x - h)^2 + k$. Then, give the coordinates of the vertex.
   a) $y = x^2 - 2x + 4$ b) $y = 3x^2 + 18x + 16$

14. a) Without graphing, predict how the graphs of the equations in each pair will differ. Explain your reasoning.
   i) $y = (x - 1)^2 - 4$ and $y = (x + 1)^2 - 4$
   ii) $y = 2(x + 2)^2 + 2$ and $y = 2(x + 2)^2 - 2$
   b) **Use Technology** Verify your answers to part a) by graphing the two equations using a graphing calculator.