Name _____
Math Teacher _____

AP Calculus
Summer Packet
Port Charlotte High School

Many topics that we will study next year in your AP Calculus class build on topics that you have already learned in previous classes. Since many of you may have been away from these ideas for a period of time, you might need a refresher in order to be up to speed at the beginning of the course. We have chosen a selection of topics for you to cover during the summer. Please understand that they are not all the areas that we will expect you to know.

Do all work for these problems on a separate sheet of paper in PENCIL. Anything written on the packet will not be graded (#17-29 may be attached with graphs drawn on paper). Work for each problem must be in chronological order. Just an answer is not sufficient for most problems and will count as a wrong answer. If you are unfamiliar with a term or type of problem, refer back to your notes or go online to the various help sites for mathematics (see below). The skills covered are part of the foundation for your course. Mastery of these skills is assumed.

Have this work ready for the first day of class. This packet will be collected and counted as a homework assignment. On the first test, you will be tested on this review material.

CALCULATORS MAY NOT BE USED, UNLESS DIRECTIONS SPECIFY.

We look forward to working with you next year!

Free Online math help sites:
www.khanacademy.com
www.math.com/homeworkhelp/Algebra.html
http://www.algebrahelp.com/
www.gomath.com

Name _____ **Calculus Summer Packet**

Tell whether the following relationships are functions. Justify your answer.

1) {(v, -1), (u, 2), (w, 0), (u, -2)}

2) $f(x) = x^3 + x^2 - 5$

3) {(6, 2), (12, 2), (14, 2)}

4) $y^2 + x^2 = 1$

Given the slope and a point on the line, give the equation of the line in slope-intercept form.

5) (2,1) m = 0

6) (-4,1) m = undefined

7) (8,-2) m = $\frac{1}{2}$

8) (-1, 3) m = $\frac{7}{5}$

Determine algebraically whether the lines L_1 and L_2 are parallel, perpendicular, or neither.

9) L_1: (0,-1), (5,9) L_2: (0,3), (4,1)

10) L_1: (-2,1), (1,5) L_2: (1,3), (5, -5)

11) L_1: (3,6), (-6,0) L_2: (0,-1), (5, 7/3)

12) L_1: (10,-7), (4,-8) L_2: (-5,-2), (-3,10)

Write an equation in slope-intercept form of a line perpendicular to the given line that contains the given point P.

13) $y = \frac{3}{2}x + 12$ P(-3,-5)

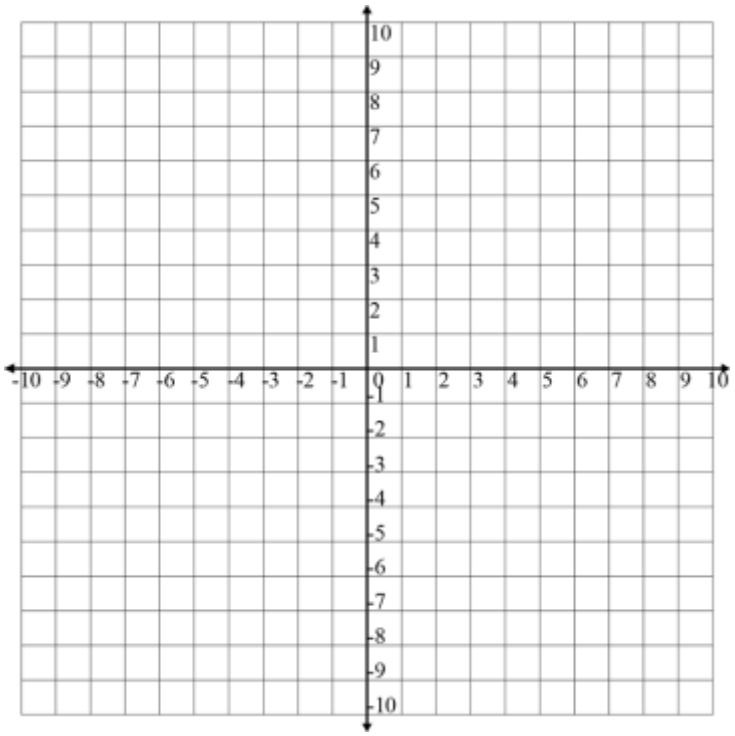
14) $6x = 10 - 5y$ P(-4,1)

15) $x - 2y = -5$ P(0,9)

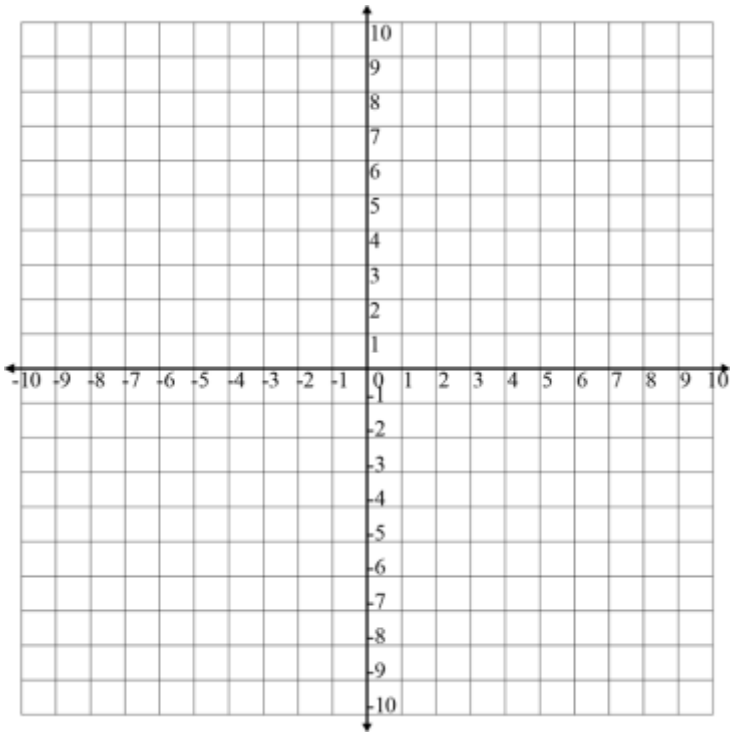
16) $\frac{-4y+12}{2x} = 2$ $P\left(\frac{5}{2}, \frac{5}{2}\right)$

Graph the following functions.

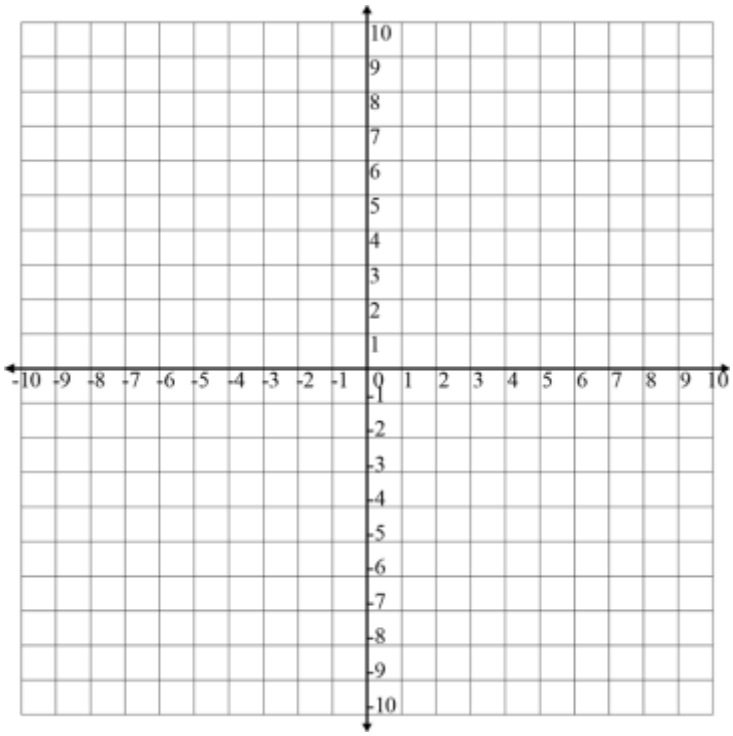
17) $f(x) = (x-2)^3 + 4$



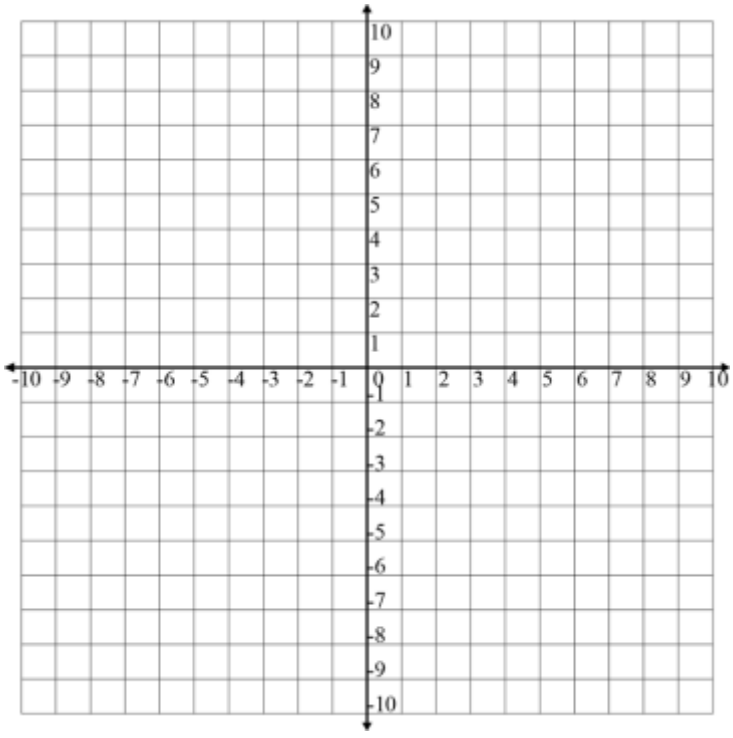
18) $f(x) = \sqrt{-x+4} - 2$



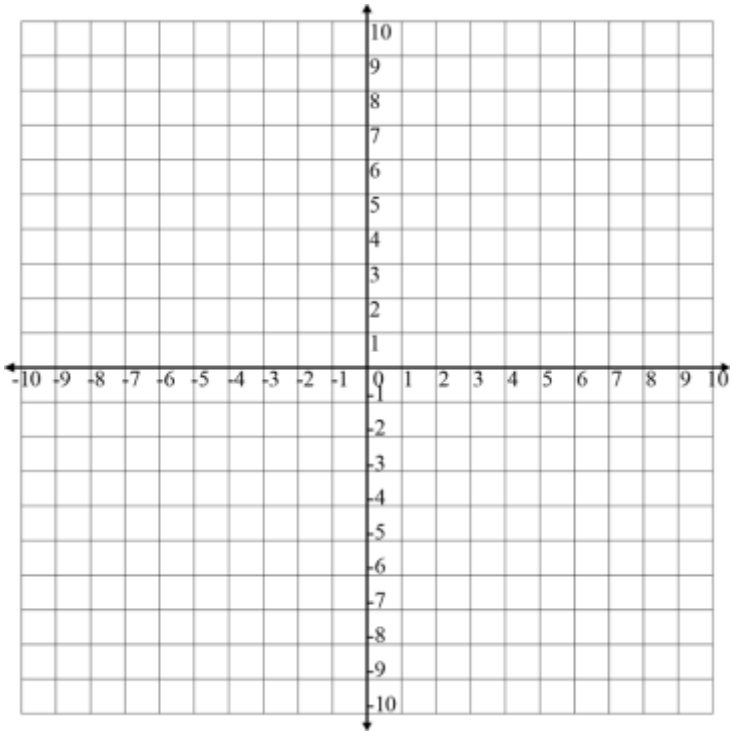
19) $f(x) = |x+2| - 3$



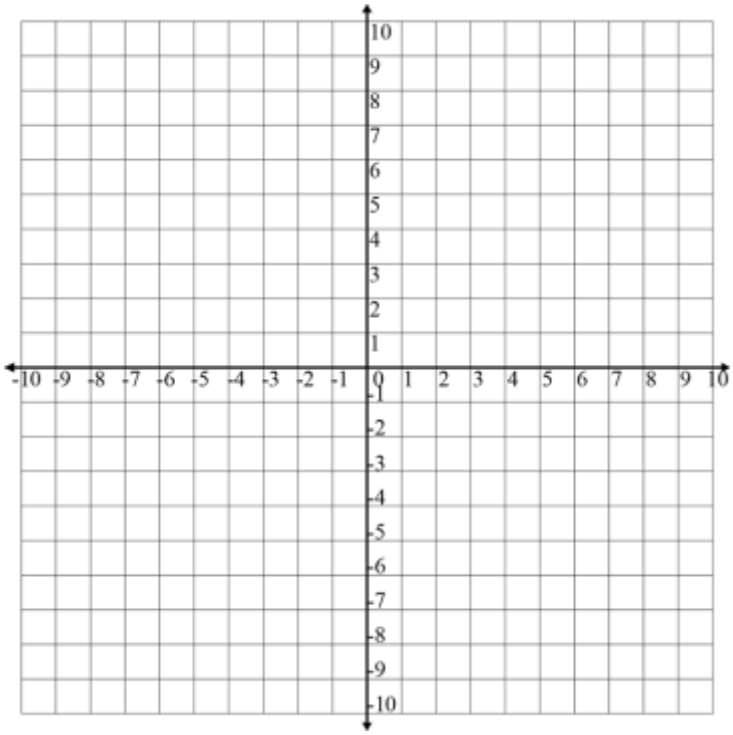
20) $f(x) = \frac{3}{x-2}$



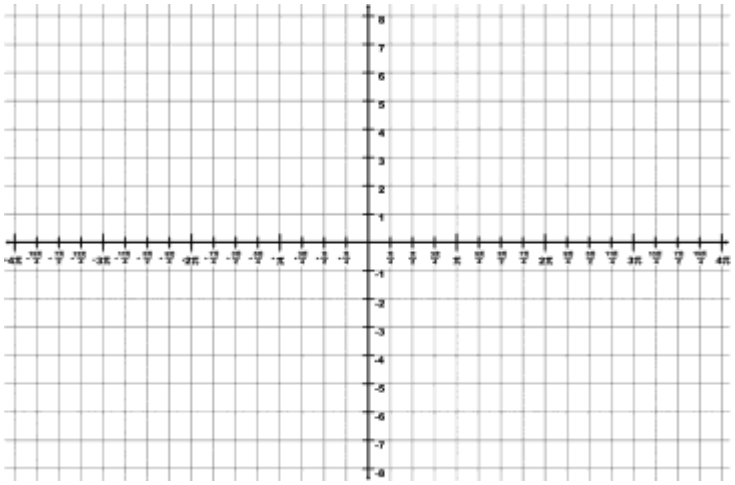
21) $f(x) = \frac{x+2}{x^2-5x-6}$



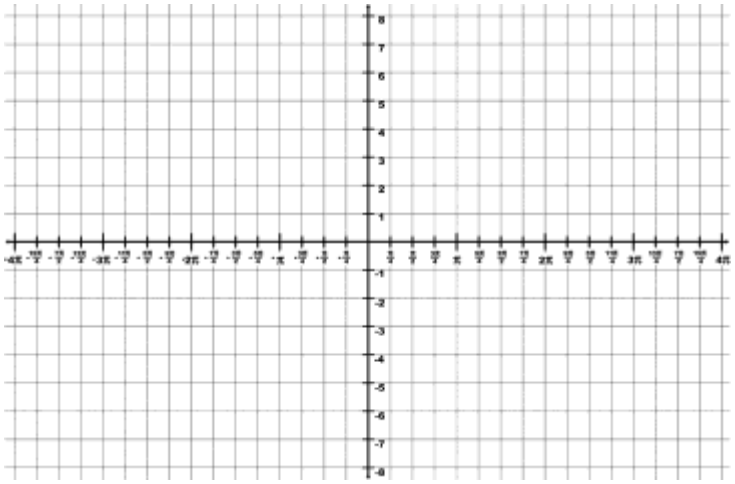
22) $f(x) = \begin{cases} x^2 + 2, & x \leq 1 \\ 2x + 2, & x > 1 \end{cases}$



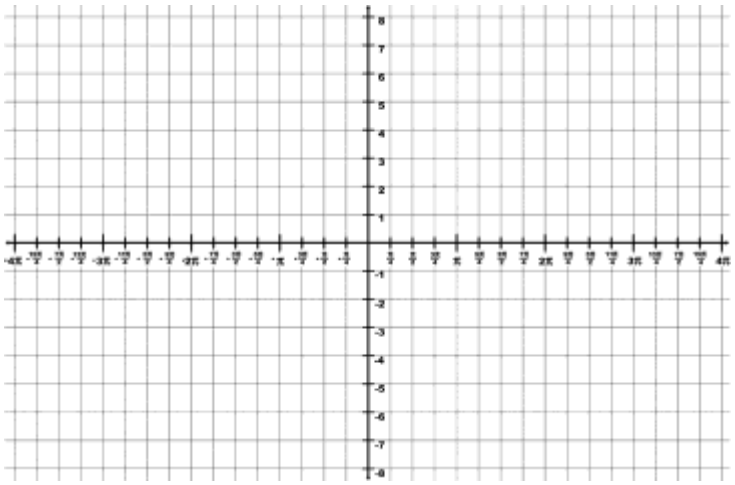
23) $f(x) = 3\sin(x - \frac{\pi}{4})$



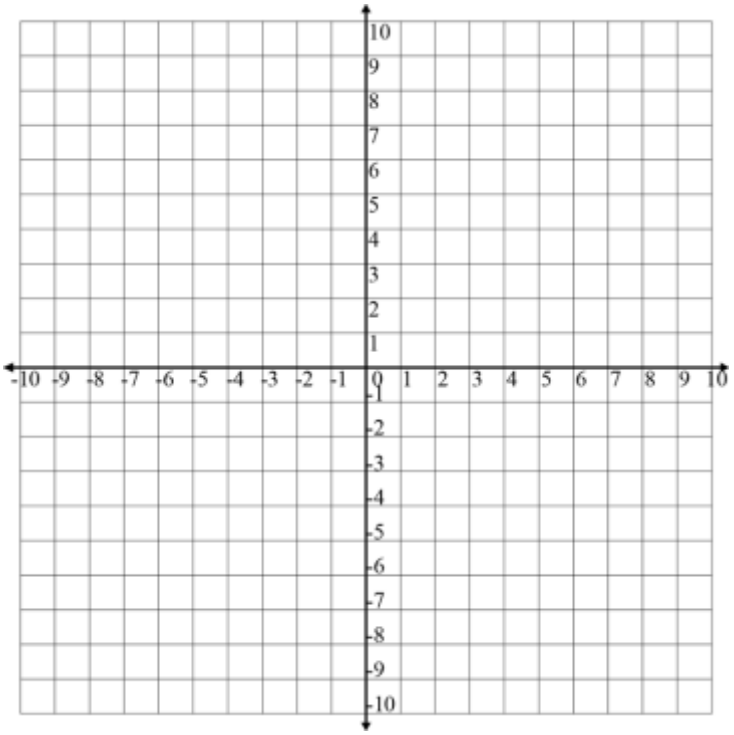
24) $f(x) = \tan(2x - \frac{\pi}{3})$



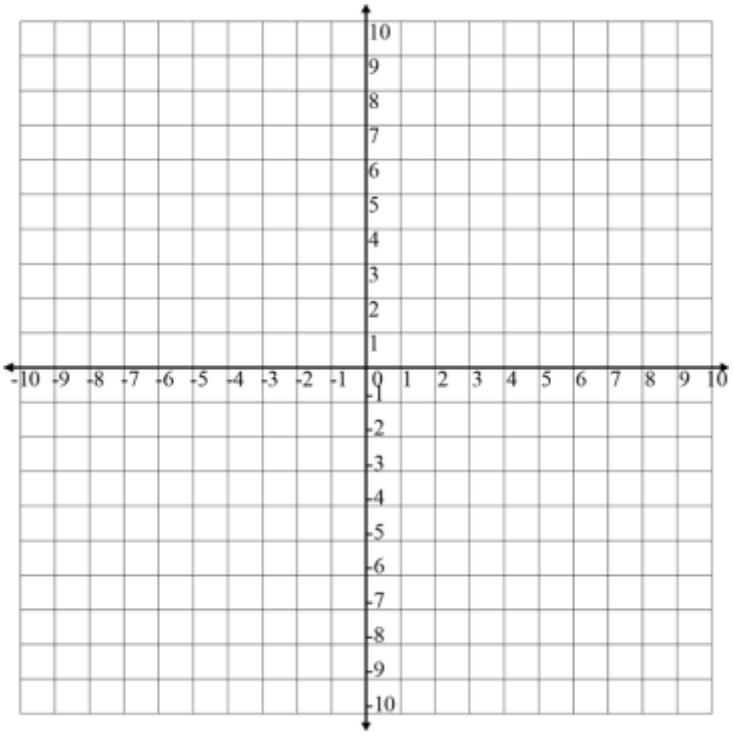
25) $f(x) = -\csc(4x)$



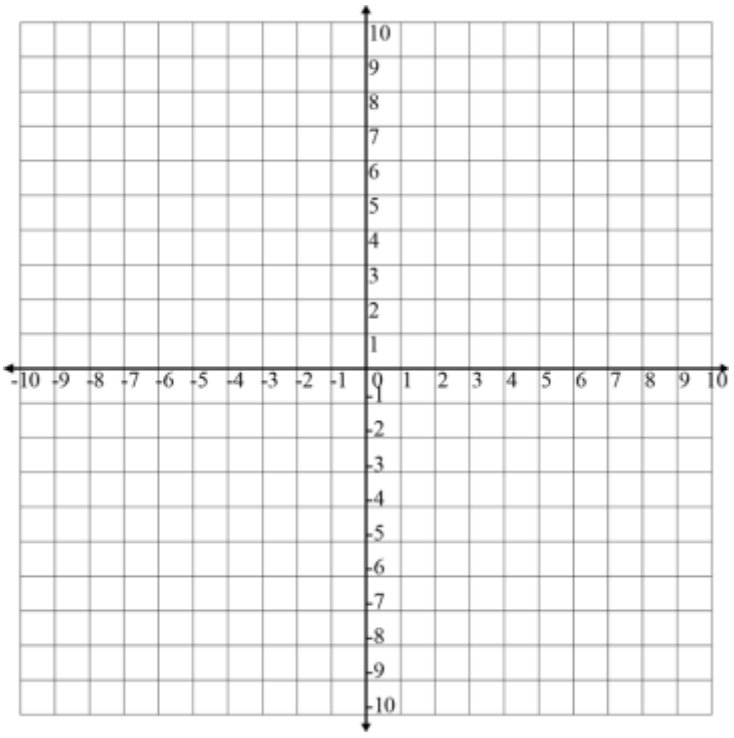
26) $f(x) = \left(\frac{1}{2}\right)^x$



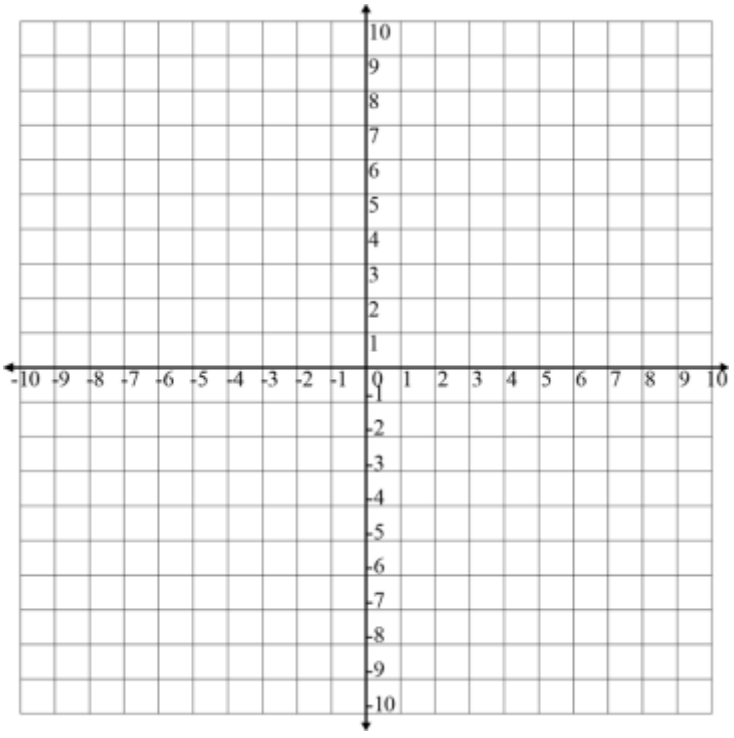
27) $f(x) = e^x$



28) $f(x) = \frac{1}{x^2}$



29) $f(x) = \frac{\sin x}{x}$ (you may use a graphing calculator to help you on this one)



Find the Domain of each function algebraically.

30) $f(x) = \frac{5}{x^2-2x}$

31) $f(x) = \frac{3x}{x^2+1}$

32) $f(x) = \frac{1}{\sqrt{x^2+8x}}$

Find the Inverse of each function algebraically.

33) $f(x) = \sqrt[7]{15x^3 - 3}$

34) $f(x) = -2x^2 + 3$

35) $f(x) = \frac{1}{\sqrt{2+5x}}$

36) $f(x) = |x + 3|$

Find the Domain and Range of each function.

37) $f(x) = \sin x$

38) $f(x) = -\cot x$

39) $f(x) = \sec x$

40) $f(x) = \ln x$

41) $f(x) = -2\csc x + 1$

For # 42-44, use algebra to find the value(s) of the variables for which $f(x) = g(x)$.

42) $f(x) = 2x^2 - 6x$
$g(x) = x - 3$

43) $f(x) = 2x^3 - 8x$
$g(x) = 6x^2 - 24$

44) $-2 = 2x - 3y$
$6 = 4x - y$

45) Given $f(x) = 6 - 2x^2$, find $f(-3)$.

46) Given $(x) = e^{x-4} + \frac{8}{x}$, find $f(4)$.

47) Given $(x) = \frac{|-x^3+6x|}{x^{-2}}$, find $f(-2)$.

Find <u>all</u> solutions for the given polynomial equation. You will need to use at least one of the methods listed below and in some cases more than one may be needed. You may use a graphing calculator, but answers should be exact answers, not decimal approximations.

(1) factoring
(2) quadratic formula
(3) synthetic division

48) $f(x) = x^2 + 3x - 4$

49) $f(x) = 2x^2 - 5x - 3$

50) $f(x) = 2x^3 + 6x^2 - 8x$

51) $f(x) = x^3 + x^2 - 5x - 5$

52) $f(x) = x^3 + 64$

53) $f(x) = x^4 + 4x^3 - 7x^2 - 22x + 24$

54) $f(x) = 3x^4 - 12x^3 - 18x^2$

Use the fundamental trigonometric identities to simplify the expression.

55) $\sin\theta(\csc\theta - \sin\theta)$

56) $\sec^2 x\,(1 - \sin^2 x)$

57) $\frac{\csc\theta}{\sec\theta}$

58) $\frac{\tan^2 t}{\sec^2 t} - 1$

Perform the addition or subtraction and use the fundamental identities to simplify.

59) $\frac{1}{1+\cos x} + \frac{1}{1-\cos x}$

60) $\frac{\cos\theta}{1+\sin\theta} + \frac{1+\sin\theta}{\cos\theta}$

61) $\tan\theta - \frac{\sec^2\theta}{\tan\theta}$

Condense the following logarithmic expression to a single logarithm.

62) $\log_3 3 + \log_3 5$

63) $\log 20 - \log 2$

64) $2\ln 8 + \ln 3 - 3\ln 2$

Expand the following logarithms completely.

65) $\log_4(x^6y^3)$

66) $\ln\left(\frac{7}{2}\right)^9$

67) $\log a^5\sqrt{b}$

Solve each logarithmic equation. (May need a calculator to solve)

68) $-9\log_6 2x = -18$

69) $-5n + \log(4n) = -5n$

70) $-3\ln x + 2 = -1$

71) $\log_3 y + 3\log_3 y^2 = 21$

Solve each equation by completing the square. Answers should be exact values, not decimal approximations.

72) $r^2 + 4r = 13$

73) $4x^2 + 16x = 65$

74) $5v^2 - 21 = 30v$

Write in exponential form.

75) $\sqrt[3]{x^2}$

76) $3a\sqrt{a^7}$

77) $-2\sqrt[4]{81x^8y^3}$

Write in radical form.

78) $(2x)^{\frac{4}{3}}$

79) $9xy^{2.5}$

80) $3\sqrt[3]{b}\cdot 4b^{\frac{3}{2}}$