

TEST TOMORROW - you may use your note card with formulas.

Let's practice some more.

Find $f'(x)$.

$$1) f(x) = -11x^5 + 17x^3 - 3x^2 - x$$

$$f'(x) = -55x^4 + 51x^2 - 6x - 1$$

$$2) f(x) = 6\cos x - 3e^{7x}$$

$$f'(x) = -6\sin x - 3e^{7x} \cdot 7$$

$$= -6\sin x - 21e^{7x}$$

$$= 3(-2\sin x - 7e^{7x})$$

$$\text{OR} \\ -3(2\sin x + 7e^{7x})$$

$$4) f(x) = \frac{8x - 1}{6x + 11}$$

$$f'(x) = \frac{(6x+11)8 - (8x-1)6}{(6x+11)^2}$$

$$f'(x) = \frac{48x + 88 - 48x + 6}{(6x+11)^2}$$

$$f'(x) = \frac{94}{(6x+11)^2}$$

$$6) f(x) = -3x^{10} \ln x$$

$$f'(x) = -3x^{10} \left(\frac{1}{x}\right) + \ln x (-30x^9)$$

$$= -3x^9 (1 + 10 \ln x)$$



$$3) f(x) = 4x^8 e^{6x}$$

$$f'(x) = 4x^8 \cdot 6e^{6x} + e^{6x} \cdot 32x^7$$

$$f'(x) = 24x^8 e^{6x} + 32x^7 e^{6x}$$

$$f'(x) = 8x^7 e^{6x} (3x + 4)$$

$$5) f(x) = \cos^8(7e^x) = (\cos(7e^x))^8$$

$$f'(x) = 8(\cos(7e^x))^7 \cdot (-\sin(7e^x)) \cdot 7e^x$$

$$f'(x) = -56e^x \cos^7(7e^x) \sin(7e^x)$$

$$7) f(x) = 8^x - x^e + e^{10}$$

$$f'(x) = 8^x \ln 8 - ex^{e-1}$$



$$-3x^9 - 30x^8 \ln x$$

$$8) f(x) = \sqrt[7]{8x^3 - 5}$$

$$f(x) = (8x^3 - 5)^{1/7}$$

$$f'(x) = \frac{1}{7} (8x^3 - 5)^{-6/7} \cdot 24x^2$$
$$= \frac{24x^2}{7 \sqrt[7]{(8x^3 - 5)^6}}$$

$$9) f(x) = x^{11} \sin(8x)$$

$$11x^{10} \sin(8x) + 8x^{11} \cos(8x)$$
$$x^{10} (11 \sin(8x) + 8x \cos(8x))$$

$$10) f(x) = \frac{\cos(12x)}{3x^{10}}$$

$$f'(x) = \frac{3x^{10} (-\sin(12x)) \cdot 12 - \cos(12x) \cdot 30x^9}{(3x^{10})^2}$$

$$f'(x) = \frac{-36x^{10} \sin(12x) - 30x^9 \cos(12x)}{9x^{20}}$$

$$f'(x) = \frac{-2 \cancel{6x^9} (6x \sin(12x) + 5 \cos(12x))}{3 \cdot 9x^{20}}$$

$$f'(x) = \frac{-2(6x \sin(12x) + 5 \cos(12x))}{3x^{11}}$$

Find $\frac{dy}{dx}$ if $7x^3 y^9 - 3x^2 + 8y = 7y^4 - 11x$

$$7x^3 \cdot 9y^8 \frac{dy}{dx} + y^9 \cdot 21x^2 - 6x + 8 \frac{dy}{dx} = 28y^3 \frac{dy}{dx} - 11$$

$$63x^3 y^8 \frac{dy}{dx} + 8 \frac{dy}{dx} - 28y^3 \frac{dy}{dx} = -21x^2 y^9 + 6x - 11$$

$$\frac{dy}{dx} = \frac{-21x^2 y^9 + 6x - 11}{63x^3 y^8 - 28y^3 + 8}$$