

1. Find the value (if it exists) of each of the following limits. (Show your work)

a) $\lim_{x \rightarrow \infty} \frac{4x + 6}{3 - 5x}$

b) $\lim_{x \rightarrow 5} \frac{x^2 - 4x - 5}{5 - x}$

c) $\lim_{x \rightarrow 2} \frac{2 - \sqrt{6 - x}}{x - 2}$

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

a) _____

b) _____

c) _____

d) _____

e) $\lim_{\Delta x \rightarrow 0} \frac{\sqrt{x + \Delta x} - \sqrt{x}}{\Delta x}$

f) $\lim_{x \rightarrow 0} \frac{\sin 3x}{x}$

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

e) _____

f) _____

g) _____

2. Find the value(s) of x for which $f(x) = \frac{x-2}{x^2-4}$ is discontinuous and label these discontinuities as removable or nonremovable.

5. Find the average rate of change of the function over the following interval.
 $f(x) = \sqrt{2x+4}$ $[-2, 0]$

2. _____

6. For the function $y = x^2 - 4x$ at $x = 1$

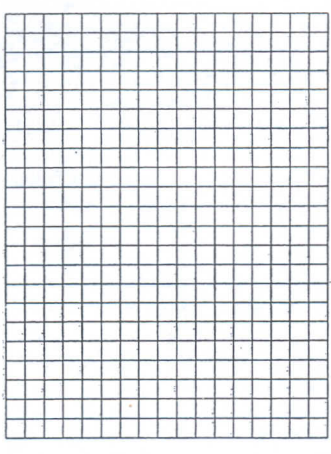
Find:

a) the slope of the curve

5. _____

3. Sketch the following graph:

$$f(x) = \begin{cases} x^2 & , x \geq 3 \\ 2x+3 & , 0 \leq x < 3 \\ -x+3 & , x < 0 \end{cases}$$



b) an equation of the tangent

6 a) _____

4. Find all vertical asymptotes of $f(x)$ if $f(x) = \frac{2x-2}{(x-1)(x^2+x-1)}$ (Exact answer(s))

c) an equation of the normal

b) _____

4. _____

c) _____