Name _____

Students Entering Trig/PreCalculus, Summer Packet

When you go into trig/precalc, we assume you have certain mathematical skills that were taught to you in previous years. If you do not have these skills, you will find that you will consistently get problems incorrectly next year, even though you understand the trig or pre-calculus concepts. It is frustrating for students when they are tripped up by the algebra and not the trig or precalculus. This summer packet is intended for you to brush up and possibly relearn these topics.
Answer all questions <u>without a calculator</u>!!

Spread out your work during the whole summer, since you need these skills to be relatively fresh in your mind in the fall. Also, don't fake your way through these problems; instead, visit the websites suggested below. The whole packet will take you about 10 hours to complete.
We expect you to try hard at reviewing this material, to look things up, watch video lessons, and then complete this practice.
Answers will be shared on the first and second day of school. On those days you will have a chance to ask questions, complete some of the problems, and then hand it in [you may attach extra paper to show your work].

http://www.khanacademy.com

http://www.purplemath.com/modules/index.htm

http://www.hippocampus.org/?select-textbook=19

http://tutorial.math.lamar.edu/Classes/Alg/Alg.aspx

This practice is divided into three sections:

1. Equations, functions, and operations
2. Word problems
3. Transformations

It is crucial that you <u>do not use a calculator</u> for any of these questions.

Solve the equation.

1. $-5(2x-1)=3(x+4)$

2. $\dfrac{1}{3}(x-6)=-\dfrac{2}{5}x+\dfrac{14}{15}$

Solve the equation for _y_.

3. $3y-5x=-13$

4. $3xy+y=15$
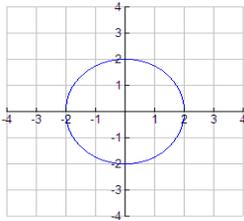
Determine if the following relations are functions. Explain why or why not.

5. $y=\pm\sqrt{x}$

6. $\{(2, 6)\ (0, 8)\ (-2, 6)\ (0, 9)\}$

7. Graph

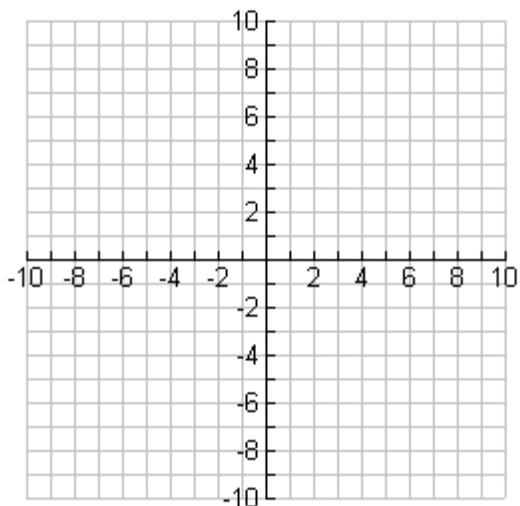8. $y=5-x^2$

Find the equation of the following lines:

9. Contains (-4, 5) and has the slope of $-\dfrac{3}{2}$.

10. Passes through the points $(-9,6)$ and $(9,-6)$.

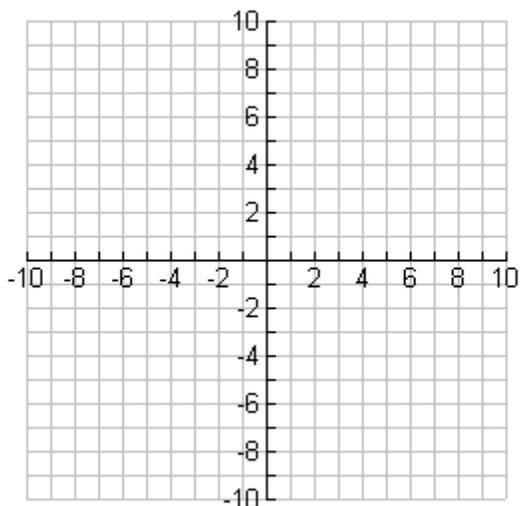11. Perpendicular to the line $2x+4y=7$ and passes through (-3, 5).

Graph the following equations using the most appropriate method. Be sure to include key points.

12. $f(x) = -2x + 3$

13. $f(x) = |x - 2| - 3$

Factor the following equations.

14. $x^2 - 11x + 24$

15. $4x^2 - 25$

16. $7x^2 - 14x$

Solve the following equations algebraically.
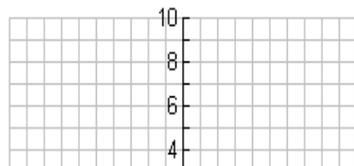
17. $x^2 - 10x + 21 = 0$

18. $2x^2 - 13x - 7 = 0$

19. $5x^2 = 120$

20. $\sqrt{x + 6} = x$

21. Write the equation of the quadratic function $y = a(x - h)^2 + k$, given

the vertex is $(2,1)$ and passes through the point $(5,2)$.

22. Graph the following quadratic equation:

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

a) Determine whether it opens up or down

b) Find the vertex & determine if it is a maximum or minimum value

c) Find x & y intercepts

d) Domain & Range

23. If $g(x) = x^2 + 12$ then find:

       a. $g(-6)$ b. x if $g(x) = 156$ c. $g^{-1}(x)$

Simplify the following expressions.

24. $\dfrac{1}{4} + \dfrac{2}{3}$ 25. $\dfrac{3x^2}{8} \cdot \dfrac{16}{9x}$ 26. $\dfrac{2}{3} \div \dfrac{1}{4}$

Use the laws of exponents to simplify the following expressions.

27. $(5x^2)(-2x^7)$ 28. $\dfrac{100m^2}{25m^5}$ 29. $\left(\dfrac{5x^9}{6y^3}\right)^2$

30. $\left(2x^3y^2\right)^4$ 31. $\left(\dfrac{6}{y^2}\right)^0$

Simplify the following expressions completely.

32. $-3\sqrt{7} + 4\sqrt{7}$ 33. $\sqrt{5} \cdot \sqrt{10}$ 34. $\sqrt{50} - \sqrt{18}$

Word Problems

35. A full mile is 4 ½ laps around the outside of the track. If you want to run $\frac{2}{3}$ of a mile, how many laps should you run?

36. The diameter of a tree varies directly as its age. A 20-year-old tree is 6 inches in diameter. How old will the tree be when it is 24 inches in diameter?

    a. What is the constant of variation?

    b. How old is the tree?

37. Assume that the rate at which a cricket chirps varies linearly with the temperature. Crickets make 70 chirps per minute at 60°F and 100 chirps per minute at 80°F.

    a. State what the independent and dependent variables are.

    b. Write the particular equation that expresses this relationship.

    c. What is the temperature-intercept? What does this tell you about the real world?

    d. What is the slope? What does it represent in terms of this problem?

38. The Brick Oven Bakery sells more loaves of bread when it reduces its price, but then its profits change. The function **y = -100(x - 1.75) ^{2} + 300** models the bakery's profits, in dollars, where x is the price of a loaf of bread in dollars. The bakery wants to maximize its profits.

    a. What is the domain of the function? Can x ever be negative? Explain.

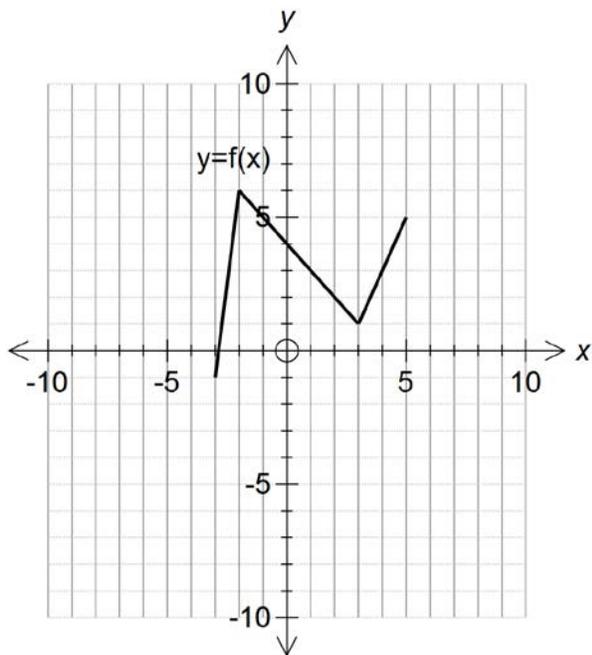   b. Find the daily profit for selling the bread at $2.00 per loaf.

    c. What price should the bakery charge to maximize its profits?
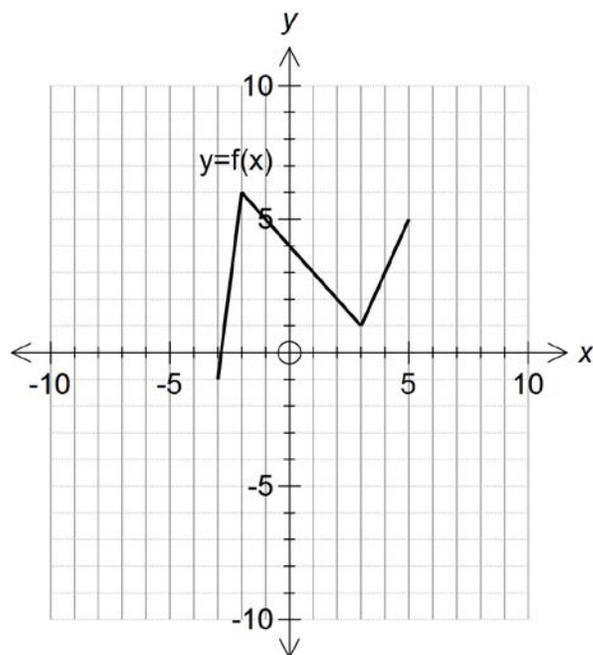
    d. What is the maximum profit?

39. During a free fall, a skydiver falls 16 feet in the 1st second, 48 feet in the 2nd second, and 80 feet in the 3rd second. If she continues to fall at this rate, how many feet will she fall in the 10th second?

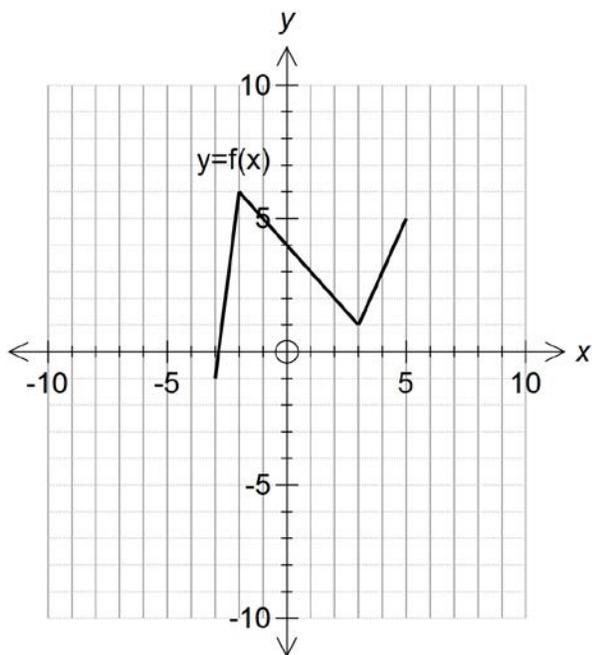Use the grid provided to sketch each of the transformations of f(x).

40. $g(x) = f(x) - 3$

41. $h(x) = f(x + 2)$

42. $j(x) = 2f(x)$

43. $k(x) = -f(x - 1) + 2$