

**MATH 12002**  
**Assignment #24**  
**Derivatives**

The following are the derivatives for the problems in Assignment #24 on §3.3. You *are* expected to compute the derivatives yourself on the homework, but these can be used to check your answers before graphing.

$$\begin{aligned} 22. \quad f(x) &= 2 + 3x - x^3 \\ f'(x) &= 3(1 + x)(1 - x) \\ f''(x) &= -6x \end{aligned}$$

$$\begin{aligned} 24. \quad g(x) &= 200 + 8x^3 + x^4 \\ g'(x) &= 4x^2(x + 6) \\ g''(x) &= 12x(x + 4) \end{aligned}$$

$$\begin{aligned} 25. \quad h(x) &= 3x^5 - 5x^3 + 3 \\ h'(x) &= 15x^2(x - 1)(x + 1) \\ h''(x) &= 60x \left(x + \frac{1}{\sqrt{2}}\right) \left(x - \frac{1}{\sqrt{2}}\right) \end{aligned}$$

$$\begin{aligned} 26. \quad h(x) &= (x^2 - 1)^3 \\ h'(x) &= 6x(x + 1)^2(x - 1)^2 \\ h''(x) &= 30(x + 1)(x - 1) \left(x + \frac{1}{\sqrt{5}}\right) \left(x - \frac{1}{\sqrt{5}}\right) \end{aligned}$$

$$\begin{aligned} 29. \quad C(x) &= x^{1/3}(x + 4) \\ C'(x) &= \frac{4}{3} \left(\frac{x + 1}{x^{2/3}}\right) \\ C''(x) &= \frac{4}{9} \left(\frac{x - 2}{x^{5/3}}\right) \end{aligned}$$

$$\begin{aligned} 30. \quad B(x) &= 3x^{2/3} - x \\ B'(x) &= \frac{2 - \sqrt[3]{x}}{\sqrt[3]{x}} \\ B''(x) &= -\frac{2}{3(\sqrt[3]{x})^4} \end{aligned}$$

$$\begin{aligned} 32. \quad f(t) &= t + \cos t \\ f'(t) &= 1 - \sin t \\ f''(t) &= -\cos t \end{aligned}$$