

Name SOLUTIONS

- No calculators allowed.
- Show sufficient work to justify each answer.
- You have 15 minutes for this quiz.

1. (2 points each) Differentiate the following functions.

(a) $y = (2x + 5)^6$

$$\frac{dy}{dx} = 6(2x+5)^5 (2x+5)'$$

$$dy/dx = 6(2x+5)^5 (2)$$

$$dy/dx = 12(2x+5)^5$$

(b) $g(x) = \sin^5 x = (\sin x)^5$

$$g'(x) = 5(\sin x)^4 (\sin x)'$$

$$g'(x) = 5 \sin^4 x \cos x$$

2. (3 points each) Differentiate the following functions.

(a) $h(t) = t^3 e^{-2t}$

$$h'(t) = (t^3)'(e^{-2t}) + (t^3)(e^{-2t})'$$

$$h'(t) = 3t^2 e^{-2t} + t^3 e^{-2t}(-2t)'$$

$$h'(t) = 3t^2 e^{-2t} - 2t^3 e^{-2t}$$

(b) $f(x) = \frac{1}{\sqrt{\sin(e^{4x})}} = (\sin(e^{4x}))^{-1/2}$

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

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

$$f'(x) = -\frac{1}{2} \sin(e^{4x})^{-3/2} \cos(e^{4x}) e^{4x} \cdot 4$$

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