Basic Differentiation Rules and Rates of Change

1. Find the derivative
(similar to p.136 #3-26)

$$f(x) = \sqrt[3]{x}$$

2. Find the derivative
(similar to p.136 #3-26)

$$f(x) = 5x^3 - 7x^2 + 4x - 1$$

3. Find the derivative
(similar to p.136 #3-26)

$$f(x) = \frac{1}{5}e^x + 4\cos x$$

4. Find the derivative
(similar to p.136 #27-32)

$$f(x) = \frac{2}{5x^3}$$

5. Find the derivative
(similar to p.136 #27-32)

$$f(x) = \frac{\sqrt[5]{x}}{x^2}$$

6. Find the slope of the graph of the function at the given point (similar to p.136 #33-40)

$$f(x) = 5(x-3)^2, \quad (2,5)$$

7. Find the slope of the graph of the function at the given point (similar to p.136 #33-40)

$$f(x) = \frac{5}{x^4}, \quad (1,5)$$

8. Find the slope of the graph of the function at the given point (similar to p.136 #33-40)

$$f(x) = -3\sin x + 2, \quad (0,2)$$

9. Find the derivative of the function (similar to p.136 #41-56)

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

10. Find the derivative of the function (similar to p.136 #41-56)

$$f(x) = \sqrt[4]{x} + \sqrt{x}$$

11. Find the derivative of the function (similar to p.136 #41-56)

$$f(x) = \frac{3}{\sqrt[4]{x}} - 2e^x - \sin x$$

12. Find the equation of the tangent line to the graph of f at the given point (similar to p.136 #57-60)

$$f(x)=\frac{-1}{\sqrt[5]{x^3}},\quad (1,-1)$$

13. Find the equation of the tangent line to the graph of f at the given point (similar to p.136 #57-60)

$$f(x)=\cos x+\frac{1}{3}e^x,\quad \left(\pi,-1+\frac{1}{3}e^{\pi}\right)$$

14. Determine the point(s) (if any) at which the graph of the function has a horizontal tangent line (similar to p.137 #61-68)

$$y=x^2-4$$

15. Determine the point(s) (if any) at which the graph of the function has a horizontal tangent line (similar to p.137 #61-68)

$$y=\sqrt{3}x-2\sin x,\quad 0\le x<2\pi$$

16. Determine the point(s) (if any) at which the graph of the function has a horizontal tangent line (similar to p.137 #61-68)

$$y=-3x+5e^x$$