

# Sample answers

Math 30

Date: \_\_\_\_\_

Derivative Gateway Test

Name: \_\_\_\_\_

Find the derivative of each of the following functions. Do not simplify your answers.

Be careful when writing answers, since all errors count, including missing parentheses! No notes or calculators allowed.

Time Limit: 20 minutes.

5.  $h(t) = (t^2 - 6t)^4 - t + \sqrt{2}$

$$h'(t) = 4(t^2 - 6t)^3(2t - 6) - 1 + 0$$

38.  $g(x) = \sqrt{x} \ln(x-3) = (x^{1/2})(\ln(x-3))$

$$g'(x) = \left(\frac{1}{2} x^{-1/2}\right)(\ln(x-3)) + (x^{1/2})\left(\frac{1}{x-3}\right)(1)$$

60.  $f(s) = \frac{s+1}{(s+2)^5}$

$$f'(s) = \frac{(s+2)^5(1) - (s+1)(5(s+2)^4)}{((s+2)^5)^2}$$

75.  $f(x) = 4x - \sqrt{\frac{3}{x}} = 4x - \sqrt{3}(x^{-1/2})$

$$f'(x) = 4 - \sqrt{3}(-\frac{1}{2}x^{-3/2})$$

100.  $f(t) = e^{\sin(\pi t)}$

$$f'(t) = e^{\sin(\pi t)} (\cos(\pi t)) (\pi)$$

115.  $f(x) = \sqrt{\ln x} + ex^2 = (\ln x)^{1/2} + ex^2$

$$f'(x) = \frac{1}{2} (\ln x)^{-1/2} \left(\frac{1}{x}\right) + e(2x)$$

125.  $P(t) = P_0(1.07)^t$ , where  $P_0$  is a constant

$$P'(t) = P_0 (1.07^t) (\ln 1.07)$$