

SHOW ALL OF YOUR WORK ON THE QUIZ PAPER. FULL CREDIT IS NOT GIVEN UNLESS THE ANSWER FOLLOWS FROM THE WORK SHOWN.

1. (8 points) The point $P(4,5)$ lies on the curve $f(x) = \sqrt{x^2 + 9}$. (a) If Q is the point $(x, \sqrt{x^2 + 9})$, use your calculator to find the slope of the secant line PQ (correct to five decimal places) for the values of x given below.

The formula for the slope of PQ is $(\sqrt{x^2 + 9} - 5)/(x - 4)$. Using the Table feature with this formula as $Y1$ and each value of x given below, the slope values are

(i) 4.1 $m = .80354$	(ii) 4.01 $m = .80036$
(iii) 3.9 $m = .79634$	(iv) 3.99 $m = .79964$

- (b) Using the results of part (a), guess the value of the slope of the tangent line (correct to one decimal place) to the curve at the point $P(4,5)$. $.8$
- (c) Using the slope from part (b), find an equation of the tangent line to the curve at $P(4,5)$.
 $y - 5 = .8(x - 4)$
 $y - 5 = .8x - 3.2$
 $y = .8x + 1.8$

2. (5 points) Find the value of $\lim_{x \rightarrow 0} \frac{4^x - 1}{x}$ numerically, by using your calculator to create a table of values. Show the table of values to support your answer and write your answer correct to two decimal places in the place provided.

x	$Y1 = (4^x - 1)/x$
.1	1.487
.01	1.3959
.001	1.3873
.0001	1.3864
.00001	1.3863
-.1	1.2945
-.01	1.3767
-.001	1.3853
-.0001	1.3862
-.00001	1.3863

Answer: 1.39

3. (7 points) The function $f(x)$ is graphed below. Use the graph to find the indicated quantities. If a limit does not exist, state this.

(a) $\lim_{x \rightarrow 0^-} f(x) = -5$

(b) $\lim_{x \rightarrow 0^+} f(x) = 3$

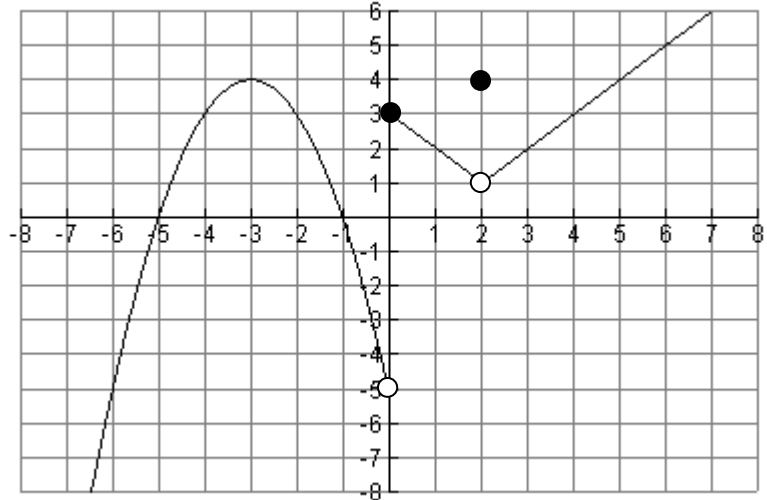
(c) $\lim_{x \rightarrow 0} f(x)$ does not exist

(d) $\lim_{x \rightarrow 2^-} f(x) = 1$

(e) $\lim_{x \rightarrow 2^+} f(x) = 1$

(f) $\lim_{x \rightarrow 2} f(x) = 1$

(g) $f(2) = 4$



4. (5 points) Evaluate the limit below *symbolically, without using your calculator*. Your answer should be a whole number or a fraction, not a decimal number.

$$\lim_{x \rightarrow 3} \frac{2x - 6}{x^2 + x - 12} = \lim_{x \rightarrow 3} \frac{2(x - 3)}{(x - 3)(x + 4)} = \lim_{x \rightarrow 3} \frac{2}{x + 4} = \frac{2}{7}$$