Name _____ Period _____ Date _____

Algebra II – 1st Semester Review

Review Chapter 2

Find the domain and range of each relation, and determine whether it is a function.

1. {(2, 1), (–4, 5), (1, 7), (2, –3), (–1, 2)} **2.** {(1, –1), (2, –2), (3, –3), (4, –4), (5, –5)}

Suppose $f(x) = 3x - 4$ and $g(x) = |x| + 3$. Find each value.

3. $f(2) - g(5)$ **4.** $f\left(\frac{1}{3}\right) + g(-2)$

5. Write an explicit formula for each sequence, then find the 14th term.

a) 12, 14, 16, 18, . . . b) 21, 15, 9, 3, . . . c) -4, -8, -12, -16

6. For the situation, find a linear model and use it to make a prediction.
There were 64 words typed in 3 minutes. There were 89 words typed in 6 minutes. How many words will be typed in 8 minutes?

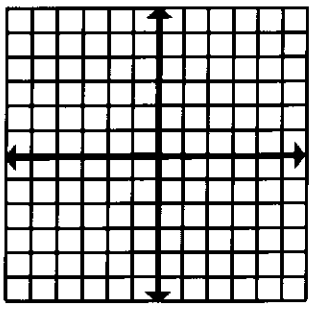
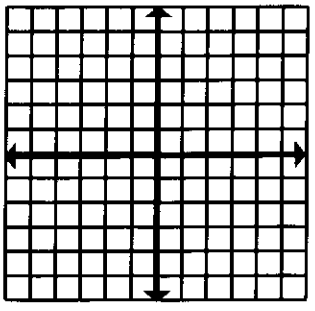
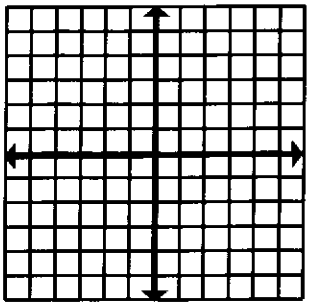
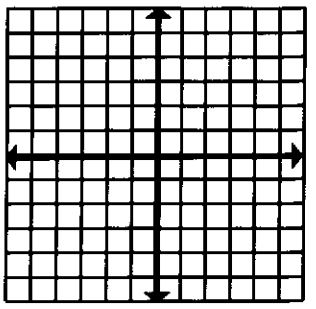
Find the slope of each line.

7. $3x - 5y = 15$ **8.** through (–2, 7) and (4, 1)

9. through (6, 1) and perpendicular to $y = \frac{3}{2}x + \frac{1}{4}$ **10.** y = -7 **11.** x = 2

Graph each problem.

12. $y = \frac{1}{2}x + 1$ **13.** $y = |x + 2| - 3$ **14.** $y = -|x| + 4$ **15.** $y = \begin{cases} 2x + 3 & x \le -2 \\ -x, & -2 < x < 3 \\ -4, & x \ge 3 \end{cases}$

Write in standard form the equation of the line with the given slope through the given point.

16. slope = 6; $\left(\frac{1}{2}, 2\right)$

17. slope = –2; (0, 0)

Write in slope-intercept form the equation of the line through each pair of points.

18. (5, -8) and (5, 3)

19. (1, 5) and (–3, 3)

20. (–4, 1) and (–2, –2)

21. The table below displays the enrollment at Westside High during the years 1996–2001. Let x equal the number of years since 1996.

Year	Enrollment
1996	1582
1997	1635
1998	1674
1999	1723
2000	1745
2001	1801

a. Use your calculator to find the equation of best fit for the data.

b. Estimate the enrollment in 2006.

Describe each translation of $y = |x|$ as vertical, horizontal, or combined. Then graph each translation.

22. $y = |x + 3| - 2$

23. $y = |x| + 2$

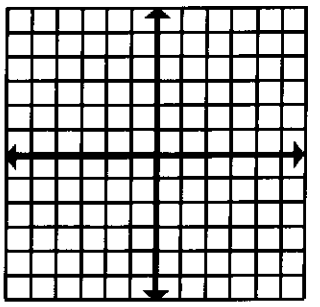
24. $y = |x - 4|$

Graph each inequality.

25. $2x + 3y \geq -6$

26. $y < -2|x - 3| + 4$

25.



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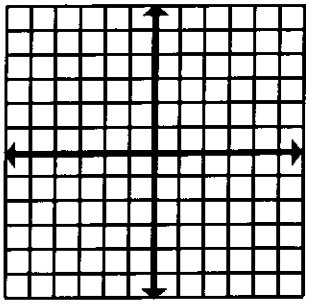
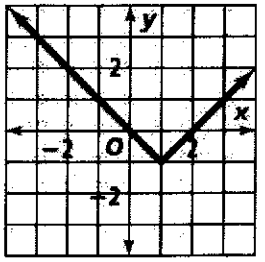


Write an equation for each function.

27.



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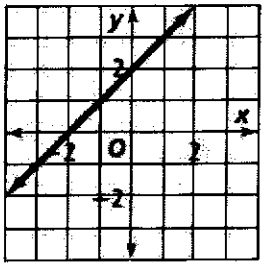


Algebra II – 1st Semester - *Review Chapter 3*

Solve each system.

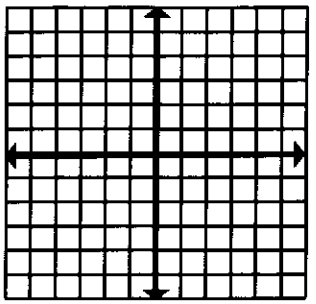
1. $\begin{cases} y = 2x + 8 \\ y = 3x - 1 \end{cases}$

2. $\begin{cases} 2x - y = 2 \\ 2x - 2y = 4 \end{cases}$

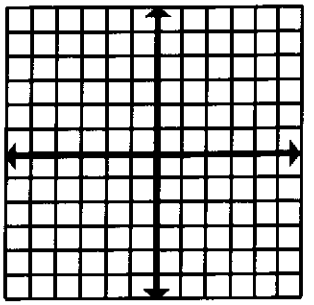
3. $\begin{cases} -x + y = 2 \\ 2x + y = -1 \end{cases}$

Graph each system.

4. $\begin{cases} y > x - 5 \\ 3x + y \le -2 \end{cases}$



5. $\begin{cases} y \le x + 2 \\ y > |x - 3| + 1 \end{cases}$



Solve each system of equations.

6. $\begin{cases} 5x + 4y - z = 1 \\ 2x - 2y + z = 1 \\ -x - y + z = 2 \end{cases}$

Solve the problem using a system of equations.

7. Jennifer has ten fewer quarters than dimes and five fewer nickels than quarters. The total value of the coins is \$4.75. How many quarters, nickels, and dimes does she have?

Graph each system of constraints. Name all vertices. Then find the values of x and y that maximize or minimize the objective function.

8. $\begin{cases} 3x + 2y \le 6 \\ 2x + 3y \le 6 \\ x \ge 0, y \ge 0 \end{cases}$ Maximum for $P = 4x + y$

9. $\begin{cases} x + y \le 5 \\ 4x + y \le 8 \\ x \ge 0, y \ge 0 \end{cases}$ Minimum for $C = x + 3y$

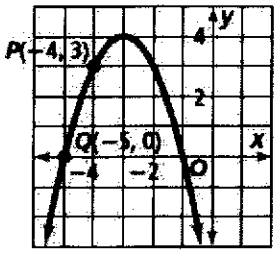
10. You are going to make and sell bread. A loaf of Irish soda bread is made with 2 c flour and $\frac{1}{4}$ c sugar. Kugelhopf cake is made with 4 c flour and 1 c sugar. You will make a profit of \$1.50 on each loaf of Irish soda bread and a profit of \$4 on each Kugelhopf cake. You have 16 c flour and 3 c sugar.

a. How many of each kind of bread should you make to maximize the profit?

b. What is the maximum profit?

Algebra II – 1st Semester - *Review Chapter 5*

1. Write the equation of the parabola in standard form. Find the coordinates of points corresponding to P and Q.



Sketch a graph of the parabola with the given vertex through the given point.

2. vertex (3, 4); point (5, 8)

3. vertex (–3, –2); point (1, 2)

Identify the axis of symmetry and the coordinates of the vertex.

4. $y = x^2 + 5$

5. $y = x^2 - 4x - 3$

Simplify each expression.

6. $(3 + i) - (7 + 6i)$

7. $(3 - 4i)(5 + 2i)$

8. $(-4 - 9i) + (5 - 7i)$

9. $3\sqrt{-25} + 4$

10. $\left(\sqrt{-9} - 2\right)\left(\sqrt{-4} + 1\right)$

11. $(5i + 4) - (4i - 3)$

Find the conjugate of each number.

12. $-2 - 3i$

13. $5 - 3i$

Solve each quadratic equation.

14. $x^2 - 16 = 0$

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

16. $3x^2 + 48 = 0$

Solve by completing the square. Show your work.

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

18. $9x^2 - 18x - 1 = 0$

Write each function in vertex form. Sketch the graph of the function and label its vertex.

19. $y = x^2 + 4x - 7$

20. $y = 3x^2 + 18x$

Evaluate the discriminant of each equation. How many real and imaginary solutions does each have?

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

22. $-2x^2 - 5x + 4 = 0$

23. A ball is thrown upward from ground level. Its height h, in feet, above the ground after t seconds is $h = 48t - 16t^2$. Find the maximum height of the ball.

Algebra II – 1st Semester - *Review Chapter 6*

Write each polynomial in standard form. Then classify it by degree and number of terms.

1. $4x^4 + 6x^3 - 2 - x^4$ **2.** $9x^2 - 2x + 3x^2$ **3.** $4x(x - 5)(x + 6)$

4. **Estimated Number of Deaths in the United States**

Year	1960	1970	1980	1990	2000	2003
Deaths (millions)	1.71	1.92	1.99	2.15	2.40	2.42

Source: *www.infoplease.com*

a. Find a cubic function to model the data. (Let x = years after 1960.)

b. Estimate the deaths for the year 2006.

Solve each equation by graphing. Where necessary, round to the nearest hundredth.

5. $x^4 + 2x^2 - 1 = 0$ **6.** $-x^3 - 3x - 2 = 0$

Write a polynomial function with rational coefficients in standard form with the given zeros.

7. 2, 3, 5 **8.** 5, $-2i$

For each function, determine the zeros and their multiplicity. Sketch the graph.

9. $y = (x - 1)^2(2x - 3)^3$ **10.** $y = 4x^2(x + 2)^3(x + 1)$

Solve each equation.

11. $(x - 1)(x^2 + 5x + 6) = 0$ **12.** $x^3 - 10x^2 + 16x = 0$

Divide using long division.

13. $(2x^3 + 13x^2 + 17x + 10) \div (x + 5)$ **14.** $(3x^3 + 12x^2 + 12x + 48) \div (3x + 12)$

Divide using synthetic division.

15. $(2x^3 - 4x + 3) \div (x - 1)$ **16.** $(x^3 + 5x^2 - x + 1) \div (x + 2)$

Use the Rational Root Theorem to list all possible rational roots for each equation. Then find any actual roots.

17. $x^3 + 6x^2 + x + 6 = 0$ **18.** $x^4 - 18x^2 + 32 = 0$

19. Use synthetic division and the Remainder Theorem to find $P(-5)$ if $P(x) = -x^3 - 4x^2 + x - 2$.

Algebra II – 1st Semester - *Review Chapter 7.1-7.4*

Simplify each radical expression.

1. $\sqrt[3]{-27x^6}$
2. $\sqrt{a^4b^6}$
3. $\sqrt[5]{-32s^{15}t^{10}}$
4. $\sqrt[4]{256y^8}$

Simplify each expression. Rationalize all denominators. Assume that all variables are positive.

5. $\left(2-\sqrt{5}\right)\left(2+\sqrt{5}\right)$
6. $\dfrac{\sqrt{48a^5b}}{\sqrt{12ab}}$
7. $\sqrt{5}\left(2\sqrt{45}-\sqrt{5}\right)$
8. $\dfrac{7}{1-\sqrt{3}}$
9. $5\sqrt{32}-7\sqrt{8}$
10. $2\sqrt{15xy^3}\cdot 3\sqrt{30x^3y^2}$

Simplify each expression. Assume that all variables are positive.

11. $2y^{\frac{1}{2}}\cdot y$
12. $(8^2)^{\frac{1}{3}}$
13. 3.6^0
14. $\left(\dfrac{1}{16}\right)^{\frac{1}{4}}$
15. $\left(\dfrac{27}{8}\right)^{\frac{2}{3}}$
17. $\left(3x^{\frac{1}{2}}\right)\left(4x^{\frac{2}{3}}\right)$
18. $\left(3a^{\frac{1}{2}}b^{\frac{1}{3}}\right)^2$
19. $\left(y^{\frac{2}{3}}\right)^{-9}$
20. $\left(a^{\frac{2}{3}}b^{-\frac{1}{2}}\right)^{-6}$
21. $81^{-\frac{1}{2}}$
22. $\left(2x^{\frac{2}{5}}\right)\left(6x^{\frac{1}{4}}\right)$
23. $\left(9x^4y^{-2}\right)^{\frac{1}{2}}$

Write each expression in radical form.

24. $x^{\frac{4}{3}}$
25. $a^{1.5}$
26. $b^{\frac{1}{5}}$

Write each expression in exponential form.

27. $\sqrt[3]{m}$
28. $\sqrt{5y}$
29. $\sqrt[3]{2y^2}$
30. $\left(\sqrt[4]{b}\right)^3$
31. $\sqrt{(6a)^4}$
33. $\sqrt[5]{n^4}$