

In problems 1-12 determine the first derivative of the given function. Use appropriate notation to label your answers.

1.  $f(x) = \sqrt{4x^2 - 5}$

2.  $g(x) = (3x + 8)^{10}$

3.  $y = e^{(4x^2 + x)}$

4.  $y = 9x^3\sqrt{x}$

5.  $F(x) = \sec(4x + 5)$

6.  $G(x) = \tan(x^2)$

7.  $y = \cos(x^2 + 4)$

8.  $y = e^{8x}$

9.  $y = 4^{x^2}$

10.  $y = \frac{3x^5 - 2x + 4}{x^3}$

11.  $h(x) = \cot(3x)$

12.  $y = 4^{\sqrt{3}} + \frac{1}{\sqrt[3]{2}}$

**In problems 13-18 find the first derivative of the given function. Use appropriate notation to label your answers and write your answers in simplified form.**

13.  $y = (3x + 4)^5(2x - 1)^6$

14.  $f(x) = \frac{3x}{x^4 + 1}$

**15.**  $g(x) = \sin((3x+1)^4)$

**16.**  $y = x^3 e^{x^2}$

**17.**  $y = x^3 (\sin x^2)$

**18.**  $y = (x + \sec x)^5$

In problems 19-23 find the specified derivative of the given function. Use appropriate notation to label your answers.

19.  $f(x) = x^2 e^{4x}$     **2<sup>nd</sup> derivative**

20.  $g(x) = \sin(x^3)$     **2<sup>nd</sup> derivative**

21.  $y = 3x^3 + 5x^2 - 4$     **3<sup>rd</sup> derivative**

22.  $y = \tan(6x)$     **2<sup>nd</sup> derivative**

23.  $y = \cos x$     **17<sup>th</sup> derivative**