Algebra 3 CP Name:_____ Period:_____
Elearning Packet 3

DIRECTIONS: Answer the following problems. Show your work. Circle your final answer.

PART 1

Solve equations and inequalities in one variable.

1. $12x + 15 = 3(x + 6)$
2. $-3(5x + 1) - 7 \geq 35$
3. $-2(3x - 8) + x < 1$
4. $3(5x + 2) = 3(x + 3)$

Solve absolute value equations and inequalities.

5. $|2x - 1| = 9$
6. $|2x - 5| = 15$
7. $|x + 3| = 4$

Find the slope of a line given two points.

8. (5, 3) and (– 3, 7)
9. (– 5, 6) and (1, – 8)

Write the slope-intercept form of the equation of a line given one point and a parallel or perpendicular line.

10. The line that passes through (2, – 3) and is parallel to the line $y = -4x + 3$.

11. The line that passes through (– 6, 1) and is perpendicular to the line $y = \frac{1}{2}x - 2$.

12. The line that passes through (1, 4) and is parallel to the line $y = 5x - 6$.

13. The line that passes through (2, 6) and is perpendicular to the line $y = -\frac{1}{4}x - 7$.

Identify the graph of a linear equation.

Match each linear equation with its graph.

14. $3x - 7y = -21$

15. $2x + 6y = -12$

16. $4x - 6y = 24$

17. $5x + 6y = 30$

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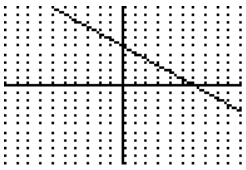

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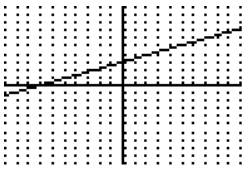

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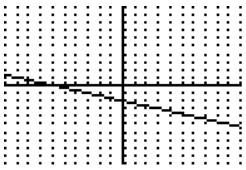

Identify the graph of a function.

Determine which graphs represent a function.

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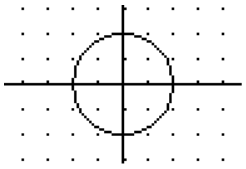

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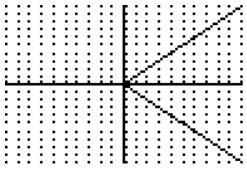

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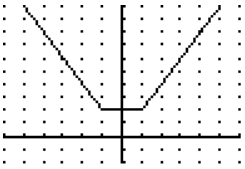

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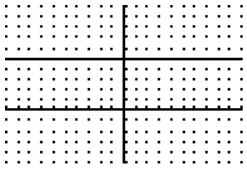


Evaluate a function..

22. Find h(– 5) if h(x) = $x^2 - 3x + 5$.

23. Find g(3) for g(x) = $3x^2 - 5x - 7$

Solve a system of 2 linear equations in 2 variables.

24. $3x - 2y = -10$
$x + y = 0$

25. $2x + y = 3$
$x - 4y = 6$

Use matrices to solve a system of 3 equations in 3 variables.

26. $\begin{cases} x + y - z = 0 \\ 2x + 4y - 4z = -1 \\ 2x + y + z = 2 \end{cases}$

27. $\begin{cases} 5x - 5y + 10z = -5 \\ 10x + 5y - 5z = 8 \\ 15x + 10y + 15z = -1 \end{cases}$

PART 2

State the axis of symmetry and the vertex of a quadratic function.

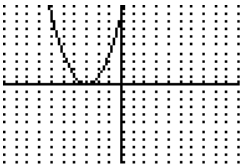
1. $y = (x + 3)^2 + 5$
2. $y = ¼ (x – 1)^2 – 2$

Identify the graph of a quadratic function.

Match each quadratic function with its graph.

3. $y = -2 (x – 3)^2 + 5$
4. $y = (x + 5)^2 – 3$
5. $y = -(x – 5)^2 – 3$
6. $y = (x + 3)^2$

A.



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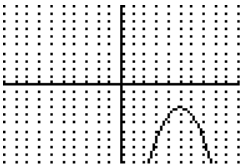

D.

Solve quadratic equations.

7. $x^2 + 9x = 0$
8. $x^2 – 4x + 13 = 0$
9. $x^2 + 10x – 29 = 0$
10. $2(x + 4)^2 + 15 = 105$

Describe the roots of a quadratic equation using the discriminant.

Match each quadratic equation with its type of roots.

11. $4x^2 – 2x – 3 = 0$
12. $2x^2 – 6x + 6 = 0$
13. $4x^2 – 8x + 4 = 0$

A. two real roots
B. two imaginary roots
C. one real root

Model vertical motion problems using the graphing calculator.

14. An arrow shot into the air is modeled by the equation $y = -\frac{44}{9}x^2 + \frac{88}{3}x$, where y is the height in feet above the ground and x represents the time in seconds after the arrow is released. Find the maximum height the arrow reaches and when the arrow will reach the ground.

15. The height of the rocket *t* seconds after launch is modeled by the equation $h = -16t^2 + 95t + 57$. Find when the rocket will hit the ground and its maximum height.

Simplify complex numbers, including products and quotients.

16. $\sqrt{-392}$

17. $(-8+7i)(-7-3i)$

18. $2(-5+7i)-(3-10i)$

Simplify powers of *i*.

19. i^{39}

20. i^{101}

21. i^{76}

Simplify expressions using the properties of exponents.

22. $(-5xy^3)(-4x^4y^2)$

23. $(2bc^3)^3(bc)^4$

24. $\dfrac{-5x^7y^3}{15x^4y^4}$

25. $\left(\dfrac{2a^2b^5}{a^3b^2}\right)^{-3}$

Factor polynomials.

26. $4x^2 - 4x - 15$

27. $2x^2 + 5x - 7$

28. $x^3 + 125$

29. $8x^3 - 1$

Divide polynomials.

30. $(6x^3 + 6x^2 - 15x - 2) \div (x + 2)$

31. $(x^4 - 8x^3 + 10x^2 + 12x - 6) \div (x - 3)$

Determine the end behavior of polynomial functions.

32. $f(x) = 5 - x$

33. $f(x) = x^4 - 2x^2 + 2$

34. $f(x) = x^3 - 4x + 15$

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

Find all zeros of polynomial functions given one zero.

36. $f(x) = x^4 - 3x^3 - 13x^2 + 9x + 30$; $x = 5$

37. $f(x) = 2x^3 - 19x^2 + 23x + 84$; $x = 4$

PART 3

Simplify radicals, exponential form, and add or subtract radicals.

1. $\sqrt{12x^5y} \bullet \sqrt{4xy^4}$

2. $\sqrt{18x^3y^3} \bullet \sqrt{24x^2y^3}$

3. $\sqrt[3]{128a^2b^5}$

4. $64^{-\frac{2}{3}}$

5. $3\sqrt{50} - 4\sqrt{18} + 2\sqrt{9}$

Solve radical equations.

6. $\sqrt{3x+7} - 13 = -6$

7. $\sqrt{2x+5} + 1 = 8$

8. $\sqrt[3]{2x+3} = 3$

9. $\sqrt[3]{6x-4} = \sqrt[3]{2x+10}$

Find the composition of two functions.

10. For the pair of functions f(x) = 3 + x and g(x) = x^2 – 2, find g(f(x)).

11. For the pair of functions f(x) = x^2 + 5 and g(x) = 4 – x, find f(g(x)).

Find the inverse equation of a function.

12. f(x) = 2x – 7

13. f(x) = $\frac{2}{3}$ x + 6

14. f(x) = $2x^3$ – 1

Simplify rational expressions.

15. $\frac{2x-6}{x^2-1} \bullet \frac{1-x}{x^2-2x-3}$

16. $\frac{8n}{n^2-4} \div \frac{4}{n+2}$

17. $\frac{x^2+4x+4}{x^2-x-6} \bullet \frac{x^2-9}{3x+6}$

18. $\frac{x^2-2x-15}{x^2-6x+5} \div \frac{x+3}{12x-12}$

Solve rational equations.

19. $\frac{5}{x+6} - \frac{2}{x} = \frac{9x+6}{x^2+6x}$

20. $\frac{2x}{x+2} - \frac{x}{x-3} = \frac{-15}{x^2-x-6}$

21. $\frac{2x-9}{x-7} + \frac{x}{2} = \frac{5}{x-7}$

Identify characteristics of circles, ellipses, hyperbolas and parabolas.

22. Write the equation of the circle with center (– 4, 7) and radius 9.

23. Change the equation of the circle by completing the square: $x^2 + y^2 – 2x – 4y – 20 = 0$.

24. Find the orientation, the center, and the length of the major axis of the ellipse:
$\frac{(x-5)^2}{36} + \frac{(y+3)^2}{16} = 1.$

25. Find the center of the hyperbola with equation $\frac{(y+5)^2}{16} - \frac{(x-2)^2}{4} = 1$?

26. Find the slope of the slant asymptotes for the hyperbola $\frac{(x-4)^2}{16} - \frac{(y+3)^2}{4} = 1.$

27. Change the equation of a parabola by completing the square: $y = – x^2 + 6x – 5$

Name:_____ Period:_____ Algebra 3 Packet 3 Answers

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PART 3

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