1.   Flu is spreading through a small school. At time t days after the beginning of the
       epidemic, there are $N(t)$ students sick, where $N(t) = 20t - t^2$. What is the average rate of
       change of the number of sick students from t = 2 to t = 5? Interpret your answer in a
       sentence, using appropriate units.

2.   The function f is defined by the graph shown. Based on this graph,

(a) $\lim\limits_{x \to -1^-} f(x) =$

(b) $\lim\limits_{x \to -1^+} f(x) =$

(c) $\lim\limits_{x \to -1} f(x) =$

(d) $f(-1) =$

(e)   Is f continuous at x = -1? Why or
       why not? Use limits in your answer.

(f) $\lim\limits_{x \to 3^-} f(x) =$
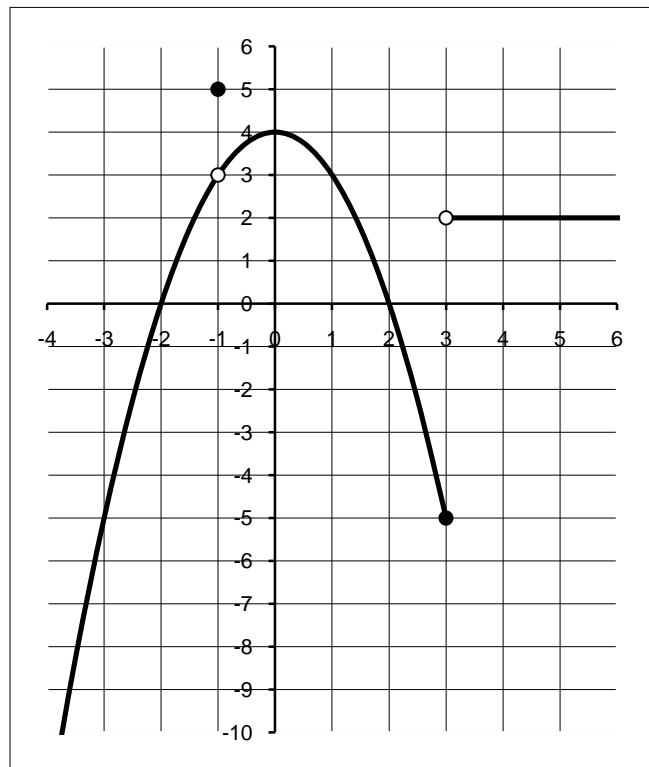
(g) $\lim\limits_{x \to 3^+} f(x) =$

(h) $\lim\limits_{x \to 3} f(x)$

(i) $f(3) =$

(j)   Is f continuous at x = 3? Why or why not? Use limits in your answer.

(k)   Is f continuous at x = 2? Why or why not? Use limits in your answer.

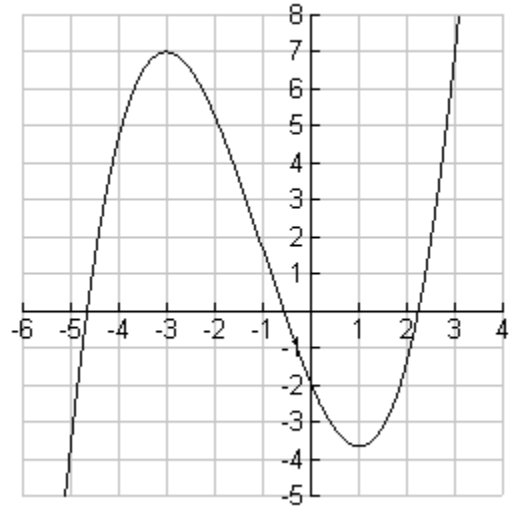3.   Find each limit algebraically. If the limit does not exist, state this.

(a) $\lim\limits_{x\to 3}\dfrac{5}{x}$

(b) $\lim\limits_{x\to 2}\dfrac{x}{x-2}$

(c) $\lim\limits_{x\to 3}\dfrac{x^2+5x-24}{x^2+x-12}$

4.   The graph of a function $f(x)$ is shown. Based on this graph, for each value of x given, state whether $f'(x)$ is positive, negative, or zero.
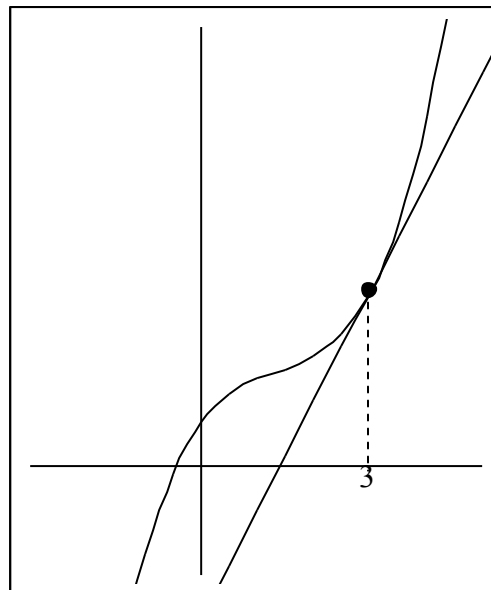
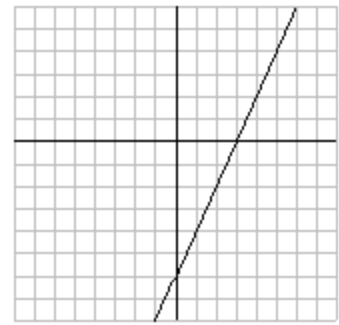| x	Is $f'(x)$ zero, negative or positive?
-4	
0	
1	

5.   The graph of a function $f(x)$ and its tangent line at x = 3 are shown. The equation of the tangent line is $y=10x-14$. Based on this graph, determine the value of

(a) $f(3)$

(b) $f'(3)$

Graph of f '(x)

9.   The graph of $f'(x)$, the derivative of a function f is shown.

(a)   On what intervals is the function f increasing?

(b)   On what intervals is the function f decreasing?

(c)   At what value of x, if any, does f have a local minimum?

(d)   At what value of x, if any, does f have a local maximum?

(e)   If it is also known that f(0) = 0, sketch a possible graph of f.

10.   Suppose it is known that $f'(x) > 0$ for all x and $f''(x) < 0$ for all x. Which of the following could be the graph of $f(x)$?