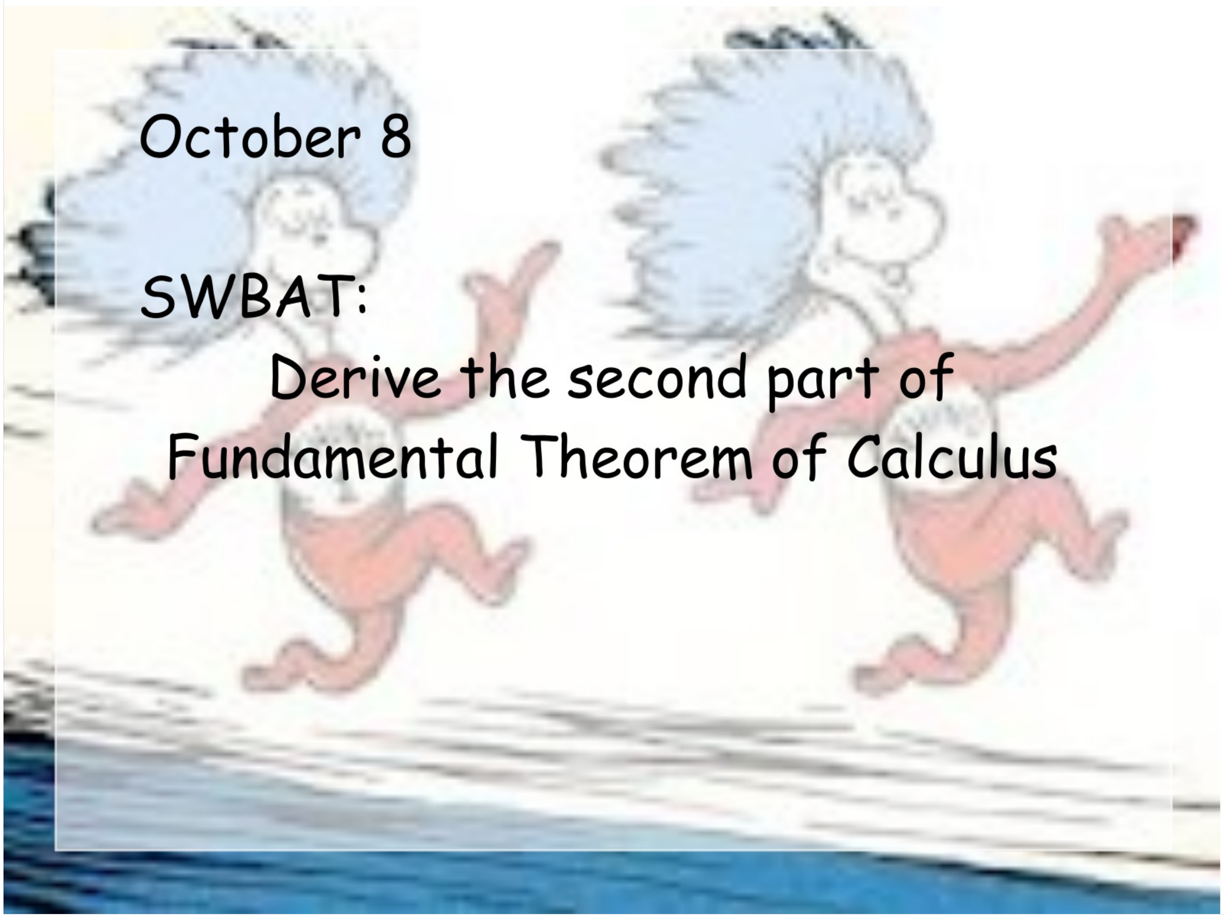


October 8

SWBAT:

Derive the second part of Fundamental Theorem of Calculus

1. $f(x) = (10 + 2x)^5$ $f'(x) = 5(10+2x)^4(2)$

2. $h(x) = (3x - 5)^2$

3. $g(t) = (3t^2 + 18)^4$

4. $p(y) = (3y - y^2)^3$

5. $S(w) = (2w + 1)^3$

6. $g(r) = (5r - 4)^{-2}$

7. $n(d) = \dfrac{1}{(7d + d^3)^7}$

8. $w(b) = (4b^3 + 2b^2 - b^{-1})^3$

9. $s(k) = \sqrt{(2k + k^2)}$ $= (2k+k^2)^{1/2}$

$s'(k) = \frac{1}{2}(2k+k^2)^{-1/2}(2+2k)$

10. $q(a) = \sqrt[5]{(4a^3)}$

$q(a) = (4a^3)^{1/5}$

1) $F(x^2+5x) \to F'(x^2+5x)(2x+5)$

2) $G(\sin(x)) \to G'(\sin x)(\cos x)$

3) $H(e^x+\tan(x)) \to H'(e^x+\tan x)(e^x+\sec^2 x)$

4) $F\left(\frac{x^3}{6}\right) \to F'\left(\frac{x^3}{6}\right)\left(\frac{3x^2}{6}\right) = F'\left(\frac{x^3}{6}\right)\left(\frac{x^2}{2}\right)$

$\frac{x^3}{6} = \frac{1}{6}(x^3)$

5) $M\left(5x-\frac{1}{x^2}\right)$

6) $P(\cot(x)+6x^4)$

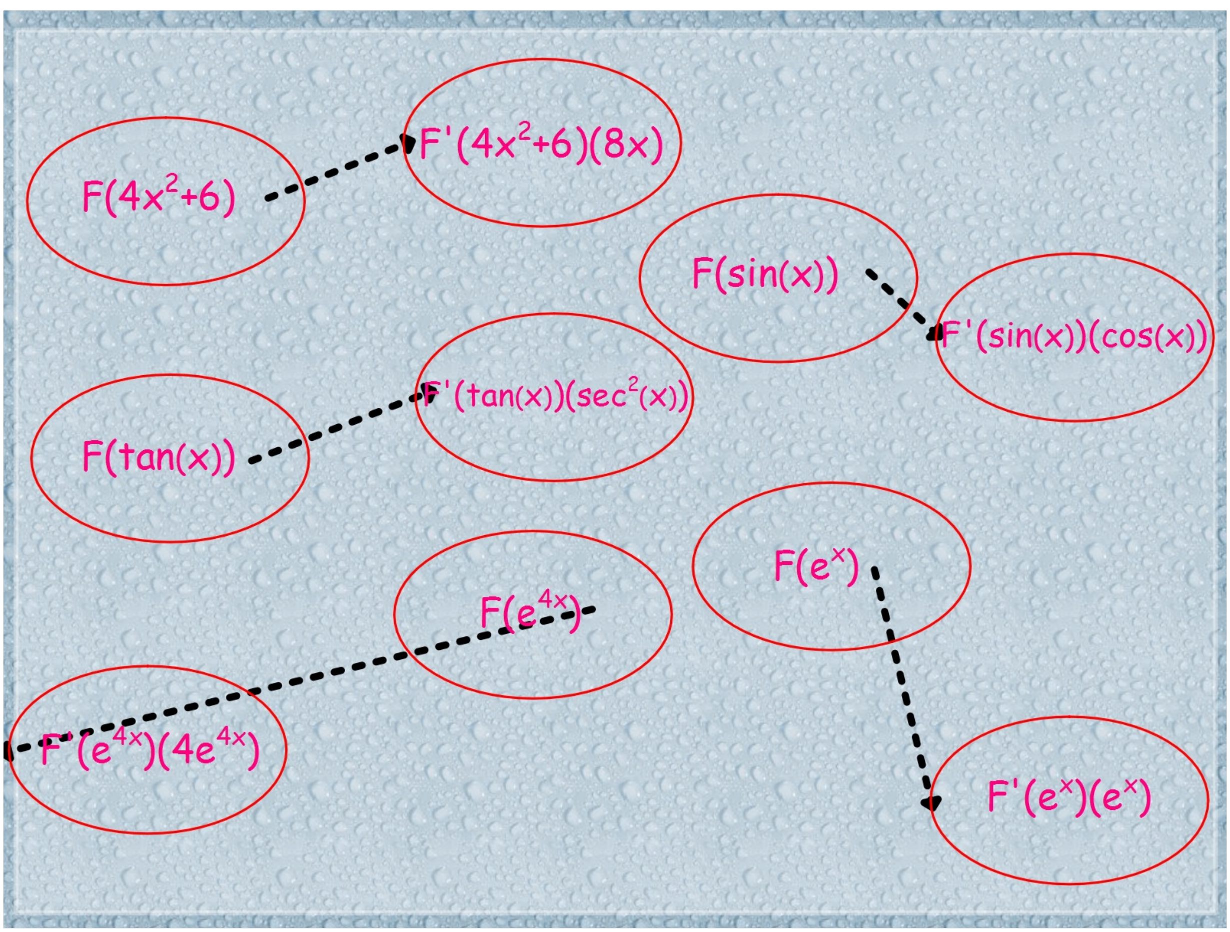
7) $F(\ln(x)+5e^x) \to F'(\ln(x)+5e^x)\left(\frac{1}{x}+5(e^x)\right)$

8) $N(x^6-7x^2+\sin(x))$

9) $F\left(4^x - x^{2/3}\right) \to F'\left(4^x-x^{2/3}\right)\left(4^x(\ln 4) - \frac{2}{3}x^{-1/3}\right)$

10) $F\left(\frac{x^4}{2}-\frac{x+3}{x^2-7}\right)$

$$F'\left(\frac{x^4}{2}-\frac{x+3}{x^2-7}\right)\left(\frac{4x^3}{2}-\frac{1(x^2-7)-2x(x+3)}{(x^2-7)^2}\right)$$



$$\frac{d}{dx}\left(\int_3^x \sqrt{\sin(e^t)+3}\,dt\right)$$

$$\frac{d}{dt}(?) = \sqrt{\sin(e^t)+3} = F'(t) \quad ? = F(t)$$

$$\cancel{? = \left(-\cos(e^t)+3x\right)^{3/2}}$$

$$\cancel{\frac{d(?)}{dt} = \frac{3}{2}\left(-\cos e^t+3x\right)^{1/2}}\left(\sin e^t+3\right)$$

$$\frac{d}{dx}\left(\int_3^x \sqrt{\sin e^t+3}\,dt\right)$$

$$= \frac{d}{dx}\left(F(t)\Big|_3^x\right) = \frac{d}{dx}\left(F(x)-F(3)\right)$$

$$= F'(x)(1) - F'(3)(0) = F'(x)(1)$$

$$= \sqrt{\sin(e^x)+3}$$

$$\frac{d}{dx}\left(\int_7^{x^2} e^{\cos t}\,dt\right)$$

$$\frac{d}{dt}(?) = e^{\cos t} = F'(t)$$

$$? = F(t)$$

$$\frac{d}{dx}\left(\int_7^{x^2} e^{\cos t}\,dt\right) = \frac{d}{dx}\left(F(t)\Big|_7^{x^2}\right)$$

$$= \frac{d}{dx}\left(F(x^2)-F(7)\right)$$

$$= F'(x^2)(2x) - F'(7)(0)$$

$$= F'(x^2)(2x)$$

$$= e^{\cos x^2}(2x)$$