Name: _____

Summer Assignment
Calculus Honors
Bender

Directions:
Students, please complete this packet over the summer.

This packet is due **Tuesday, September 8, 2015**. If you need assistance, check the following sites to help you:

http://mathispower4u.yolasite.com/alg-2.php
http://mathispower4u.yolasite.com/trigonometry.php

Be sure to bring it to class. Every problem must be done to the best of your ability. You will be tested on these topics after the second week of school. Make sure you circle the problems you had difficulty with so that we can go over it in class.

LAWS OF EXPONENTS. ***Simplify by using the laws of exponents. Simplify as much as possible.***

1. $6y^{-2}\left(2y^{4}\right)^{-3}$	2. $\dfrac{7x^{2}}{x^{-3}}$	3. $\dfrac{3x\sqrt{x}}{x^{\frac{1}{2}}}$

WORKING WITH RADICALS. ***Simplify these radicals. Do not give decimal answers. Leave answers in simplest radical form. Rationalize the denominator when necessary.***

4. $\dfrac{3\sqrt{3y}}{\sqrt{2x}}$	5. $\sqrt[3]{144x^{9}y^{-4}z^{5}}$	6. $\dfrac{4\sqrt[3]{2}}{\sqrt[3]{9x^{2}}}$
7. $\dfrac{2x}{5-\sqrt{3}}$	8. $\dfrac{2}{\sqrt{x}+\sqrt{x-2}}$	

FACTORING. ***Factor completely by using an appropriate factoring method.***

9. $81-y^{4}$	10. $y^{3}+64$	11. $6x^{2}-5x-4$
12. $x^{2}-4xy+4y^{2}$	13. $3x\left(x+1\right)^{\frac{3}{2}}-6\left(x+1\right)^{\frac{1}{2}}$	14. $2x^{3}-4x^{2}-x+2$
15. $8x^{6}+19x^{3}-27$	16. $\dfrac{1}{2}x^{-\frac{1}{2}}\left(x^{2}-x\right)-x^{\frac{1}{2}}\left(2x-1\right)$	17. $2x^{4}+7x^{3}-26x^{2}+23x-6$

RATIONAL EXPRESSIONS. ***Simplify each expression. For sums/differences write your final answer as one fraction with a common denominator.***

18. $\dfrac{80x^7 - 270x^4}{45x^7 - 20x^9}$

19. $\dfrac{(m-n)^2}{(m^2-n^2)^2}$

20. $\dfrac{pu+qv-pv-qu}{pu-qv-pv+qu}$

21. $\dfrac{28k^2-4k^3}{k-6} \div \dfrac{4k^3-28k^2}{k-4}$

22. $\dfrac{2}{x^2-4} - \dfrac{1}{x-2}$

23. $-\dfrac{1}{x} + \dfrac{2}{x^2+1}$

24. $\dfrac{\dfrac{x^2-3x+2}{9x^2}}{\dfrac{4x^2-4}{3x}}$

25. $\dfrac{\dfrac{4}{x-1} - \dfrac{3}{x+1}}{\dfrac{3x-9}{x^2-1} + \dfrac{x-3}{2x-2}}$

SOLUTIONS AND POINTS OF INTERSECTION

Find the x and y intercepts of the graph of the equation.

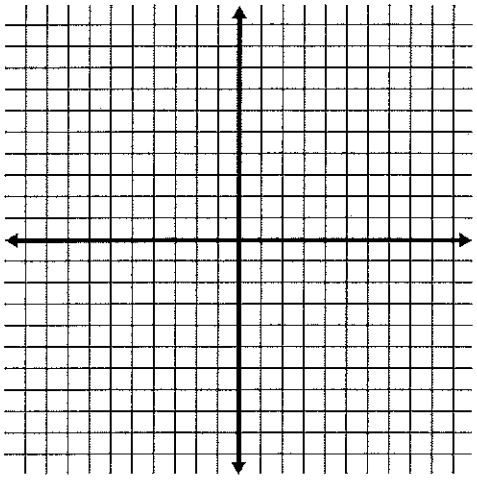
26. $2x-y-3=0$	*27.* $y=x^2\sqrt{9-x^2}$

Solve the system of equations. Answer in coordinate form.

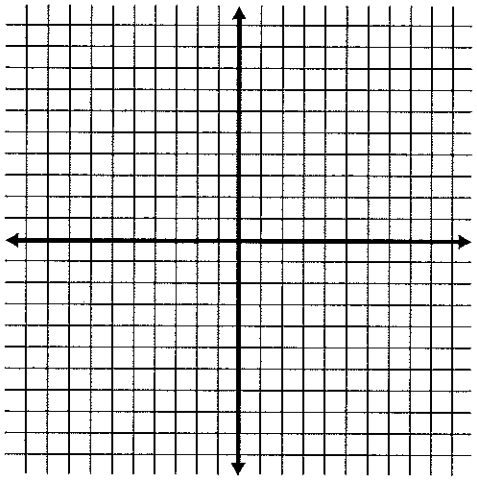
28. $x+y=2$ $2x-y=1$	*29.* $x^2+y^2=25$ $2x+y=10$
30. $y=x^3$ $y=2x$	*31.* $y=x^4-2x^2+1$ $y=1-x^2$

SKETCHING GRAPHS

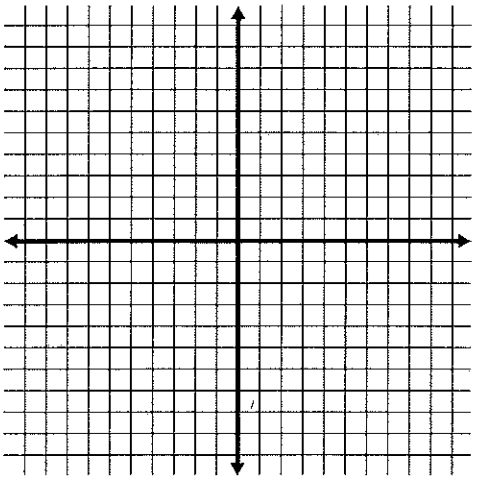
32. $f(x) = -3|x+1| - 4$



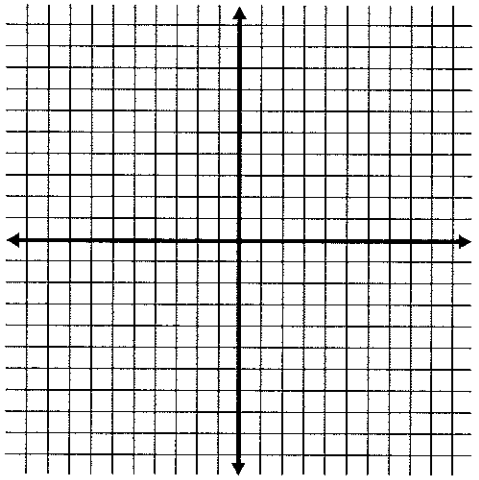
33. $f(x) = \frac{1}{2}(x-2)^2 + 4$



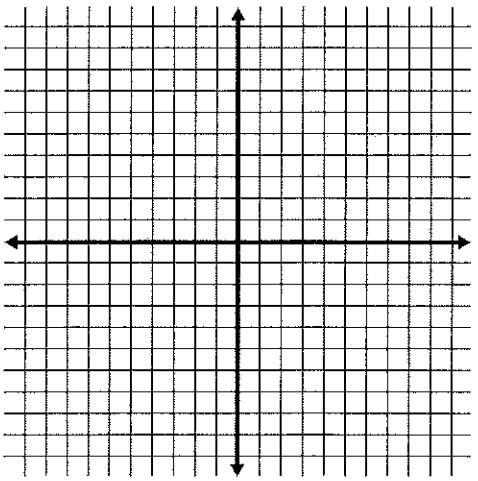
34. $f(x) = x^4 - 10x^2 + 9$



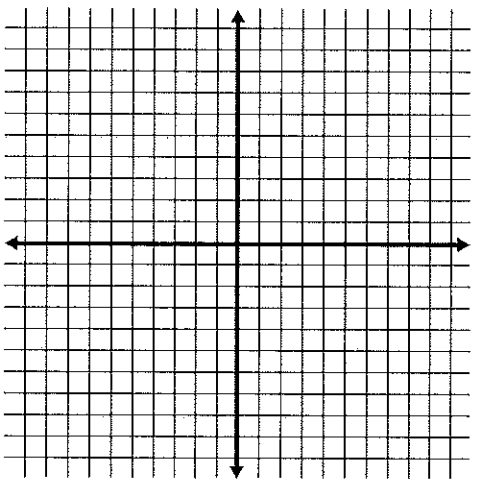
35. $f(x) = \frac{x^2 - 2x}{x^2 - 3x - 10}$



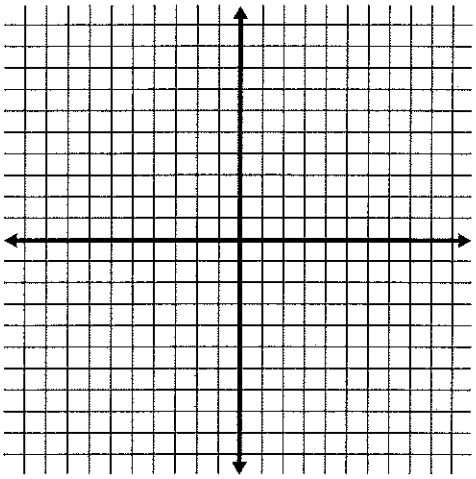
36. $f(x) = 2\sqrt{x-3} + 5$



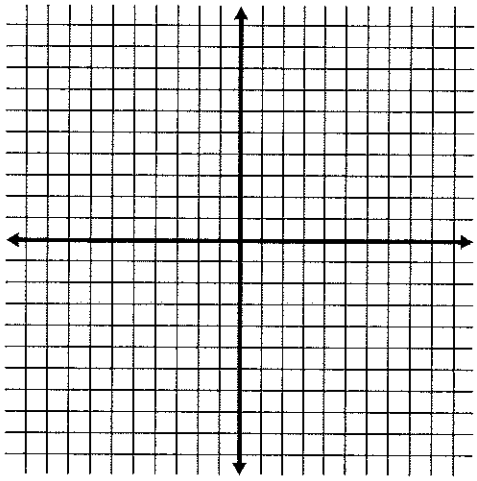
37. $f(x) = 2\sqrt[3]{x-5} - 1$



38. $f(x) = 2(3)^{x-1} + 3$

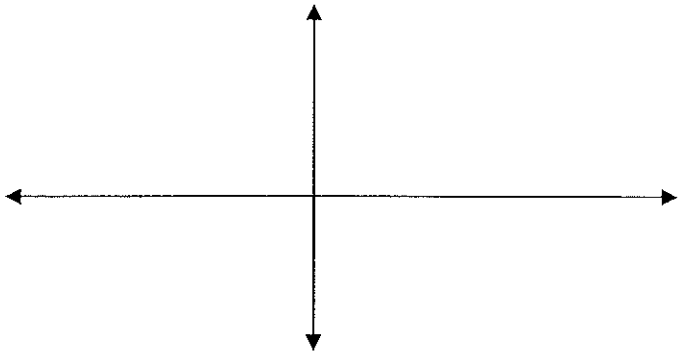


39. $f(x) = -\log_2(x-2) + 4$



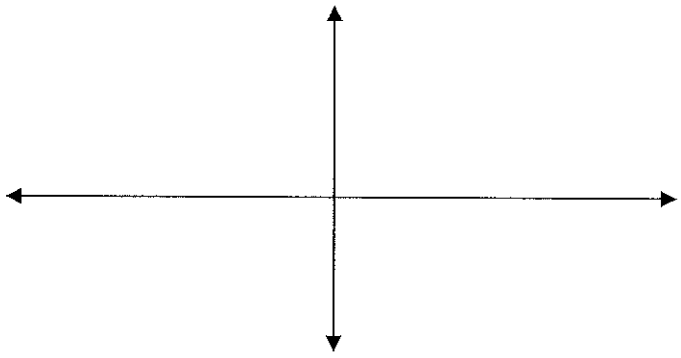
40. $f(x) = -2\sin\left(\frac{1}{2}x - \pi\right) + 3$

(use radians on the x-axis)



41. $f(x) = \frac{1}{2}\sec\left(2x + \frac{\pi}{2}\right) - 1$

(use radians on the x-axis)



EQUATIONS OF LINES. ***Find the following.***

42. Write an equation of the line that passes through the point (2, 1) and is:

a) parallel to $4x - 2y = 3$

b) perpendicular to $4x - 2y = 3$

43. A line is represented by the equation $ax + by = 4$.

a) When is the line parallel to the x-axis?

b) When is the line parallel to the y-axis?

c) Give values for a and b such that the line has a slope of $\frac{5}{8}$.

d) Give values for a and b such that the line is perpendicular to $y = \frac{2}{5}x + 3$.

EVALUATING AND OPERATIONS ON FUNCTIONS

Evaluate the function at the specified values of the independent variables. Simplify the result.

44. $f(x)=2x-3$

(a) $f(0)$

(b) $f^{-1}(9)$

(c) $f(x-1)$

(d) $f(x+\Delta x)$

45. $g(x)=\frac{1}{x}$

(a) $g(2)$

(b) $g^{-1}(4)$

(c) $g(x+4)$

(d) $g(x+\Delta x)-g(x)$

For 46 and 47 find (a) $f(x)+g(x)$**, (b)** $f(x)\cdot g(x)$**, (c)** $\frac{f(x)}{g(x)}$**, (d)** $f(g(x))$**, and (e)** $g(f(x))$**.**

46. $f(x)=2x-5$
$g(x)=5$

47. $f(x)=x^2+1$
$g(x)=x-1$

48. Let $g(0)=1$, $g(1)=-3$, $g(2)=5$, $g(7)=2$, $h(1)=7$, $h(2)=1$, $h(5)=0$. Evaluate:

a) $(g\circ h)(2)$

b) $g(g(h(1)))$

c) $h(g(h(5)))$

d) $g^{-1}(5)$

e) $(g^{-1}\circ h^{-1})(1)$

f) $(h^{-1}\circ g^{-1})(-3)$

49. If $F(x) = f \circ g \circ h$, identify functions for f, g, and h.

a) $F(x) = \sqrt{2x-2}$ b) $F(x) = -4\sin(1-x)$

Evaluate the difference quotient and simplify the result.

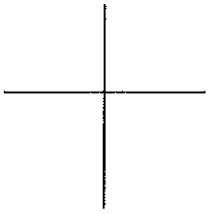
50. $f(x) = x^2 - 4x + 1$; $\dfrac{f(x+\Delta x) - f(x)}{\Delta x}$

51. $g(x) = \sqrt{x+3}$; $\dfrac{g(x+\Delta x) - g(x)}{\Delta x}$

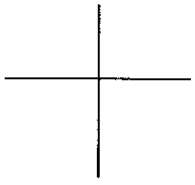
TRIGONOMETRY

52. Sketch θ in standard position and find EXACT values for the 6 trig functions of θ.

a) $\theta = 495°$



b) $\theta = -\dfrac{5}{6}\pi°$



53. Solve each equation. Give the answer in **radians** on the interval $[0, 2\pi]$.

a) $\tan x = \sqrt{3}$ b) $\cos x = 1$ c) $\csc x = -\dfrac{2\sqrt{3}}{3}$ d) $\cot x = 1$

e) $\sec x = -1$ f) $\sin x = 1$ g) $\sec x = 2$ h) $\sin x = -\dfrac{1}{2}$

i) $\tan x = -1$ j) $\cot x = -\dfrac{\sqrt{3}}{3}$ k) $\cos x = -\dfrac{\sqrt{2}}{2}$ l) $\csc x = \sqrt{2}$

SOLVING DIFFERENT TYPES OF EQUATIONS *(exact answers only)*

54. $1-\dfrac{3}{x-3}=\dfrac{2x-4}{x^2-9}$	*55.* $4^{2x+3}=\left(\dfrac{1}{8}\right)^{3x-5}$
56. $e^{2x}-8e^{x}+15=0$	*57.* $\ln(x)-\ln(x+1)=\ln(3)$
58. $\log_3 x+\log_3(x-6)=3$	*59.* $\cos 3x=\dfrac{\sqrt{3}}{2},\quad 0\le x\le 2\pi$
60. $\cot^2 x-\csc x=1,\quad 0\le x\le 2\pi$	*61.* $\sin 2x=\sin x,\quad 0\le x\le 2\pi$