Skills Practice

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I. Adding and Subtracting Polynomials

A. Write each polynomial in general form. Classify the polynomial by its number of terms and by its degree.

1. $2x + 6x^2$

2. $-9m^2 + 4m$

3. $10 - 5x$

4. $7x - 3 + 12x^2$

5. $15 + 4w - w^3$

6. $5x^2 - 15 + 20x$

7. $-1 - p^4$

8. $-6t^2 + 4t + 3t^3$

9. $-18a^3 + 54a - 22a^2$

10. $x^3 - x^2 - x^5$

B. Simplify each expression.

1. $(5x - 8) + (7x + 10)$

2. $(4m^2 + 9m) - (2m^2 + 6)$

3. $(-x^2 + 5x - 12) + (2x^2 - 6)$

4. $(10t^2 - 3t + 9) - (6t^2 - 7t)$

5. $(-5w^2 + 3w - 8) + (15w^2 - 4w + 11)$

6. $(3x^3 + 10x - 1) - (5x^2 + 10x - 9)$

7. $(-a^2 + 2a - 8) + (2a^2 - 9a + 15)$

8. $(14p^4 + 7p^2) + (8p^3 + 7p^2 - p)$

9. $(3x^4 + 3x^2 - 3) - (6x^5 - 9x^3 + 2)$

10. $(-7m^3 - m^2 - m) - (-10m^3 - m - 1)$

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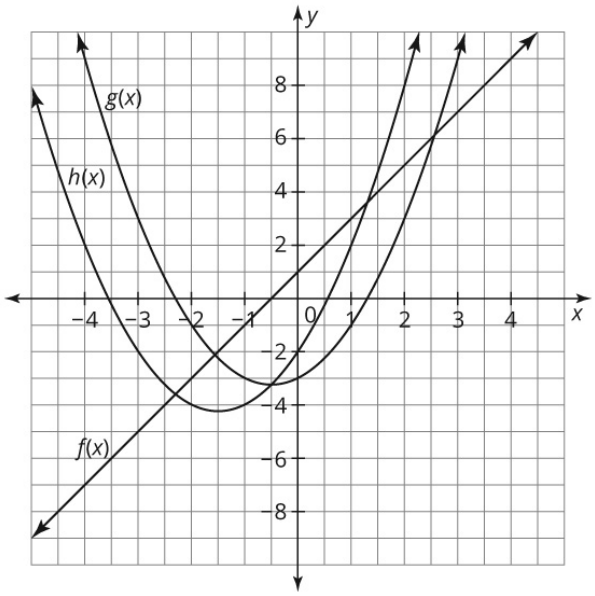
C. The graphs of the functions $f(x) = 2x + 1$, $g(x) = x^2 + x - 3$, and $h(x) = f(x) + g(x)$ are shown. Evaluate the function $h(x)$ for each given value of x. Use the graph of $h(x)$ to verify your answer.



1. Evaluate $h(x)$ at $x = 2$.

2. Evaluate $h(x)$ at $x = -4$.

3. Evaluate $h(x)$ at $x = 0$.

4. Evaluate $h(x)$ at $x = 1$.

5. Evaluate $h(x)$ at $x = -2$.

6. Evaluate $h(x)$ at $x = -1.5$.

II. Multiplying Polynomials

A. Determine the product of the binomials using multiplication tables.

1. $3x + 4$ and $2x + 2$

2. $5m + 3$ and $4m + 6$

3. $6t + 5$ and $7t - 5$

4. $4x + 2$ and $4x - 2$

5. $10w - 1$ and $9w + 8$

6. $y + 12$ and $5y + 15$

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B. Determine the product of the polynomials using the Distributive Property.

1. $2x(x + 6)$

2. $4x^2(x + 2)$

3. $7x(x - 5)$

4. $(2x + 1)(x + 8)$

5. $(x + 3)(x^2 - 1)$

6. $(4x + 4)(5x - 5)$

7. $3x(x^2 + 5x - 1)$

8. $9x(3x^2 - 4x + 2)$

9. $(x + 2)(x^2 + 6x - 1)$

10. $(x - 4)(x^2 + 2x - 3)$

III. Difference of Squares and Solutions to Quadratic Equations

A. Factor out the greatest common factor of each polynomial, if possible.

1. $x^2 + 9x$

2. $m^2 - 4m$

3. $5x^2 + 20x - 15$

4. $24w^2 - 16$

5. $y^3 - 7y$

6. $2x^3 + 10x^2$

7. $3w + 10$

8. $20x^3 + 16x^2 + 8x$

9. $7m^3 - 21$

10. $15x^3 + 4$

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B. Solve each quadratic equation. Rewrite the roots in radical form.

1. $x^2 = 48$

2. $x^2 = 52$

3. $x^2 = 27$

4. $x^2 = 175$

5. $(12 - x)^2 = 8$

6. $(x + 20)^2 = 80$

C. Factor each binomial completely.

1. $x^2 - 25$

2. $x^2 - 64$

3. $x^2 - 144$

4. $m^2 - 100$

5. $25x^2 - 16$

6. $t^2 - 225$

7. $4a^2 - 49$

8. $x^2 - y^2$

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D. Determine the roots of each quadratic equation or the zeros of each quadratic function.

1. $x^2 - 100 = 0$

2. $4x^2 - 9 = 0$

3. $f(x) = x^2 - 225$

4. $f(x) = 9x^2 - 1$

5. $f(x) = 8x^2 - 50$

6. $16x^2 - 25 = 0$

IV. Completing the Square

A. Use an area model to complete the square for each expression. Factor the resulting trinomial and write the original expression in vertex form.

1. $x^2 + 2x$

2. $x^2 + 4x$

3. $x^2 + 12x$

4. $x^2 + 9x$

5. $x^2 + 11x$

6. $x^2 + 28x$

B. Determine the unknown value that would make each trinomial a perfect square.

1. $x^2 - 10x + _____$

2. $x^2 + 14x + _____$

3. $x^2 + _____\ x + 9$

4. $x^2 - _____\ x + 81$

5. $x^2 + 7x + _____$

6. $x^2 - 15x + _____$

7. $x^2 - _____\ x + 169$

8. $x^2 + _____\ x + \frac{9}{4}$

C. Determine the roots of each quadratic equation by completing the square. Round your answer to the nearest hundredth. Check your answer.

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1. $x^2 + 4x - 6 = 0$

2. $x^2 - 2x - 4 = 0$

3. $x^2 + 10x + 2 = 0$

4. $x^2 - 12x + 25 = 0$

5. $x^2 + 3x - 1 = 0$

6. $x^2 + x - 10 = 0$

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V. Solving Quadratic Equations by Factoring

A. Factor each trinomial.

1. $x^2 - 2x - 8$

2. $y^2 + 13y + 42$

3. $m^2 + 6m - 7$

4. $x^2 - 9x + 18$

5. $4w^2 + 12w - 40$

6. $2t^3 - 14t^2 + 24t$

7. $3m^3 + 36m^2 + 60m$

8. $2x^2 - 8x - 42$

9. $x^2 + 11x + 10$

10. $w^2 + 6w - 16$

11. $m^2 + 2m - 35$

12. $x^2 + 4x - 12$

13. $3n^2 - 27n + 60$

14. $2x^2 + 22x + 60$

B. Factor and solve each quadratic equation.

1. $x^2 + 5x + 6 = 0$

2. $x^2 - 3x - 4 = 0$

3. $m^2 + 2m - 35 = 0$

4. $-x^2 - 4x + 12 = 0$

5. $x^2 + 8x = 0$

6. $w^2 + 50 = -15w$

7. $-t^2 + 12t = 32$

8. $x^2 + 2x + 2 = 0$

9. $2t^2 + t - 3 = 0$

10. $w^2 + 5w - 32 = 2w - 4$

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C. Determine the zeros of each quadratic function, if possible.

1. $f(x) = x^2 - 5x$

2. $f(x) = 3x^2 + 6x$

3. $f(x) = x^2 + 11x + 30$

4. $f(x) = x^2 - 9x - 36$

5. $f(x) = 2x^2 + 9x + 10$

6. $f(x) = x^2 + 5x + 14$

7. $f(x) = 3x^2 + 3x - 6$

8. $f(x) = \frac{1}{2}x^2 - \frac{3}{4}x$

VI. The Quadratic Formula

A. Determine the zeros or roots of each function or equation.

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

2. $f(x) = -3x^2 - x + 7$

3. $2x^2 + 6x - 7 = 2$

4. $4x^2 - x - 1 = 5$

5. $f(x) = -8x^2 + 2x + 1$

6. $3x^2 + x + 3 = 5$

7. $f(x) = -2x^2 - 8x + 1$

8. $5x^2 + 8x - 3 = 1$

9. $-3x^2 + 6x + 2 = -5$

10. $f(x) = x^2 + 6x + 5$

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11. $f(x) = -2x^2 + 5x - 1$

12. $-3x^2 + 8x - 2 = -6$

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

14. $2x^2 + 8x + 3 = -5$

15. $f(x) = 9x^2 + 5x + 1$

16. $6x^2 + 3x - 5 = 2$

17. $f(x) = 5x^2 + 10x + 5$

18. $f(x) = 7x^2 + 9x + 5$

VII. Solving Quadratic Equations with Complex Solutions

A. Simplify each expression using i.

1. $\sqrt{-9}$

2. $\sqrt{-36}$

3. $\sqrt{-20}$

4. $3 + \sqrt{-18}$

5. $9 - \sqrt{-64}$

6. $\dfrac{10 + \sqrt{-12}}{2}$

7. $\dfrac{8 - \sqrt{-32}}{4}$

8. $\dfrac{16 + \sqrt{-48}}{2}$

B. Determine the real part and the imaginary part of each complex number.

1. 24

2. $8i$

3. $7 + 3i$

4. 8

5. $-35i$

6. $14 + \sqrt{5i}$

7. 52

8. $2.5 + 3i\sqrt{2}$

C. Identify each given number using words from the box.

natural number	whole number	integer
rational number	irrational number	real number
imaginary number	complex number	

1. -25

2. $\sqrt{3}$

3. 9

4. $6 + 7i$

5. $\frac{2}{5}$

6. $14i$

7. $0.\overline{18}$

8. $\sqrt{-4}$

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D. For each given graph, determine the number of roots for the quadratic equation. Then, determine whether the roots are real or imaginary.

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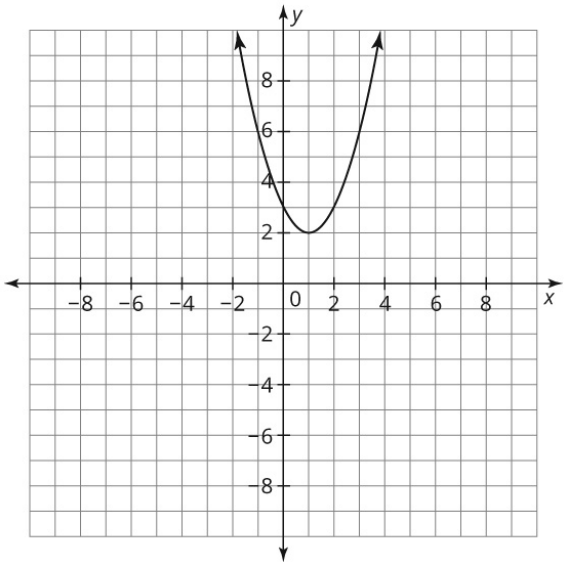

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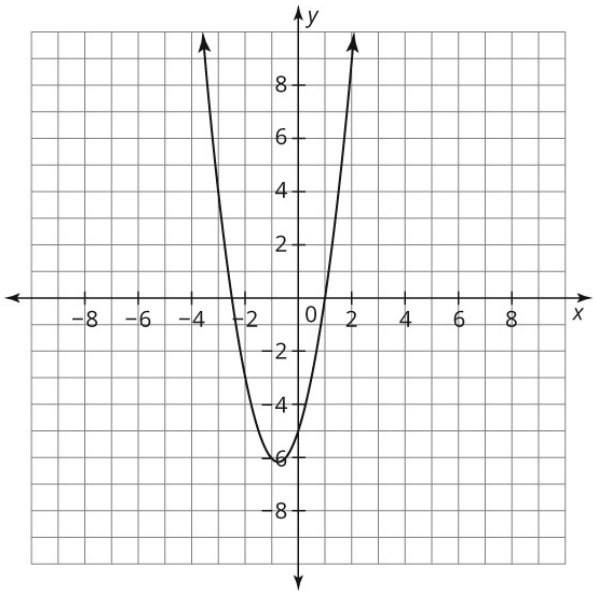

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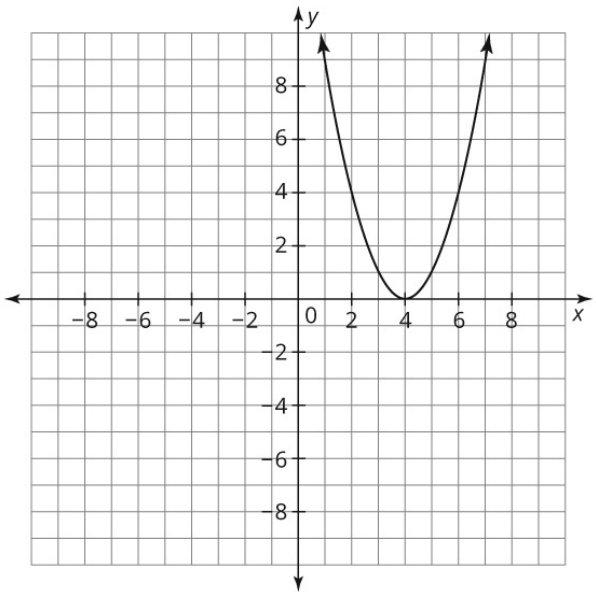

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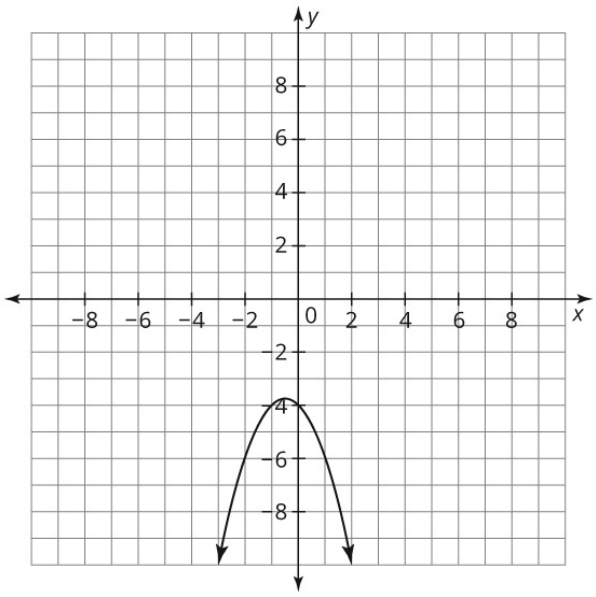

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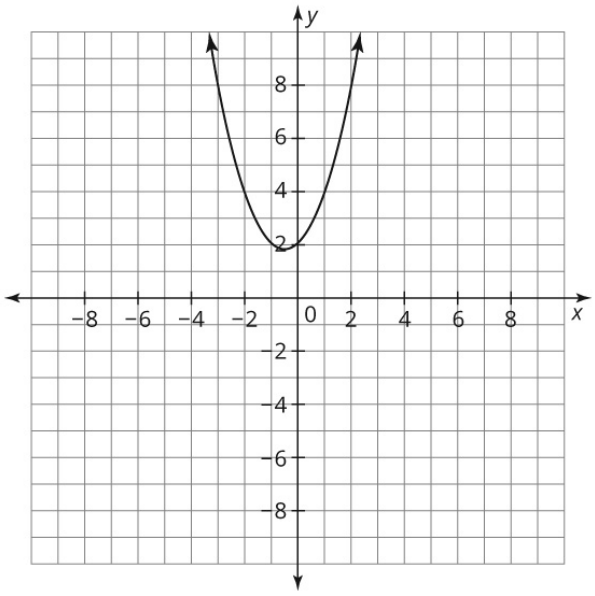

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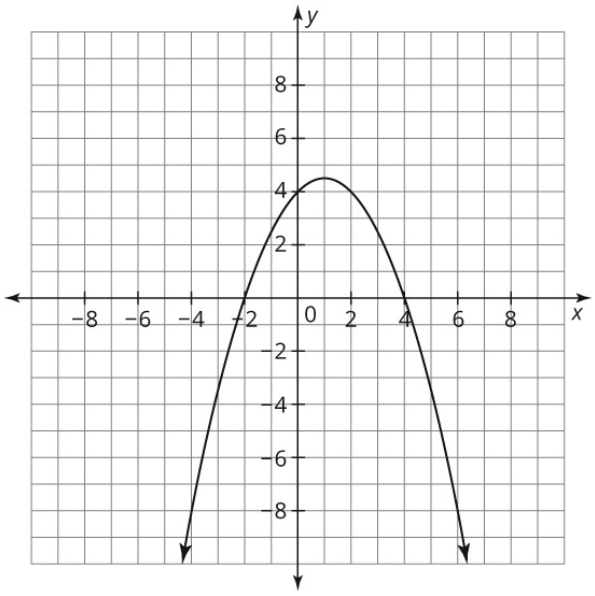

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