

Summer Packet

Directions: Give a complete algebraic solution (non-calculator) for problems #1-29.

On problems #30-35, use algebra and your calculator to solve each problem.

Box, Circle or Highlight all final answers for all non-graphing problems.

Be sure to include units and round appropriately when necessary.

All work to be graded must be included on these pages. If you need additional space, attach by post-it.

The topics included in this packet will not be covered in class. They are topics that have been covered in previous courses and are topics that you should be familiar with. You may check out a Calculus textbook from the book room at school if you want a resource for completing this packet. All items are covered in Chapter 1. We will start with Chapter 2 in August.

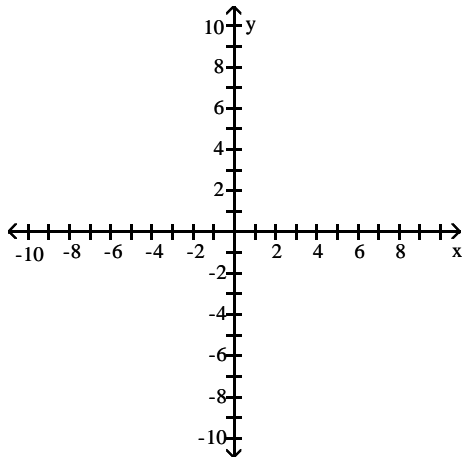
**This packet will be turned in at the beginning of the first day of class this fall.
It will be your first major grade in AP Calculus.**

A particle moves from A to B in the coordinate plane. Find the increments Δx and Δy in the particle's coordinates.

- 1) A(-5.0, -0.5), B(5.7, 7.5)

Plot the points and find the slope (if any) of the line they determine.

- 2) A(9, 6), B(6, -5)



Write an equation for the line described.

- 3) Passes through (3, 2) with slope $-\frac{2}{3}$

4) Passes through $(3, -1)$ and $(-2, 7)$

5) Passes through $(1, -5)$ and perpendicular to the line $-7x - 5y = 18$

Find the slope and the y-intercept of the line.

6) $2x - 5y = 14$

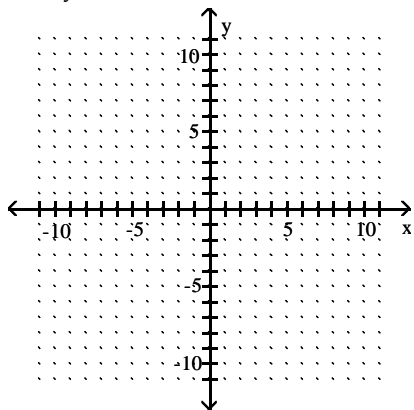
Find the domain and range.

7) $y = \frac{-4}{\sqrt{x+1}}$

8) $y = \sqrt{9+x}$

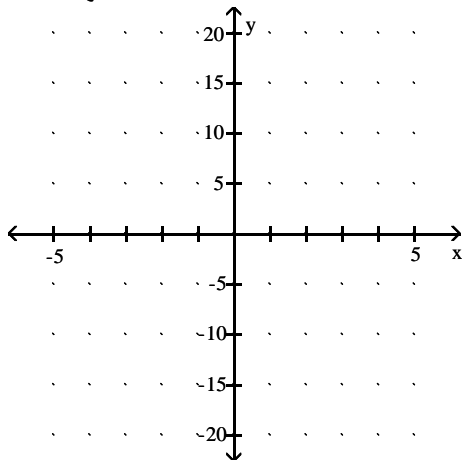
Graph the line.

9) $x + 3y = 3$



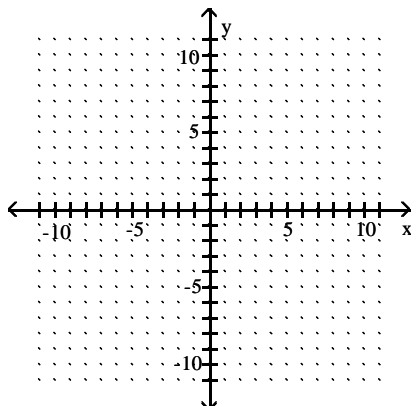
Graph the piecewise-defined function.

$$10) f(x) = \begin{cases} 4x + 2, & x < -2 \\ x, & -2 \leq x \leq 3 \\ 3x - 1, & x > 3 \end{cases}$$



11)

$$y(x) = \begin{cases} 4x + 1, & \text{if } x < 0 \\ 5x^2 - 1, & \text{if } x \geq 0 \end{cases}$$

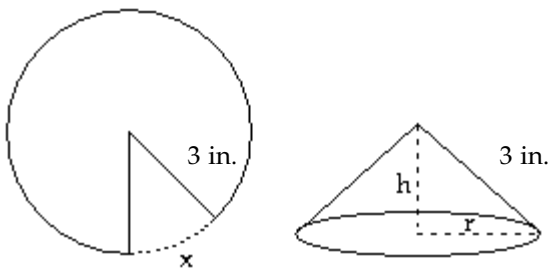


Solve the problem.

12) If $f(x) = 5x + 1$ and $g(x) = -7x^2 - 8x - 6$, find $g(f(3))$.

13) If $(f \circ g)(x) = 16x + 7$ and $g(x) = 2x - 1$, find $f(x)$.

- 14) A cone is constructed from a circular piece of paper with a 3-inch radius by cutting out a sector of the circle with arc length x . The two edges of the remaining portion are joined together to form a cone with radius r and height h , as shown in the figure. Express the volume V of the cone as a function of x .

**Rewrite the exponential expression to have the indicated base.**

15) $\left(\frac{1}{4}\right)^{2x}$; base 2

16) 27^{2x} ; base 3

Determine if the function has an inverse function.

17) $y = x^2 + 5x - 3$

18) $y = x^3 - 3x + 5$

Find the inverse of the function.

19) $f(x) = x^3 + 6$

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

21) $f(x) = \frac{-4x + 6}{-3x - 8}$

Solve the equation.

22) $(8.76)^t = 9$

23) $2^x + 2^{-x} = 3$

24) $\ln(y + 6) - \ln 4 = x + \ln x$; Solve for y.

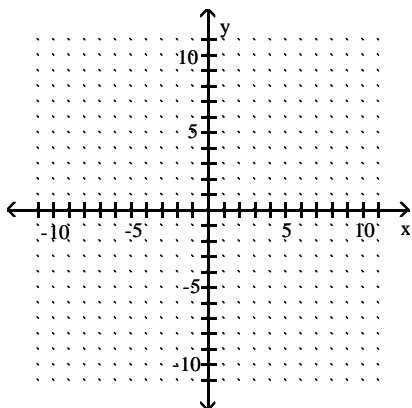
Find the requested function value meeting all of the given conditions.

25) $\sin \theta = \frac{\sqrt{3}}{2}$ and $\tan \theta < 0$; Find $\tan \theta$.

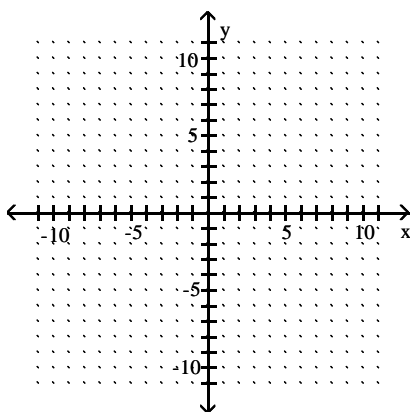
26) $\tan \theta = -\frac{\sqrt{3}}{3}$ and $\cos \theta < 0$; Find $\sin \theta$.

Graph the function.

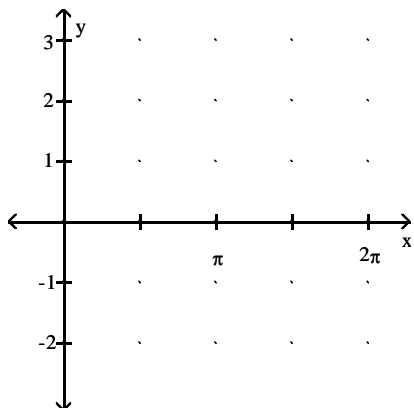
27) $f(x) = \ln(x - 3)$



28) $f(x) = \ln x - 3$



29) $y = 2 \sin \left(4x + \frac{\pi}{3} \right) + 1$, over the interval $[0, 2\pi]$.



Solve the problem.

- 30) A study was conducted to compare the average time spent in the lab each week versus course grade for computer students. The results are recorded in the table below. Use the equation of the least squares line to predict the grade of a student who spends 17 hours in the lab.

Number of hours spent in lab (x)	Grade (percent) (y)
10	96
11	51
16	62
9	58
7	89
15	81
16	46
10	51

- 31) The table shows the total stopping distance of a sport utility vehicle as a function of its speed. Use the quadratic regression equation for the data to predict the average total stopping distance for a speed of 73 miles per hour.

Speed (mph)	Average total stopping distance (ft)
20	47
25	61.5
30	78.5
35	97
40	122
45	149
50	180
55	216.5
60	254
65	298.5
70	350
75	408
80	473

32) Assume the cost of a car is \$25,000. With continuous compounding in effect, find the number of years it would take to double the cost of the car at an annual inflation rate of 2.9%. Round the answer to the nearest hundredth.

33) How long will it take for the population of a certain country to double if its annual growth rate is 2.9%? Round to the nearest year.

34) A college student invests \$11,000 in an account paying 8% per year compounded annually. In how many years will the amount quadruple?

35) Estimate the y -value associated with $x = 15$ as predicted by the natural logarithmic regression equation for the following data.

x	y
10	1.51
20	2.88
30	3.71
40	4.36