AP Calculus summer assignments

Vocabulary: Students should be familiar with the following terms as they related to mathematics. Provide a brief definition of the following words when used in a mathematics context: **Function; inverse function; composite function; asymptote; quadratic formula; factoring; acceleration; velocity.**

Worksheets

Worksheets involving the use of logarithms, trigonometric functions, and limits have been provided. A pre-quiz will be given the first week of the school year, with questions selected directly from the worksheets provided. You may use any resource available, including internet lessons, text books, fellow students, or tutors to guide you through. This material will be referenced throughout the course, so it is important you know these concepts.

Expand each logarithm.

1) $\log (6 \cdot 11)$

2) $\log (5 \cdot 3)$

3) $\log \left(\frac{6}{11}\right)^5$

4) $\log \left(3 \cdot 2^3\right)$

5) $\log \frac{2^4}{5}$

6) $\log \left(\frac{6}{5}\right)^6$

7) $\log \frac{x}{y^6}$

8) $\log (a \cdot b)^2$

9) $\log \frac{u^4}{v}$

10) $\log \frac{x}{y^5}$

11) $\log \sqrt[3]{x \cdot y \cdot z}$

12) $\log \left(x \cdot y \cdot z^2\right)$

Condense each expression to a single logarithm.

13) $\log 3 - \log 8$

14) $\dfrac{\log 6}{3}$

15) $4\log 3 - 4\log 8$

16) $\log 2 + \log 11 + \log 7$

17) $\log 7 - 2\log 12$

18) $\dfrac{2\log 7}{3}$

19) $6\log_3 u + 6\log_3 v$

20) $\ln x - 4\ln y$

21) $\log_4 u - 6\log_4 v$

22) $\log_3 u - 5\log_3 v$

23) $20\log_6 u + 5\log_6 v$

24) $4\log_3 u - 20\log_3 v$

Critical thinking questions:

25) $2(\log 2x - \log y) - (\log 3 + 2\log 5)$

26) $\log x \cdot \log 2$

Exponents and Logarithms Worksheet #1

1 - 3. Rewrite as an equivalent logarithmic equation.

1) $2^3 = 8$

2) $5^{-3} = \frac{1}{125}$

3) $y^z = 9$

4 – 7. Rewrite as an equivalent exponential equation.

4) $\log_4 \frac{1}{64} = -3$

5) $\log\ 0.0001 = -4$

6) $\log_5 1 = 0$

7) $\ln \sqrt{e} = \frac{1}{2}$

8 – 13. SIMPLE EXPONENTIAL EQUATIONS

Use the property if $b^n = b^m$ then n = m to solve exponential equations. If no solution exists, state this.

8) $3^x = \frac{1}{27}$

9) $4^{7-3x} = \frac{1}{16}$

10) $2^x = -8$

11) $9^{7x+3} = 27$

12) $2^{x^2-3} = 64$

13) $6 + 7e^{4x} = 13$

13 – 21. Evaluate each log expression if possible. Hint: set each expression equal to "x" then change to exponential equation to solve for "x".

14) $\log_5 \frac{1}{125}$

15) $\log_8 0$

16) $\log_8 32$

17) $\log_5 5^4$

18) $\log_{17} -17$

19) $\log_5 1$

20) $\log\ 0.01$

21) $\ln \sqrt[5]{e}$

22 – 30. SIMPLE LOGARITHM EQUATIONS

Solve the problem. If no solution exists, state this.

22) $\log_2 x = 4$

23) $\log_x 4 = 1$

24) $\log_x 125 = 3$

25) $\log_2 x = -4$

26) $\log_{27} x = \frac{2}{3}$

27) $\log_3 x = 0$

28) $\log_{25} x = \frac{1}{2}$

29) $\log x = 1$

30) $\log_6 (7x - 3) = 2$

31 – 32. Use the property if $\log_b m = \log_b n$ then n = m to solve exponential equations if possible.

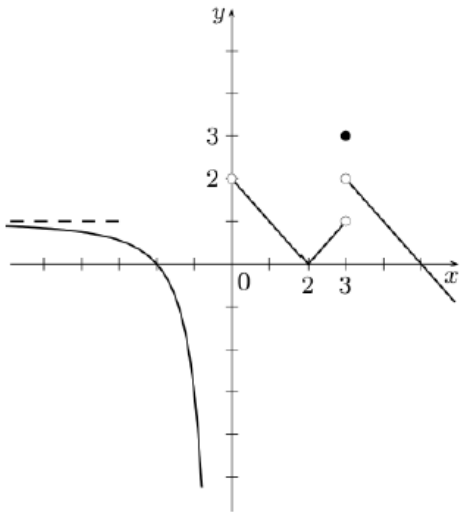
31) $\log_6 (7x + 2) = \log_6 (7x + 5)$

32) $\log (x + 4) = \log (4x - 5)$

201-103-RE - Calculus 1

WORKSHEET: LIMITS

1. Use the graph of the function $f(x)$ to answer each question.
   Use ∞, $-\infty$ or DNE where appropriate.



(a) $f(0) =$

(b) $f(2) =$

(c) $f(3) =$

(d) $\lim_{x \to 0^-} f(x) =$

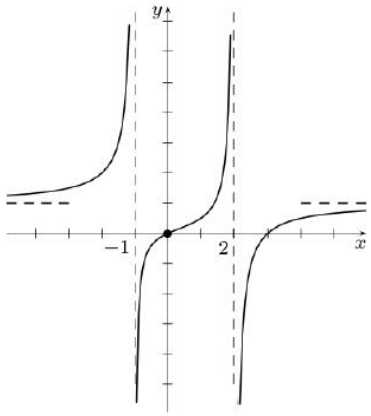
(e) $\lim_{x \to 0} f(x) =$

(f) $\lim_{x \to 3^+} f(x) =$

(g) $\lim_{x \to 3} f(x) =$

(h) $\lim_{x \to -\infty} f(x) =$

2. Use the graph of the function $f(x)$ to answer each question.
   Use ∞, $-\infty$ or DNE where appropriate.



(a) $f(0) =$

(b) $f(2) =$

(c) $f(3) =$

(d) $\lim_{x \to -1} f(x) =$

(e) $\lim_{x \to 0} f(x) =$

(f) $\lim_{x \to 2^+} f(x) =$

(g) $\lim_{x \to \infty} f(x) =$

3. Evaluate each limit using algebraic techniques.
Use ∞, $-\infty$ or DNE where appropriate.

(a) $\lim_{x\to 0} \dfrac{x^2-25}{x^2-4x-5}$

(b) $\lim_{x\to 5} \dfrac{x^2-25}{x^2-4x-5}$

(c) $\lim_{x\to 1} \dfrac{7x^2-4x-3}{3x^2-4x+1}$

(d) $\lim_{x\to -2} \dfrac{x^4+5x^3+6x^2}{x^2(x+1)-4(x+1)}$

(e) $\lim_{x\to -3} |x+1| + \dfrac{3}{x}$

(f) $\lim_{x\to 3} \dfrac{\sqrt{x+1}-2}{x^2-9}$

(g) $\lim_{x\to 3} \dfrac{\sqrt{x^2+7}-3}{x+3}$

(h) $\lim_{x\to 2} \dfrac{x^2+2x-8}{\sqrt{x^2+5}-(x+1)}$

(i) $\lim_{y\to 5} \left(\dfrac{2y^2+2y+4}{6y-3}\right)^{1/3}$

(j) $\lim_{x\to 0} \sqrt[4]{2\cos(x)-5}$

(k) $\lim_{x\to 0} \dfrac{\dfrac{1}{3+x}-\dfrac{1}{3-x}}{x}$

(l) $\lim_{x\to -6} \dfrac{\dfrac{2x+8}{x^2-12}-\dfrac{1}{x}}{x+6}$

(m) $\lim_{x\to \infty} \sqrt{x^2-2}-\sqrt{x^2+1}$

(n) $\lim_{x\to -\infty} \sqrt{x-2}-\sqrt{x}$

(o) $\lim_{x\to 7} \sqrt[6]{2x-14}$

(p) $\lim_{x\to 1^-} \sqrt{3-3x}$

(q) $\lim_{x\to \infty} \dfrac{x^4-10}{4x^3+x}$

(r) $\lim_{x\to -\infty} \sqrt[3]{\dfrac{x-3}{5-x}}$

(s) $\lim_{x\to \infty} \dfrac{3x^3+x^2-2}{x^2+x-2x^3+1}$

(t) $\lim_{x\to \infty} \dfrac{x+5}{2x^2+1}$

(u) $\lim_{x\to -\infty} \cos\left(\dfrac{x^5+1}{x^6+x^5+100}\right)$

(v) $\lim_{x\to 2} \dfrac{2x}{x^2-4}$

(w) $\lim_{x\to -1} \dfrac{3x}{x^2+2x+1}$

(x) $\lim_{x\to -1} \dfrac{x^2-25}{x^2-4x-5}$

(y) $\lim_{x\to 3} \dfrac{\sqrt{x^2-5}+2}{x-3}$

(z) $\lim_{x\to 0} \dfrac{2^x+\sin(x)}{x^4}$

(A) $\lim_{x\to 1^-} \dfrac{1}{x-1} + e^{x^2}$

(B) $\lim_{x\to \infty} 2x^2-3x$

(C) $\lim_{x\to 0} \dfrac{\sqrt{x+2}-\sqrt{2-x}}{x}$

(D) $\lim_{x\to 0^+} \dfrac{e^x}{1+\ln(x)}$

(E) $\lim_{x\to \infty} \sqrt{x^2+1}-2x$

(F) $\lim_{x\to 1} \dfrac{\sqrt[3]{x}-1}{\sqrt{x}-1}$

4. Find the following limits involving absolute values.

(a) $\lim_{x\to 1} \dfrac{x^2-1}{|x-1|}$ (b) $\lim_{x\to -2} \dfrac{1}{|x+2|} + x^2$ (c) $\lim_{x\to 3^-} \dfrac{x^2|x-3|}{x-3}$

5. Find the value of the parameter k to make the following limit exist and be finite. What is then the value of the limit?

$$\lim_{x\to 5} \frac{x^2+kx-20}{x-5}$$

6. Answer the following questions for the piecewise defined function $f(x)$ described on the right hand side.

(a) $f(1) =$

(b) $\lim_{x\to 0} f(x) =$

(c) $\lim_{x\to 1} f(x) =$

$$f(x) = \begin{cases} \sin(\pi x) & \text{for } x < 1, \\ 2^{x^2} & \text{for } x > 1. \end{cases}$$

7. Answer the following questions for the piecewise defined function $f(t)$ described on the right hand side.

(a) $f(-3/2) =$

(b) $f(2) =$

(c) $f(3/2) =$

(d) $\lim_{t\to -2} f(t) =$

(e) $\lim_{t\to -1^+} f(t) =$

(f) $\lim_{t\to 2} f(t) =$

(g) $\lim_{t\to 0} f(t) =$

$$f(t) = \begin{cases} t^2 & \text{for } t < -2 \\ \dfrac{t+6}{t^2-t} & \text{for } -1 < t < 2 \\ 3t-2 & \text{for } t \geq 2 \end{cases}$$

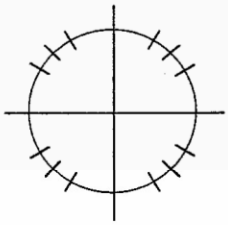
Math 36

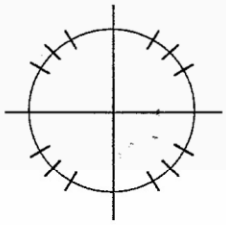
Unit Circle Worksheet

Name _____

Use the unit circle and the first quadrant chart to find the given values.

θ°					
θ^r					
$\sin\theta$					
$\cos\theta$					
$\tan\theta$					





1. $\sin(45°)$ **2.** $\cos(30°)$ **3.** $\tan(60°)$

4. $\sec(120°)$ **5.** $\cot(225°)$ **6.** $\csc(330°)$

7. $\cos(270°)$ **8.** $\tan(90°)$ **9.** $\sin(180°)$

10. $\csc(-45°)$ **11.** $\sec(-150°)$ **12.** $\cot(-120°)$

13. $\tan(570°)$ **14.** $\cos(495°)$ **15.** $\sin(660°)$

16. $\sin\left(\frac{\pi}{6}\right)$ **17.** $\cos\left(\frac{\pi}{3}\right)$ **18.** $\tan\left(\frac{\pi}{4}\right)$

19. $\sec\left(\frac{3\pi}{4}\right)$ **20.** $\cot\left(\frac{5\pi}{3}\right)$ **21.** $\csc\left(\frac{7\pi}{6}\right)$

22. $\cos\left(\frac{\pi}{2}\right)$ **23.** $\tan(\pi)$ **24.** $\sin\left(\frac{3\pi}{2}\right)$

25. $\csc\left(-\frac{2\pi}{3}\right)$ **26.** $\sec\left(-\frac{5\pi}{4}\right)$ **27.** $\cot\left(-\frac{11\pi}{6}\right)$

28. $\tan\left(\frac{11\pi}{4}\right)$ **29.** $\cos\left(\frac{17\pi}{3}\right)$ **30.** $\sin\left(\frac{19\pi}{6}\right)$