

Brien McMahon High School
Pre-Calculus
Summer Packet Problems, 2011

Name _____
Date Due 2nd day of class

Pre-Calculus is a very exciting class that moves at a fast pace. Because we will need to hit the ground running next fall, it is necessary for you to refresh your memory on some math basics before the beginning of class in September. The problems outlined in this summer packet will assist you in practicing the skills you will need for Pre-Calculus.

The completed summer packet is due on the second day of class. Students who have the completed packet ready on the first day of class will receive a 5-point bonus! The first two days of class will be spent reviewing and discussing the packet. The first quiz will also be based on the problems in the summer packet.

Work must be shown to support each answer and should be done neatly on a **separate sheet of paper**. Please circle final answers.

Solve the equation.

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

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

Solve the equation for y.

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

4. $3xy + y = 15$

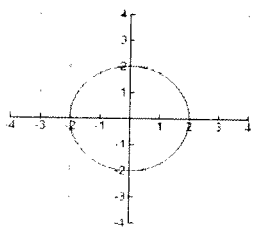
Determine if the following relations are functions. Explain why or why not.

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 $-\frac{3}{2}$.

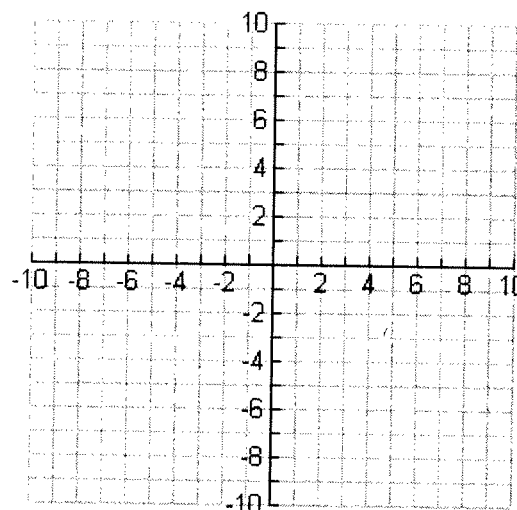
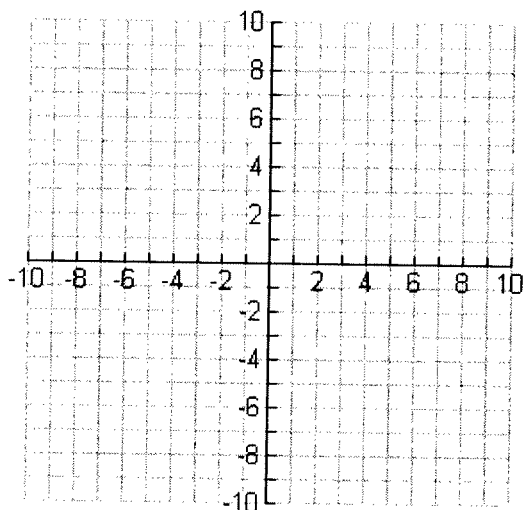
10. Passes through the points $(-9, 6)$ and $(9, -6)$.

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. $x^2 + 5x - 24$

15. $4x^2 - 16y^2$

16. $x^4 - 81$

Solve the following quadratic equations by using square root, factoring, or the quadratic formula.

17. $x^2 + 10x = -21$

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

19. $\frac{x^2}{9} - 11 = 5$

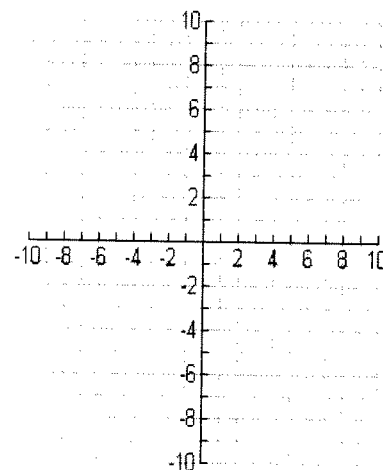
20. Write the equation of the quadratic function in standard form $y = a(x - h)^2 + k$, given

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

21. Graph the following quadratic equation:

$$f(x) = -2x^2 - 5x - 1$$

- Determine whether it opens up or down
- Find the vertex & determine if it is a maximum or minimum value
- Find x & y intercepts
- Domain & Range



22. Given the following functions, $f(x) = -3(x-2)^2 - 1$ and $g(x) = \frac{2x+3}{x+5}$, find:

a. $f(g(-4))$

b. $g(f(2))$

23. If $g(x) = x^2 - 5x + 12$ then find:

a. $g(-6)$

b. $g(x-2)$

Simplify the following rational expressions.

24. $\frac{x}{4} + \frac{2x}{3}$

25. $\frac{3x^2}{8} \cdot \frac{14}{9x}$

26. $\frac{x^2 - x - 20}{x + 4} \cdot \frac{x - 3}{x^2 - 2x - 15}$

27. $\frac{x^2 + 6x - 16}{x^2 - 4}$

28. Solve the equation: $\frac{-2}{x+3} = \frac{1}{x+1}$

Use the laws of exponents to simplify the following expressions.

29. $(2x^3y^4)^5$

30. $\frac{-10m^4n^5 \cdot 3m^3}{5m^2n}$

31. $\left(\frac{6}{y^2}\right)^0$

Simplify the following expressions.

32. $\sqrt{512x^8y^{13}}$

33. $\sqrt[3]{27m^6}$

34. $\sqrt{5} \cdot \sqrt{10}$

35. $-3\sqrt{7} + 4\sqrt{7}$

Word Problems

36. A full mile is $4\frac{1}{2}$ laps around the outside of the track. If you want to run $\frac{2}{3}$ of a mile, how many laps should you run?
37. 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?
38. 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 .
- State what the independent and dependent variables are.
 - Write the particular equation that expresses this relationship.
 - What is the temperature-intercept? What does this tell you about the real world?
 - What is the slope? What does it represent in terms of this problem?
39. 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.
- What is the domain of the function? Can x ever be negative? Explain.
 - Find the daily profit for selling the bread at \$2.00 per loaf; at \$1.25 per loaf.
 - What price should the bakery charge to maximize its profits?
 - What is the maximum profit?
40. Dan receives \$375 per week for selling new and used cars at a car dealership. In addition, he receives 5% of the profit on any sales that he generates. Write an equation that relates Dan's weekly salary S when he has sales that generate a profit of x dollars.