Section 10: The derivative as a function

10.1 Use the 4-step process to find the derivative of $f(x) = 3x + 1$. The steps:

(a) Find
$$f(x+h)$$

(b) Find
$$\frac{f(x+h) - f(x)}{h}$$

(c) Find
$$\frac{f(x+h) - f(x)}{h}$$

(d) Find
$$\lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$$

10.2 Use the 4-step process to find the derivative of $f(x) = 4x^2 - 2$. The steps:

(a) Find
$$f(x+h)$$

(b) Find
$$\frac{f(x+h) - f(x)}{h}$$

(c) Find
$$\frac{f(x+h) - f(x)}{h}$$

(d) Find
$$\lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$$

10.3 Use the 4-step process to find the derivative of$f(x) = -2x^2 + 3x - 1$. The steps:

(a) Find
$$f(x+h)$$

(b) Find
$$\frac{f(x+h) - f(x)}{h}$$

(c) Find
$$\frac{f(x+h) - f(x)}{h}$$

(d) Find

$$\lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$$

10.4 Use the rules to find the derivatives of the following functions.

(a) $f(x) = .02x^3$.

(b) $f(x) = .12x^{1/2}$.

(c) $f(x) = .01x$.

(d) $f(x) = 1.3x^{-1}$.

(e) $f(x) = -.02x^2 + 5x - 1$.

(f) $f(x) = -.12x^2 + 30x - 1200$.

10.5 Use the derivative function, $f'(x)$ to determine the interval(s) where the function

$$f(x) = -2x^2 + 12x - 9$$

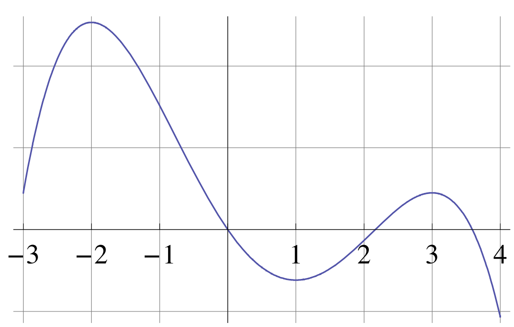
is increasing.

10.6 Use the derivative function, $f'(x)$ to determine the interval(s) where the function

$$f(x) = 3x^2 + 5x - 16$$

is increasing.

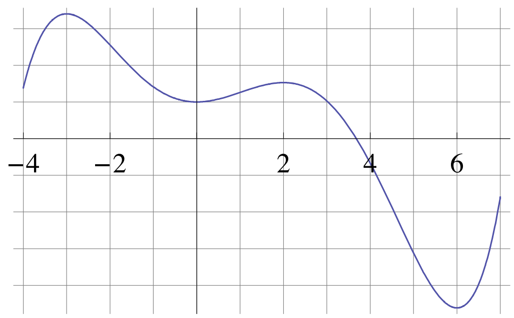
10.7 The graph of a function $g(x)$ is shown below.



(a) Find the interval(s) where the derivative, $g'(x)$ is positive.

(b) Find the values of x where the derivative, $g'(x) = 0$.

10.8 The graph of a function $f(x)$ is shown below.



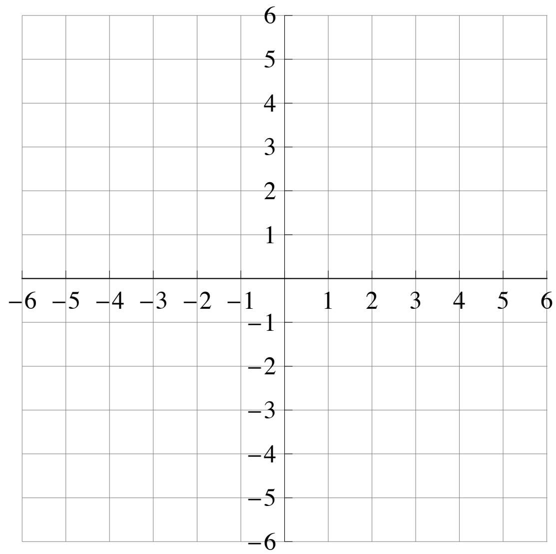
(a) Find the interval(s) where the derivative, $f'(x)$ is negative.

(b) Find the values of x where the derivative, $f'(x) = 0$.

10.9 Compute the derivative $h'(x)$ of the function

$$h(x) = x^2 - 2x + 1.$$

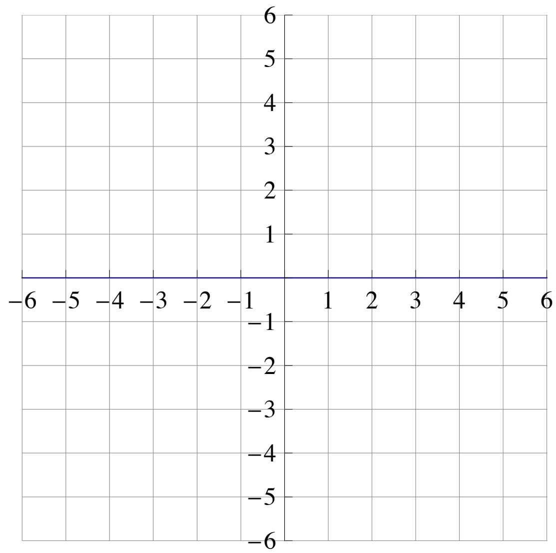
Draw the graph of $h'(x)$.



10.10 Compute the derivative $f'(x)$ of the function

$$f(x) = -2x^2 + 3x - 1.$$

Draw the graph of $f'(x)$.



10.11 Use the rules to find the derivative of $P(x) = R(x) - C(x)$ in terms of $R(x)$, $C(x)$, $R'(x)$ and $C'(x)$.

10.12 The demand function in terms of price is denoted by $f(p)$ where p is the price in dollars. Revenue is price times quantity sold and can be expressed in terms of price by

$$R(p) = p\,f(p)$$

(a) Find the derivative $R'(p)$ in terms of price. Your derivative will be in terms of p, $f(p)$ and $f'(p)$.

(b) What equation would you have to solve to determine where revenue was maximized?