

SOLUTIONS TO FIRST PRACTICE TEST

$$1) f'(x) = 2 \cdot 6^{7x} \cdot \ln 6 \cdot 7 - 8e^{2x} \cdot 2 - 0$$

$$f'(x) = 14 \cdot 6^{7x} \ln 6 - 16e^{2x}$$

$$f'(x) = 2(7 \cdot 6^{7x} \ln 6 - 8e^{2x})$$

$$3) g'(x) = \frac{(7+6x)(-3) - (11-3x) \cdot 6}{(7+6x)^2}$$

$$g'(x) = \frac{-21 - 18x - 66 + 18x}{(7+6x)^2}$$

$$g'(x) = \frac{-87}{(7+6x)^2}$$

$$4) f(x) = \frac{7 \sin(2x)}{3x^7}$$

$$f'(x) = \frac{3x^7 \cdot 7 \cos(2x) \cdot 2 - 7 \sin(2x) \cdot 21x^6}{(3x^7)^2}$$

$$f'(x) = \frac{42x^7 \cos(2x) - 147x^6 \sin(2x)}{9x^{14}}$$

$$f'(x) = \frac{2x^6 (2x \cos(2x) - 7 \sin(2x))}{9x^{14}}$$

$$f'(x) = \frac{7(2x \cos(2x) - 7 \sin(2x))}{3x^8}$$

$$2) h(x) = 5(8+3x^2)^{-1/4}$$
$$h'(x) = -\frac{5}{4}(8+3x^2)^{-5/4} \cdot 6x$$

~~$$h'(x) = \frac{-15x}{2\sqrt[4]{(8+3x^2)^5}}$$~~

$$h'(x) = \frac{-15x}{2\sqrt[4]{(8+3x^2)^5}}$$

$$5) f'(x) = 3x^4 \cdot 3e^{3x} + e^{3x} \cdot 12x^3$$

$$f'(x) = 9x^4 e^{3x} + 12x^3 e^{3x}$$

$$f'(x) = 3x^3 e^{3x} (3x+4)$$

$$6) g(x) = [\sin(3x^3)]^{10}$$

$$g'(x) = 10 [\sin(3x^3)]^9 \cdot \cos(3x^3) \cdot 9x^2$$

$$g'(x) = 90x^2 \cdot \sin^9(3x^3) \cdot \cos(3x^3)$$

$$7) x^2 + 4y^3 = 10 - x$$

$$2x + 12y^2 \frac{dy}{dx} = -1$$

$$2 \cdot 2 + 12 \cdot 1^2 \frac{dy}{dx} = -1$$

$$4 + 12 \frac{dy}{dx} = -1$$

$$12 \frac{dy}{dx} = -5$$

$$\frac{dy}{dx} = \frac{-5}{12} = m$$

$$1 = \frac{-5}{12} \cdot 2 + b$$

$$1 = \frac{-5}{6} + b$$

$$\frac{11}{6} = b$$

$$y = -\frac{5}{12}x + \frac{11}{6}$$

$$8) 3x^4 + 8x^4 y^3 + 2y = 13 - 2x^2$$

$$12x^3 + 8x^4 \cdot 3y^2 \frac{dy}{dx} + y^3 \cdot 32x^3 + 2 \frac{dy}{dx} = -4x$$

$$24x^4 y^2 \frac{dy}{dx} + 2 \frac{dy}{dx} = -4x - 12x^3 - 32x^3 y^3$$

$$\frac{dy}{dx} (24x^4 y^2 + 2) = -4x - 12x^3 - 32x^3 y^3$$

$$\frac{dy}{dx} = \frac{-4x - 12x^3 - 32x^3 y^3}{24x^4 y^2 + 2}$$

FACTOR AND CANCEL 2

$$\frac{dy}{dx} = \frac{-2x - 6x^3 - 16x^3 y^3}{12x^4 y^2 + 1}$$

$$9) a) h(t) = -16t^2 + v_0 t + h_0 = -16t^2 + 96t + 112$$

$$v(t) = h'(t) = -32t + 96$$

$$a(t) = h''(t) = -32$$

$$b) -32t + 96 = 0$$

$$-32t = -96$$

$$t = 3 \text{ seconds}$$

$$c) h(3) = -16 \cdot 3^2 + 96 \cdot 3 + 112$$

$$= -144 + 288 + 112$$

$$= 256 \text{ ft}$$

$$d) -16t^2 + 96t + 112 = 0$$

$$-16(t^2 - 6t - 7) = 0$$

$$-16(t-7)(t+1) = 0$$

$$t = 7 \text{ seconds}$$

$t = -1$
doesn't work

$$e) v(7) = -32 \cdot 7 + 96$$

$$= -128 \text{ ft/sec}$$