

This is your summer assignment. It covers topics learned in Algebra 2 and Math Analysis/Trig. These are topics that are prerequisite to being successful in Calculus. **Please wait until at least August 1st to begin this review so the material will be fresh in your mind when the school year begins.** If you have forgotten something, you should be able to find it in your notes or you could check a website. Try www.hippocampus.org for help.

- **Show all work**, even if you can problem in your head. **NO WORK = NO CREDIT** Please box your answers.
- This assignment is **due on the first day of class**. It will count as 3 homework grades. We will go over this assignment minimally in class. Out-of-class help sessions will be offered for additional review.
- There will be a test on this material during the 2nd week of class.

1) Using point slope formula, write the equation of the line that passes through the points (4,-1) and (2, 3)

2) Given: $P(-1, 3)$; $L: 2x + y = 4$

Write the equation of the line through P that is:

- (a) parallel to L , and (b) perpendicular to L .

3) Find the exact value, without a calculator!

a) $\cos \frac{\pi}{6}$

b) $\tan \frac{11\pi}{6}$

c) $\sin \frac{7\pi}{2}$

d) $\csc \frac{2\pi}{3}$

e) $\sec \frac{5\pi}{4}$

f) $\cot \frac{11\pi}{6}$

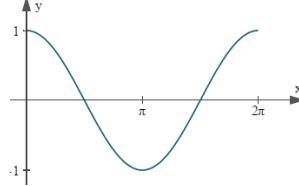
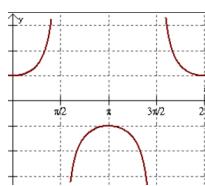
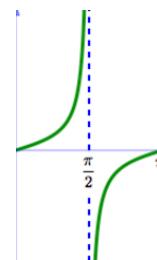
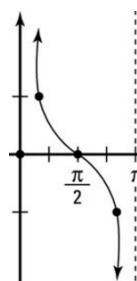
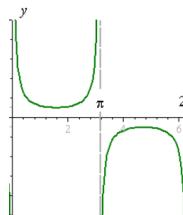
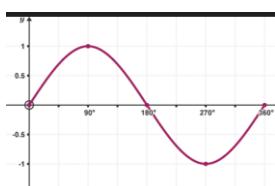
g) $\sin \frac{-8\pi}{3}$

h) $\sec \pi$

i) $\cot \frac{5\pi}{3}$

j) $\csc 0$

4. Name the trig function represented by each graph



Factor completely.

5) $8x^3 + y^3$

6) $2x^2 + x - 3$

7) $(2x-1)^2(x-3) + (x+1)(2x-1)^3$

8) $24(3x-2)^{\frac{2}{7}}(6x-1)^2 - 4(3x-2)^{\frac{9}{7}}(6x-1)^3$

Solve the given systems of equations, *without a calculator!* Your answers should be ordered pairs.

9) $\begin{cases} 7x - 4y = -5 \\ 3x + 6y = -33 \end{cases}$

10) $\begin{cases} y = \frac{1}{3}x - 5 \\ 2x - 6y = -30 \end{cases}$

11) $\begin{cases} y = (x-2)^2 + 1 \\ y = x + 1 \end{cases}$

Evaluate each expression.

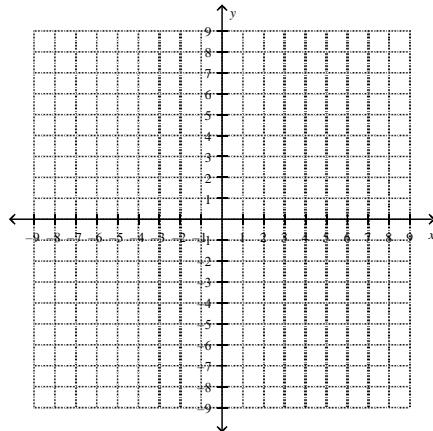
12) $6\sqrt{75} - \sqrt{300}$

13) $81^{\frac{3}{4}}$

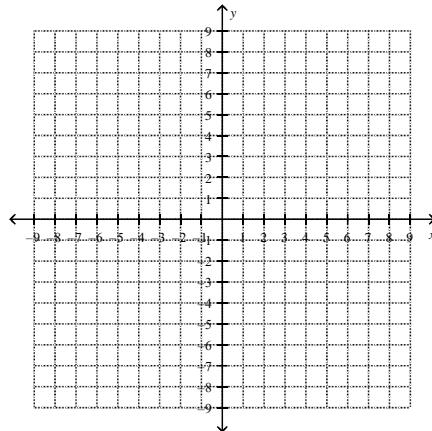
14) $32^{-\frac{2}{5}}$

Draw a sketch of the piece-wise function on graph paper. Use what you know about parent graphs to sketch.

$$15) \quad f(x) = \begin{cases} 2, & x < -3 \\ -2|x+1|, & -3 \leq x < 1 \\ \sqrt{x-1} + 2, & x \geq 1 \end{cases}$$



$$16) \quad g(x) = \begin{cases} \sqrt[3]{x+2} - 4, & (-\infty, -1) \\ 2x^2, & [-1, 2) \\ \frac{1}{x-4}, & (2, \infty) \end{cases}$$



17) Using #15 and #16 find the following values:

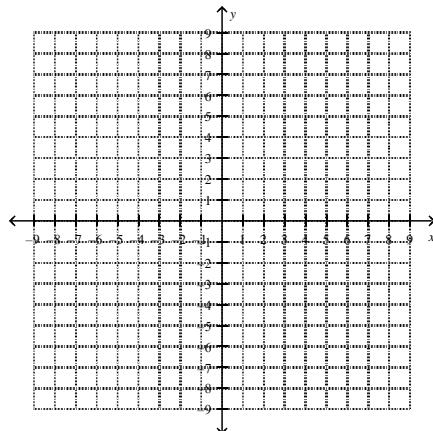
a) $g(-3) = \underline{\hspace{2cm}}$ b) $g(4) = \underline{\hspace{2cm}}$

c) $g(3) = \underline{\hspace{2cm}}$ d) $f(1) = \underline{\hspace{2cm}}$

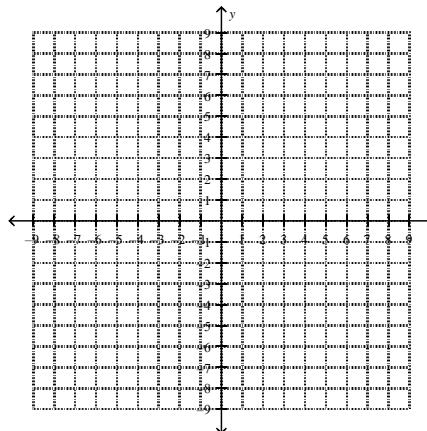
e) $f(-3) = \underline{\hspace{2cm}}$ g) $f(-7) = \underline{\hspace{2cm}}$

Graph the following. Use a different color for each equation when using same grid.

18) $x = -(y+4)^2 + 5$ and $y = \log_3(x-1) - 2$



19) $y = e^x$ and $y = x^3 - 6$



Simplify the following expressions.

20) $\sqrt{x} \bullet \sqrt[3]{x} \bullet x^{\frac{1}{6}}$

21) $\frac{3(x+h)^2 - 3x^2}{h}$

$$22) \quad \frac{1}{1-2a} - \frac{2}{1+2a} + \frac{6a+2}{4a^2-1}$$

$$23) \quad \frac{\frac{2}{x}-3}{1-\frac{1}{x-1}}$$

$$24) \quad \frac{1}{5} \left(\frac{x^5+4}{x^2-5} \right)^{\frac{-4}{5}} \left[\frac{(x^2-5)(5x^4)-(x^5+4)(2x)}{(x^2-5)^2} \right]$$

$$25) \quad \frac{5(x^2+4)^{\frac{1}{3}} - 5x\left(\frac{1}{3}\right)(x^2+4)^{\frac{-2}{3}}(2x)}{\left[(x^2+4)^{\frac{1}{3}}\right]^2}$$

Solve each equation. (The domain for the trig equations is $0 \leq x \leq 2\pi$.)

$$26) \quad 6x^3 - 11x^2 + 4x = 0$$

$$27) \quad 4x^3 + 9x = 0$$

$$28) \quad \sqrt{x^2 - 9} = x - 1$$

$$29) |2x - 3| = 14$$

$$30) \frac{2x-7}{x+1} = \frac{2x}{x+4}$$

$$31) 4\tan 2x - 9 = -5 \text{ on } [0, 2\pi]$$

$$32) \cos\left(\frac{x}{2}\right) = -\frac{\sqrt{3}}{2} \text{ on } [0, 2\pi]$$

Log Properties. Fill in the rest of the log property.

$$33) \log_b b^k =$$

$$34) a \bullet \log_b m =$$

$$35) \log_b m + \log_b n =$$

$$36) \log_b m - \log_b n =$$

Simplify the logarithmic expressions without a calculator.

$$37) \ln \sqrt{e}$$

$$38) \log_2 \sqrt{8}$$

$$39) \frac{1}{2} \bullet [\ln 20 - \ln 5]$$

Solve the following equations algebraically, without a calculator.

$$40) 15e^{0.5t} = 90$$

$$41) \ln(y+1) = 4$$

$$42) \log_3(x-5) - \log_3(x-1) = 2$$

Use the properties of logs to rewrite the following logarithmic expressions in terms of a single logarithm.

43) $\frac{1}{3}\log(x+4) - 2\log x + 5\log(x-2)$

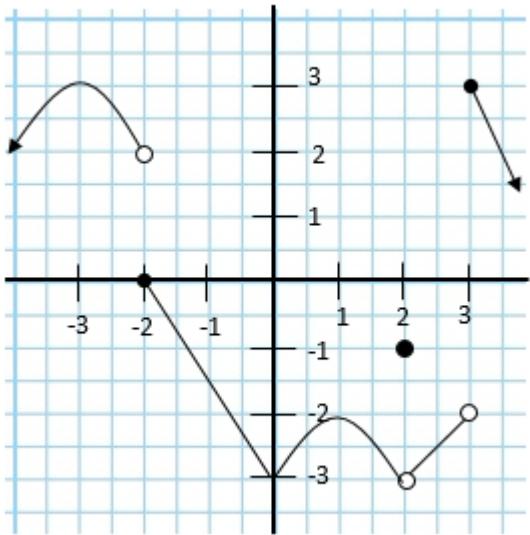
44) $4\log a - 3\log b - \frac{1}{2}\log c$

Find any (a) horizontal asymptotes, (b) vertical asymptotes and (c) holes (x,y) of the function.

45) $y = \frac{3x+4}{x^2+7x-18}$

46) $y = \frac{4x^2+x-14}{3x^2+11x+10}$

47) Limits: Find the limit or functional value for each of the following.



a) $\lim_{x \rightarrow -3} f(x)$

b) $\lim_{x \rightarrow 3^+} f(x)$

c) $\lim_{x \rightarrow -2} f(x)$

d) $\lim_{x \rightarrow 2^+} f(x)$

e) $\lim_{x \rightarrow 2} f(x)$

f) $\lim_{x \rightarrow 2^-} f(x)$

g) $f(2)$

h) $\lim_{x \rightarrow 1} f(x)$

i) $f(1)$

j) $\lim_{x \rightarrow -2^-} f(x)$

k) $\lim_{x \rightarrow 3} f(x)$

Find the limits.

48) $\lim_{x \rightarrow 2} (5x+6)^{\frac{3}{2}}$

49) $\lim_{x \rightarrow 3} \frac{x^4 - 3x^3 + x - 3}{x^3 - 3x^2 + 2x - 6}$

50) $\lim_{x \rightarrow \frac{1}{3}} \frac{6x^2 - 17x + 5}{3x - 1}$

$$51) \lim_{x \rightarrow 3} \frac{x^3 - 27}{x^2 - 9}$$

$$52) \lim_{x \rightarrow 5} \frac{\sqrt{x-1} - 2}{x - 5}$$

$$53) \lim_{x \rightarrow 0} \frac{\frac{1}{x+1} - 1}{x}$$

Simplify using Trig Identities

$$54) \frac{1}{\csc x + 1} + \frac{1}{\csc x - 1}$$

$$55) \frac{\tan x - \sin x \cos x}{\sin^2 x}$$

$$56) \text{ Verify } \sin 3x = 3 \sin x - 4 \sin^3 x$$