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Chapter 2 Prerequisite Skills

Properties of Quadratic Functions

1. Compare the graph of each quadratic function to that of $y = x^2$. Identify the direction of opening and state whether the parabola has been vertically stretched or compressed. Justify your answer.

a) $y = -2x^2$

b) $y = \frac{1}{3}x^2$

c) $y = -4(x - 3)^2 + 2$

d) $y = 0.8x^2 - 0.8x + 2$

2. Determine the vertex of each parabola.

a) $y = \frac{1}{2}(x - 4)^2 - 4$

b) $y = (x + 3)^2 + 2$

c) $y = -4(x + 5)^2 + 3$

d) $y = \frac{1}{3}(x + 1)^2 - \frac{1}{2}$

Translations

3. Draw the graph of each relation after a vertical translation of 4 units down.

a) $y = 2x - 3$

b) $y = -x^2$

c) $x^2 + y^2 = 36$

d) $y = \sqrt{x}$

4. Draw each relation in question 3 after a horizontal translation of 3 units to the right.

Graph Functions

5. Graph each function on grid paper.

a) $y = -3x + 2$

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

c) $y = (x + 5)(x - 7)$

d) $y = \frac{1}{4}(x + 3)^2 - 4$

Distributive Property

6. Expand and simplify.

a) $2x(x - 5)$

b) $4x^2y\,(3x - 7y)$

c) $-5y(3y^2 - 2y + 4)$

d) $(2x - 5)(3x + 1)$

e) $(5x - 2)(5x + 2)$

f) $6x(3x + 1) - 2x(5 - 7x)$

Common Factors

7. Determine the greatest common factor of each set.

a) 24, 36

b) 14, 35, 49

c) 20, 40, 60

d) $3x^2y$, $6x^2y^2$, $9x^3y^3$

e) $3y^2 + 12y$, $6y^2 + 9y$

f) $x^2 + 3x - 4$, $x^2 + 9x + 20$

8. Factor fully.

a) $25x^2 + 5x$

b) $-28x^3y + 49x^2y^2$

c) $6x^3y^3 - 9x^2y^4$

d) $-10x^5y^2 + 12x^4y^2$

e) $5x(x + 3) + y(x + 3)$

f) $x(2 - 10y) - 3(2 - 10y)$

Factor Quadratic Expressions

9. Factor fully.

a) $x^2 + 5x + 4$

b) $x^2 - 9x + 18$

c) $x^2 + 2x + 1$

d) $3x^2 - 27$

e) $-2x^2 - 12x + 32$

f) $7x^2 - 56x + 105$

g) $-3x^2 - 12x - 12$

h) $4x^2 + 36$

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10. Factor fully.

a) $2x^2 - 11x + 12$
b) $9x^2 - 12x - 5$
c) $5x^2 - 2x - 3$
d) $2x^2 - 13x + 20$
e) $10x^2 - 33x - 7$
f) $8x^2 - 70x + 48$

Work With Fractions

11. Determine the least common multiple of each set.

a) 13, 26, 39
b) $6x^2y$, $3xy$, $9x^2y^2$
c) $(x^2 - 2x - 3)$, $(x^2 - 9)$

12. Add or subtract.

a) $\frac{2}{3} + \frac{3}{4}$
b) $\frac{3}{5} - \frac{1}{3}$
c) $\frac{x}{3} + \frac{y}{2}$
d) $\frac{3x}{5} - \frac{2y}{7}$

13. Simplify.

a) $\left(\frac{2}{3}\right)\left(-\frac{1}{5}\right)$
b) $\left(\frac{4}{5}\right)\left(\frac{25}{12}\right)$
c) $\left(\frac{17}{8}\right)\left(\sqrt{\frac{13}{289}}\right)$
d) $\left(-\frac{5}{8}\right)\left(\sqrt{\frac{75}{128}}\right)$

Rearrange Formulas

14. Solve for the indicated variable.

a) $P = 2l + 2w$, for l
b) $x^2 + y^2 = 36$, for x
c) $y = 2x^2 + 3$, for x
d) $V = lwh$, for w
e) $V = \frac{4}{3}\pi r^3$, for r
f) $y = \sqrt{2x^2 + 3}$, for x

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