

MORE PRACTICE WITH DERIVATIVES (chapter 3)

1.  $h'(y)$  for  $h(y) = \frac{\ln y}{1 - \ln y}$

2.  $f'(x)$  for  $f(x) = \frac{x^2 + 1}{x^3}$

3.  $f'(z)$  for  $f(z) = \frac{bz + a^6}{1 - b}$

4.  $\frac{d}{dx}((x+1)^3 e^{4x})$

5.  $f'(m)$  for  $f(m) = \frac{1}{\sec(2m)}$

6.  $x'(r)$  for  $x(r) = 3\sqrt{r} - \sqrt{\frac{3}{r}} + \frac{1}{3\sqrt{r}}$

7.  $y'(p)$  for  $y(p) = \ln \sqrt[3]{5 + p^2}$

8.  $\frac{dy}{dx}$  for  $x^2 y + (x + y)^2 = 5$

9.  $f'(t)$  for  $f(t) = \sin^{-1}\left(\frac{2}{t}\right)$

10.  $g'(\theta)$  for  $g(\theta) = \sqrt[3]{\tan(5\theta)}$

11.  $\frac{dy}{du}$  for  $y = 3^u + (\cot u)^3$

12.  $f'(x)$  for  $f(x) = \frac{ax^2}{(2-x)^3}$

13.  $h'(y)$  for  $h(y) = \frac{\cos y}{1 - \sin y}$

14.  $f'(t)$  for  $f(t) = \frac{t}{\sqrt{t^3 + 1}}$

15.  $g'(x)$  for  $g(x) = \begin{cases} \frac{x}{x^2 + 1} & x > 0 \\ xe^x & x \leq 0 \end{cases}$

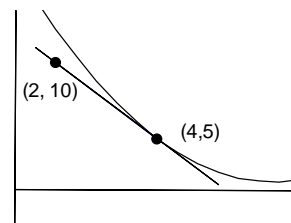
16.  $p'(x)$  for  $p(x) = \frac{ax^2 + bx + c}{d}$

17.  $\frac{d^2y}{d\theta^2}$  for  $y = \sin^2 \theta + \cos^2 \theta$

18. A graph of  $f(x)$  and its tangent line are shown at the right.

Find the following values.

- A.  $h'(2)$  for  $h(x) = f(x^2)$ .
- B.  $k'(4)$  for  $k(x) = (f(x))^2$ .
- C.  $g'(5)$  for  $g(x) = f^{-1}(x)$ .
- D.  $p'(4)$  for  $p(x) = \ln(f(x))$ .



19. Suppose  $f(t)$  models the number of motor vehicles (millions) registered in the world since 1980. Give a practical interpretation for each.

- A.  $f(20)$
- B.  $f^{-1}(400)$
- C.  $f'(20)$
- D.  $(f^{-1})'(400)$