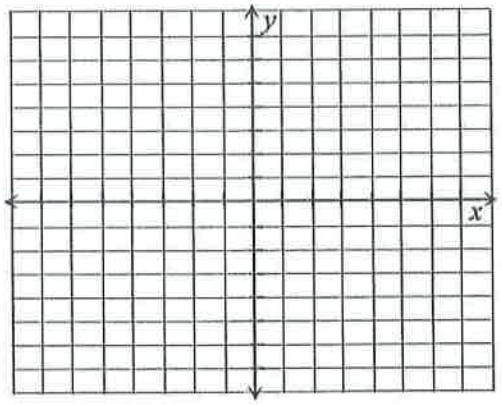
Name_____ Class_____ Date_____

Solving Systems of Equations

Solve by graphing.

1. $y = \frac{2}{3}x - 3$

$y = \frac{4}{6}x + 2$



Solve each system by substitution.

2. $-2x + y = -9$

$3x - 12y = 24$

3. $x + 3y = 9$

$y = -\frac{3}{2}x + \frac{13}{2}$

Solve each system by elimination.

4. $-4x + 3y = 24$

$8x - 6y = -48$

5. $x + 2y = -7$

$3x - 4y = -1$

Solve by any method.

6. $4x - 5y = 11$

$6x + 7y = 31$

7. $x = 3y - 2$

$x = 7y + 2$

Use a system of equations to solve each problem.

8. Jamie has 300 ft of fencing to enclose a rectangular pasture. The pasture's length is to be 10 ft less than 3 times the width. Find the width of the garden.

9. You have a total of 25 coins, all nickels and quarters. The total value is \$3.85. Write and solve a system of equations to find the number of nickels n and the number of quarters q that you have.

10. You are planning to start a small business mowing your neighbors' lawns. You bought a used lawn mower for \$150 and you have calculated that an average lawn costs about \$1.75 in gasoline. You plan to charge \$20 per lawn.

    a. Define your variables.

    b. Write a cost function.

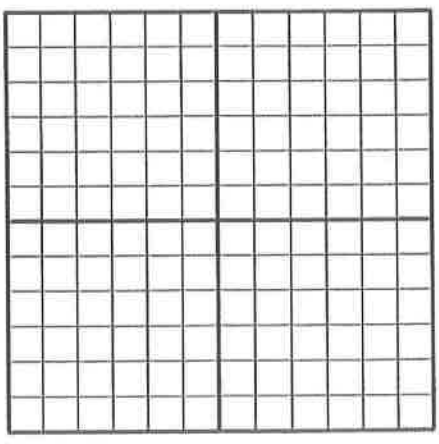
    c. Write a revenue function.

    d. Determine your breakeven point. Explain what the breakeven point means.

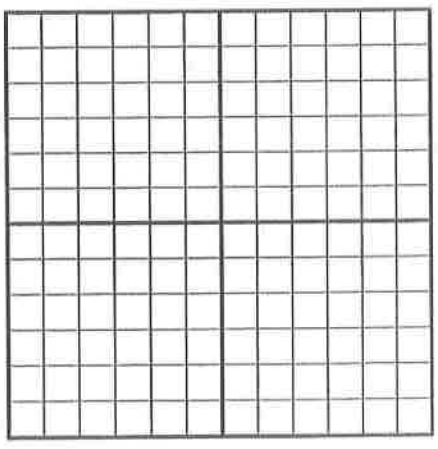
Linear Inequalities/Systems of Linear Inequalities

Graph each inequality or system of inequalities.

1. $y \leq -2x + 3$

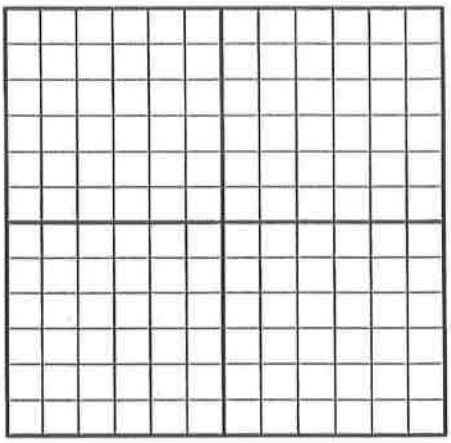


2. $2x - 3y > -6$



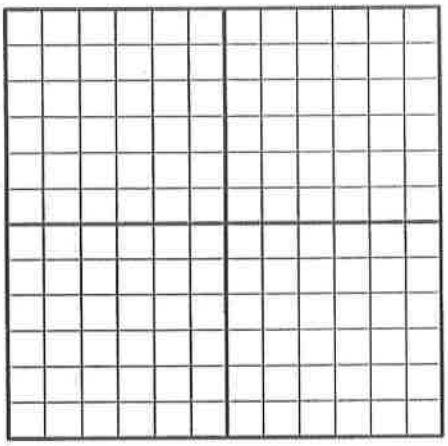
3. $2x - y < 1$

$y \leq -\frac{1}{3}x$



4. $x < 4$

$y \geq -2$



Exponential Functions

Simplify each expression.

1. $3x^5y \cdot 5x^2y^3$

2. $\left(\frac{y^5}{x^4}\right)^{-3}$

3. $a^4b^0(a^{-5})$

4. $\frac{2y^4}{x^2y^{-4}}$

5. $\left(3xy^4\right)^{-4}$

6. $\frac{a^2b^8}{\left(2a^4b^2 \cdot a^2b\right)^2}$

7. $\frac{(-2y)^4 \cdot x^4y}{-y^{-1}}$

8. $\frac{a^0b^3}{(2a^{-1}b^3)^{-1} \cdot a^{-2}}$

9. $\frac{-5x^{-3}y^0 \cdot -2x^{-1}y^{-5}}{(4x^2y^{-4})^{-2}}$

10. **Rewrite the following expressions using roots:**

a) $4x^{\frac{2}{3}}$

b) $(8x)^{\frac{5}{2}}$

11. **Rewrite the following expressions using fractional exponents:**

7) $\sqrt[5]{x}$

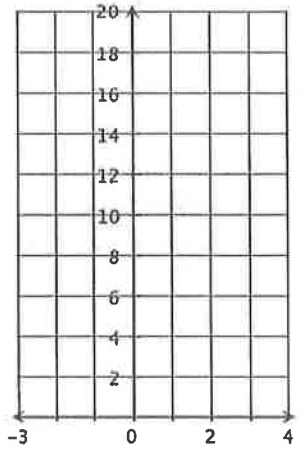
8) $\left(\sqrt{4x}\right)^3$

12) Which function, $f(x) = 2(3.2)^x$ *or* $f(x) = 2(3.3)^x$ is steeper? Explain how you know.

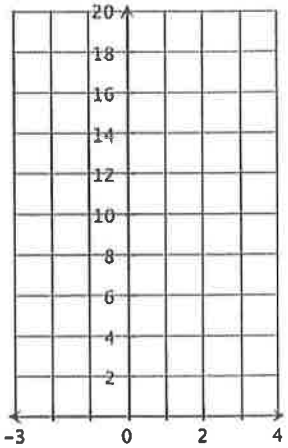
13) Which function, $f(x) = 2\left(\frac{5}{4}\right)^x$ *or* $f(x) = 2\left(\frac{4}{5}\right)^x$ is decreasing? Explain how you know.

14) In terms of exponents, what is the meaning of $8^{\frac{1}{3}}$?

15) Graph $y = 3(2)^x$



16) Graph $y = \frac{1}{4}^x$



17)

x	0	1	2	3	4	5
y	36	12	4	$\frac{4}{3}$	$\frac{4}{9}$	$\frac{4}{27}$

a) Does this data represent an exponential function? Explain.

b) What is the equation for this function?

18)

x	0	1	2	3	4	5
y	4	12	20	28	36	44

a) Does this data represent an exponential function? Explain.

b) What is the equation for this function?

19) The starting salary for a new employee is $35,000. The salary for this employee increases by 15% per year. What is the salary after 15 years?

20) You drink a soda with 120mg of caffeine. Each hour the caffeine in your system decrease by about 12% each hour. Approximately how much caffeine is in your system after 8 hours?

21) Gold-198 has a half-life of 2.7 days. How much of a 96 gram sample of gold-198 will be left after 8.1 days?

22) You just joined Twitter. Your initial number of Twitter followers is 2. You find that your number of followers triple every 2 weeks. How many followers will you have after 10 weeks?

23) Suppose you have saved up $4,000 in an account that pays 2% interest compounded semi-annually. What is your account balance after 20 years?

Simplifying/Factoring Polynomials.

Name the polynomial using the degree and number of terms:

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

2. $-2a^4b^3+a^3b^2c-6a^2bc+7abc$

3. $8x-4$

4. 7

Simplify each expression.

5. $(3x^2+x+7)+(7x+8x^4-3)$

6. $(8y^2-4y+5)-(y^2+5y-3)$

7. $2x(7x-3)-4x$

8. $3x(2x+x^2)+5x(3x-4x^2)$

9. $(x+7y)(x-4y)$

10. $(2x^2-3)(8x^2+x)$

11. $(w^2+3)(3w^2+5w-6)$

12. $(3x+5)(2x-7)$

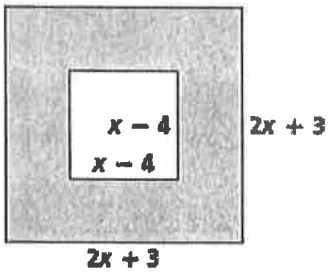
Simplify each expression.

13. $(w-5)^2$

14. $(3x+8)^2$

15. $(x+13)(x-13)$

16. Find the area of the shaded region.



Factor each expression.

17. $49x^4-16y^2$

18. $6x^4y^3+18x^2y^2-24xy$

19. $x^2-8x-48$

20. $2x^2+15x+13$

21. $3x^2-48x+189$

22. $4x^2-12xy+9y^2$

23. $24x^2-92x+28$

24. $x^2+9xy-36y^2$

25. $64y^2-100$

26. $4n^3+8n^2-5n-10$

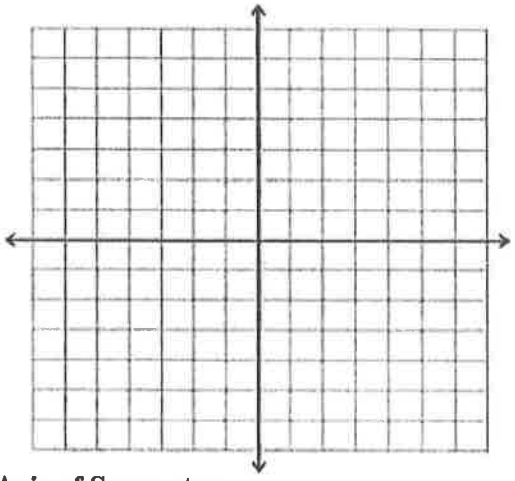
Graphing/Solving Quadratics.

1. Without graphing, describe the features of the graph of $y = -5x^2 + 2x + 7$

2. Without graphing, describe the features of the graph of $y = \frac{1}{2}(x+3)^2 - 4$

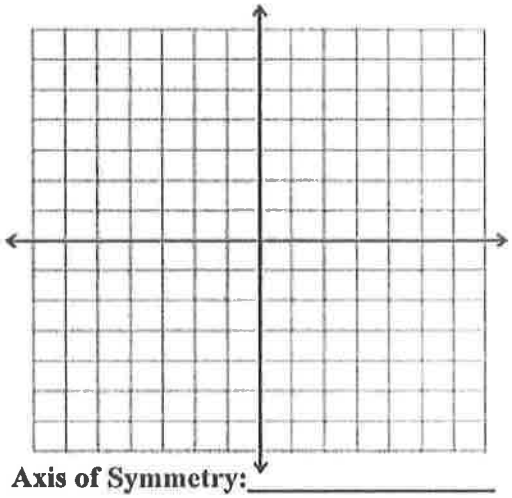
Find the missing information and graph each quadratic. You should have 5 points plotted and graph the axis of symmetry

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



Axis of Symmetry:_____
Vertex:_____
Y-Intercept:_____

4. $y = 2(x-3)^2 - 4$

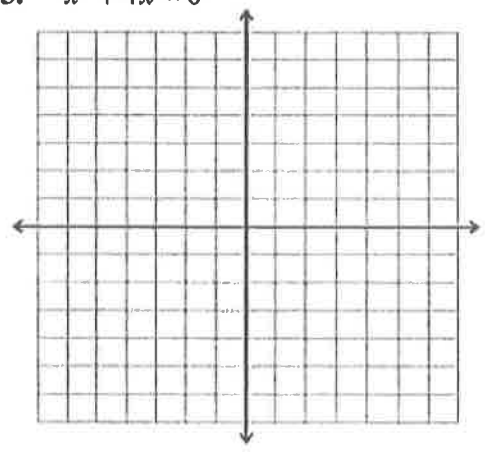


Axis of Symmetry:_____
Vertex:_____
Y-Intercept:_____

Equation in Vertex Form: _____

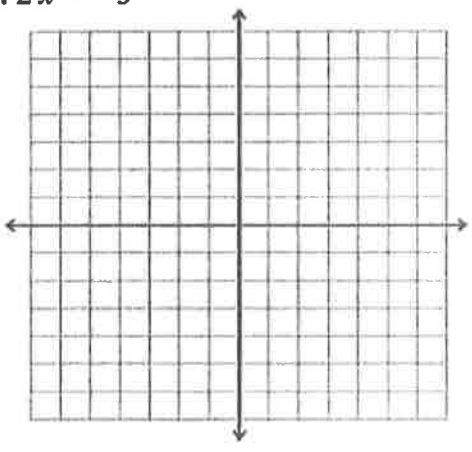
Solve by graphing:

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



Solution (s): _____

6. $2x^2 = -3$



Solution (s): _____

7. In the game Angry Birds the yellow angry bird is flung through a sling shot and follows a parabolic path. The flight of the path of the bird can be modeled with the equation $y = -16(x-1)^2 + 38$. What is the maximum height the yellow angry bird will reach?

8. A ball is thrown into the air with an initial upward velocity of 60 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 60t + 6$.

a. What is the maximum height of the ball?

b. After how many seconds will the ball hit the ground?

9. The profits of a company can be modeled by the equation $P = 300x^2 - 1000x - 100$ where x is the number of years and P is the amount of profit in thousands of dollars. How long will it take the company to break even? Round your answer to the nearest tenth.

Solve by taking the square root. Leave your answers in simplest radical form.

10. $2m^2 - 1 = 97$

11. $3g^2 + 81 = 0$

12. $16x^2 = 1$

13. $2x^2 + 18 = 118$

Solve by factoring.

14. $m^2 + m - 56 = 0$

15. $c^2 = 8c$

16. $4x^2 - 11x = -6$

17. $5x^2 = -40x - 35$

Use the quadratic formula to solve each equation. Leave answers in simplified radical form.

14. $x^2 - 4x - 7 = 0$

15. $2x^2 - 5x - 12 = 0$

Use any method you choose to solve each equation.

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

17. $3x^2 - 12x = -1$

18. $8k^2 + 3 = 139$

19. $15x^2 - 20x + 5 = 0$

Find the number of solutions of each equation. Explain how you arrived at your answer.

20. $5x^2 - 4x + 6 = 0$

21. $3a^2 - 4a - 5 = 0$

22. $16x^2 + 56x + 49$