Quadratic Equations and Functions

1. Factor the following polynomial completely $x^2 + 4x - 21$.
   (1)____________________

2. Solve the following equation $25w^2 = 9$.
   (2)____________________

3. Solve the following equation $x(x + 11) = -30$.
   (3)____________________
4. If \( f(x) = 3x^2 - 2x \) and \( g(x) = -x + 11 \), solve the equation \( f(x) = g(x) \) for \( x \).

5. Solve the following equation \( x^2 + 6 = x + 26 \).

6. Solve the following equation \( 10t^2 - 31t + 15 = 0 \).

7. Find the \( y \)-coordinate for the point \((1, y)\) on the graph of \( f(x) = x^2 + 8x + 4 \).
8. For the function $f(x)$ shown in the graph below, determine $f(-2)$.

9. For the function $f(x)$ shown in the graph below, determine any $x$- and $y$-intercept(s). Write your answers as points.

$x$-intercept ___________________ $y$-intercept ___________________
10. Find the vertex of the parabola given by the quadratic function $f(x) = x^2 + 2x + 2$. Write your answer as a point.

(10)____________________

General Polynomial Functions

11. Factor the polynomial $11t^3 + 11t^2 - 330t$ completely.

(11)____________________

12. Solve the equation $-2(x + 5)(-3x + 3)^2(x + 8) = 0$ for $x$.

13. Determine the $x$-intercept(s) for the function $f(x) = -2(x+5)(x-8)^2(x-1)^2$. Specify for each whether the graph crosses or touches the $x$-axis at the intercept.

14. Determine the $y$-intercept for the function $f(x) = 3(x - 2)(x + 3)(x - 1)^2(x - 4)$. 
15. Which of the following is the graph of \( f(x) = 0.2(x - 1)^3(x - 5) \)? CIRCLE THE CORRECT GRAPH.
Quadratic Equations and Functions

1. $(x + 7)(x - 3)$

2. $w = \frac{3}{5}$ and $w = -\frac{3}{5}$

3. $x = -5$ and $x = -6$

4. $x = \frac{1 + \sqrt{133}}{6}$

5. $x = 5$ and $x = -4$

6. $t = \frac{5}{2}$ and $t = \frac{3}{5}$

7. 13

8. 5

9. x-intercept: $(1, 0)$ and y-intercept: $(0, -1)$

10. (-1,1)

General Polynomial Functions

11. $11t(t + 6)(t - 5)$

12. $x = -5, 1, -8$

13. • $(−5, 0)$ crosses
   • $(8, 0)$ touches
   • $(1, 0)$ touches

14. $(0, 72)$

15. D
• This exam covers material from Sections R.4, R.5, 1.2, 1.7, 3.4, 4.3, 4.4 and 5.1. The topics covered are quadratic equations, quadratic functions and general polynomial functions.

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**Quadratic Equations and Functions**

1. Factor the following polynomial completely \( x^2 + 4x - 32 \).

\[(1) \]

2. Solve the following equation \( t^2 - 7t + 12 = 0 \).

\[(2) \]

3. Solve the following equation \( x(x - 5) = 14 \).

\[(3) \]
4. If \( f(x) = 2x^2 + 8x \) and \( g(x) = -x - 6 \), solve the equation \( f(x) = g(x) \) for \( x \).

\[
\begin{align*}
(4) & \quad \text{__________________} \\
\end{align*}
\]

5. Solve the following equation \( x^2 - 10x = -16 \).

\[
\begin{align*}
(5) & \quad \text{__________________} \\
\end{align*}
\]

6. Solve the following equation \( -8t^2 + 30t - 25 = 0 \).

\[
\begin{align*}
(6) & \quad \text{__________________} \\
\end{align*}
\]

7. Find the \( y \)-coordinate for the point \((-1, y)\) on the graph of \( f(x) = x^2 + 5x - 1 \).

\[
\begin{align*}
(7) & \quad \text{__________________} \\
\end{align*}
\]
8. For the function $f(x)$ shown in the graph below, determine $f(-3)$.

![Graph of a function]

9. Find the $x$- and $y$-intercept(s) for the quadratic function $f(x) = 12x^2 - 5x - 25$. Write your answers as points.

$x$-intercept ______________________ $y$-intercept ______________________

10. Find the vertex of the parabola given by the quadratic function $f(x) = x^2 + 6x + 6$. Write your answer as a point.

$(10)____________________$

General Polynomial Functions
11. Factor the polynomial $11t^5 - 99t^4 + 154t^3$ completely.

12. Solve the equation $2(x - 4)^2(x + 4)^2 = 0$ for $x$.

13. Determine the $x$-intercept(s) for the function $f(x) = 2(x - 3)(x - 5)^4$. Specify for each whether the graph crosses or touches the $x$-axis at the intercept.

14. Determine the $y$-intercept for the function $f(x) = -4(x - 4)(x + 4)^2(x + 5)$.
15. Which of the following is the graph of \( f(x) = 0.2(x - 5)^3(x - 1) \)? CIRCLE THE CORRECT GRAPH.
Quadratic Equations and Functions

1. \((x + 8)(x - 4)\)

2. \(t = 4\) and \(t = 3\)

3. \(x = -2\) and \(x = 7\)

4. \(x = \frac{-9 \pm \sqrt{33}}{4}\)

5. \(x = 2\) and \(x = 8\)

6. \(t = \frac{5}{2}\) and \(t = \frac{5}{4}\)

7. \(-5\)

8. \(-4\)

9. x-intercepts: \((\frac{5}{3}, 0), (-\frac{5}{4}, 0)\) and y-intercept: \((0, -25)\)

10. \((-3, -3)\)

General Polynomial Functions

11. \(11t^3(t - 7)(t - 2)\)

12. \(x = 4, -4\)

13. • (3, 0) crosses
   • (5, 0) touches

14. (0, 1280)

15. B
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### Quadratic Equations and Functions

1. Factor the following polynomial completely $x^2 + 16x + 64$.

   \[ (1) \]

2. Solve the following equation $t^2 - 9t + 20 = 0$.

   \[ (2) \]

3. Solve the following equation $x(x - 3) = 4$.

   \[ (3) \]
4. If \( f(x) = 2x^2 - 5x \) and \( g(x) = -2x + 1 \), solve the equation \( f(x) = g(x) \) for \( x \).

\[(4)\]

5. Solve the following equation \( x^2 + 5 = 8x - 10 \).

\[(5)\]

6. Solve the following equation \( x^2 - 3x - 8 = 0 \).

\[(6)\]

7. Find all possible \( x \)-coordinate(s) for the point \( (x, -6) \) on the graph of \( f(x) = x^2 - 5x - 2 \).

\[(7)\]
8. For the function $f(x)$ shown in the graph below, determine $f(-2)$.

![Graph of a function](image)

(8) 

9. For the function $f(x)$ shown in the graph below, determine any x- and y-intercept(s). Write your answers as points.

![Graph of a function](image)

$x$-intercept ______________________ $y$-intercept ______________________
10. Find the vertex of the parabola given by the quadratic function \( f(x) = -x^2 + 10x - 26 \). Write your answer as a point.

\[ (10) \text{________________________} \]

**General Polynomial Functions**

11. Factor the polynomial \( 4t^4 - 484t^2 \) completely.

\[ (11) \text{________________________} \]

12. Solve the equation \(-4(x - 6)(x + 1)^2 = 0\) for \( x \).

13. Determine the \( x \)-intercept(s) for the function \( f(x) = -2(x + 4)(x + 3)(x - 6)(x - 1)^2 \). Specify for each whether the graph crosses or touches the \( x \)-axis at the intercept.

14. Determine the \( y \)-intercept for the function \( f(x) = 4(x + 5)(x - 1)(x - 2)(x + 4)(x + 1) \).
15. Which of the following is the graph of $f(x) = -0.3(x + 4)^2(x - 3)$? CIRCLE THE CORRECT GRAPH.
Quadratic Equations and Functions

1. \((x + 8)(x + 8)\)

2. \(t = 4\) and \(t = 5\)

3. \(x = 4\) and \(x = -1\)

4. \(x = \frac{3 + \sqrt{17}}{4}\)

5. \(x = 3\) and \(x = 5\)

6. \(x = \frac{3 + \sqrt{41}}{2}\)

7. \(x = 1\) and \(x = 4\)

8. \(-9\)

9. x-intercepts: \((-1, 0), (4, 0)\) and y-intercept: \((0, -4)\)

10. \((5, -1)\)

General Polynomial Functions

11. \(4t^2(t - 11)(t + 11)\)

12. \(x = 6, -1\)

13. • \((-4, 0)\) crosses
    • \((-3, 0)\) crosses
    • \((6, 0)\) crosses
    • \((1, 0)\) touches

14. \((0, 160)\)

15. C
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**Quadratic Equations and Functions**

1. Factor the following polynomial completely $x^2 + 4x + 4$.

   (1) ________________

2. Solve the following equation $64w^2 = 9$.

   (2) ________________

3. Solve the following equation $x(x + 14) = -45$.

   (3) ________________
4. If \( f(x) = 3x^2 + 10x \) and \( g(x) = -x + 8 \), solve the equation \( f(x) = g(x) \) for \( x \).

\[ (4) \]

5. Solve the following equation \( x^2 - 13x = -40 \).

\[ (5) \]

6. Solve the following equation \( 3x^2 - x - 11 = 0 \).

\[ (6) \]

7. Find all possible \( x \)-coordinate(s) for the point \( (x, 2) \) on the graph of \( f(x) = x^2 - 2x - 13 \).

\[ (7) \]
8. For the function $f(x)$ shown in the graph below, determine $f(-3)$.

![Graph of a function]

(8)____________________

9. Find the $x$- and $y$-intercept(s) for the quadratic function $f(x) = 9x^2 - 6x + 4$. Write your answers as points.

$x$-intercept ______________________ $y$-intercept ______________________

10. Find the vertex of the parabola given by the quadratic function $f(x) = x^2 + 8x + 17$. Write your answer as a point.

(10)____________________

General Polynomial Functions
11. Factor the polynomial \(-9t^4 - 18t^3 + 720t^2\) completely.

12. Solve the equation \(-4(x - 9)(-5x - 4)^2 = 0\) for \(x\).

13. Determine the \(x\)-intercept(s) for the function \(f(x) = -2(x + 3)(x + 2)^3\). Specify for each whether the graph crosses or touches the \(x\)-axis at the intercept.

14. Determine the \(y\)-intercept for the function \(f(x) = -3(x + 5)^2(x + 4)^2\).
15. Which of the following is the graph of $f(x) = 0.2(x - 3)^3(x + 2)$? CIRCLE THE CORRECT GRAPH.
Quadratic Equations and Functions

1. \((x + 2)(x + 2)\)

2. \(w = \frac{3}{8}\) and \(w = -\frac{3}{8}\)

3. \(x = -9\) and \(x = -5\)

4. \(x = \frac{-11 \pm \sqrt{217}}{6}\)

5. \(x = 5\) and \(x = 8\)

6. \(x = \frac{1 \pm \sqrt{133}}{6}\)

7. \(x = -3\) and \(x = 5\)

8. 4

9. No x-intercepts and y-intercept: (0, 4)

10. (-4, 1)

General Polynomial Functions

11. \(-9t^2(t - 8)(t + 10)\)

12. \(x = 9, -\frac{4}{5}\)

13. • \((-3, 0)\) crosses
   • \((-2, 0)\) crosses

14. \((0, -1200)\)

15. C