

## Unit 5 Review

### Non-Calculator:

1)  $\lim_{x \rightarrow -1} \frac{3x^2 + 8}{x - 4x^2}$

2)  $\lim_{x \rightarrow -3} \frac{x + 3}{x^2 - x - 12}$

3)  $\lim_{x \rightarrow -3} \frac{\sqrt{1-x} - 2}{x + 3}$

4)  $\lim_{x \rightarrow 5} \frac{x + 1}{x - 5}$

5)  $\lim_{x \rightarrow 0} \frac{\frac{3}{x+3} - 1}{x}$

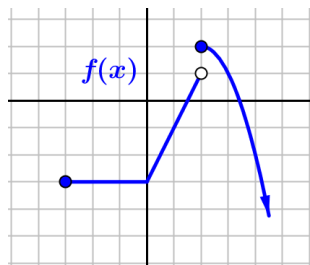
6) Given the graph of  $f(x)$ , find the following:

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

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

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

d)  $f(2) =$



7) Show the end behavior of each function using arrows

a)  $f(x) = \frac{(x-3)^2(-x+1)^4}{x(x-7)}$

b)  $g(x) = \frac{.01x^{33} - x^{15}}{5 - x^6}$

8) Solve for  $x$  (and  $y$ )

a)  $5(x+4)^2 - 3 = 32$

b)  $5 - x^2 = 7x$

c)  $\frac{1}{3} = \frac{1}{\sqrt{x-2}}$

9) Find the following limits:

a)  $\lim_{x \rightarrow \infty} \frac{3x^2 - 5}{x^2 + 5x - 4}$

b)  $\lim_{x \rightarrow -\infty} \frac{8x^3 + 16}{x + 4}$

10)  $f(x) = 2x^2 - 3x$

a) find  $f(-1)$

b) find  $\frac{dy}{dx}$  using the limit definition given below.

$$\frac{dy}{dx} = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

c) Write an equation of the line tangent to the graph of  $f(x)$  when  $x = -1$

11) Find the derivative,  $\frac{dy}{dx}$ , of

$y = 5x^2 - 1$  using the limit definition below.

$$\frac{dy}{dx} = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

12) Use the function  $y = \sqrt{x+2}$  for the following:

a) Find the domain of the function.

b) Find the derivative,  $\frac{dy}{dx}$ , using the limit definition below.

$$\frac{dy}{dx} = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

13) Graph

$$f(x) = \begin{cases} x - 1 & x < 2 \\ (x - 3)^2 + 1 & x \geq 2 \end{cases}$$

### Calculator:

14) Use the table feature on your calculator to find to 3 decimal place accuracy. (hint: radian mode)

$$\lim_{x \rightarrow 2} \frac{\tan(x-2)}{x^2 + x - 6}$$

15)  $g(x) = x^2 - 5x + 1$

a) Find  $g(2)$

b) Find  $\frac{dy}{dx}$  when  $x = 2$

c) Write the equation of a line tangent to the graph at  $x = 2$

d) At which value of  $x$  is the slope of  $g(x) = 3$ ?

e) At which value of  $x$  is the tangent line of  $g(x)$  a horizontal line?

16) Use your calculator to find:

a)  $\lim_{x \rightarrow 0} \frac{\cos x}{x}$

b)  $\lim_{x \rightarrow 3^-} \frac{|x(x-3)|}{x-3}$