

APPL. OF INTEGRATION REVIEW

particular - find C

general - leave C

$$\frac{d^2 y}{dx^2} = (6x-2)^5 dx \quad u = 6x-2$$

$$\int \frac{d^2 y}{dx^2} = \int u^5 \cdot \frac{du}{6} \quad \frac{du}{6} = dx$$

$$\frac{dy}{dx} = \frac{1}{6} \frac{u^6}{6} + C$$

$$\int \frac{dy}{dx} = \int \frac{1}{36} u^6 + C$$

$$\int \frac{1}{36} (6x-2)^6 + C$$

$$y = \frac{1}{36} \int u^6 \cdot \frac{du}{6} + C$$

$$y = \frac{1}{216} \cdot \frac{u^7}{7} + C_1 x + C_2$$

$$= \frac{1}{1512} (6x-2)^7 + C_1 x + C_2$$

Hare = 50¹⁵⁰ yds behind turtle
 accel. = at 3 ft/s²

Turtle = not accel.
 0.5 ft/sec
 10 ft. to finish

s=160	s=10	
v=0	v=0.5	0
a=3	a=0	
t=0	t=0	

Hare
 $a(t) = 3$
 $v(t) = 3t + C$
 $0 = 0$
 $v(t) = 3t$
 $s(t) = \frac{3}{2}t^2 + C$
 $160 = 0 + C$
 $s(t) = \frac{3}{2}t^2 + 160$

Turtle
 $v = 0.5$
 $s(t) = 0.5t + C$
 $10 = 0 + C$
 $s(t) = 0.5t + 10$
 $\frac{3}{2}t^2 + 160 = 0.5t + 10$
 $1.5t^2 - 0.5t - 150 = 0$
 $0.5(3t^2 - t - 300) = 0$

$$\frac{1 \pm \sqrt{1 - 4(3)(-300)}}{2(3)}$$

$$\frac{1 \pm \sqrt{3601}}{6} = 10.2$$

~~-9.8~~

$$6 \quad \int \frac{dR}{dx} = \int \text{marg Rev}$$

R = solve for C

b) Profit = R - C

c) Optimization

1) Find critical pts
 $f'(x) = 0$

2) Set interval

3) Test interval pts + crit pts

WorkKnow $F(x) = Kx$ Hyperbolic

$$\frac{d}{dx} \cosh x = \sinh x$$

$$\frac{d}{dx} \operatorname{sech} x = -\operatorname{sech} x \tanh x$$