

(1) For each function below, use this definition of the derivative function to compute $f'(x)$

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

a. $f(x) = \frac{2}{x}$

b. $f(x) = 3x^2 - x$

c. $f(x) = 3 - \sqrt{x+2}$

d. $f(x) = \frac{2x-1}{x^2}$

(2) Use the short-cut rules for differentiation to identify the derivatives of these functions:

a. $\frac{d}{dx}(3x^3) =$

f. $\frac{d}{dx}\left(\frac{x+1}{x}\right) =$

b. $\frac{d}{dx}(2x^6) =$

g. $\frac{d}{dx}\left(\frac{x^2-x}{x}\right) =$

c. $\frac{d}{dx}(4\sqrt{x}) =$

h. $\frac{d}{dx}(3x^3 + x^2 - x + 4) =$

d. $\frac{d}{dx}\left(\frac{3}{x^3}\right) =$

i. $\frac{d}{dx}\left(8\sqrt[3]{x} + \frac{3}{x}\right) =$

e. $\frac{d}{dx}\left(\frac{2x-1}{x^2}\right) =$

j. $\frac{d}{dx}\left((4x^2 - \sqrt[3]{x})(3x^5 + \sqrt{x})\right) =$

(3) For each graph below, sketch the graph of the derivative.





