

Math 1171

Homework #11

3.8 #12

3.9 #10, 15, 60

3.8 #12 $\sqrt[8]{500}$: $f(x) = x^8 - 500$
 $f'(x) = 8x^7$

Start with $x_1 = 2$.

$$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} = 2 - \frac{2^8 - 500}{8 \cdot 2^7} = 2.23828125$$

$$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = 2.180559717$$

$$x_4 = 2.174616751$$

$$x_5 = 2.174559281$$

$$x_6 = 2.174559276$$

$$x_7 = \underline{2.174559276}$$

#10

$$(x-5)^2 = x^2 - 10x + 25$$

antideriv is

$$\frac{1}{3}x^3 - 10 \cdot \frac{1}{2}x^2 + 25x + C$$

#15

$$f(t) = \frac{2t - 4 + 3\sqrt{t}}{\sqrt{t}} = (2t - 4 + 3t^{1/2}) t^{-1/2}$$

$$= 2t^{1/2} - 4t^{-1/2} + 3$$

so

$$F(t) = 2 \cdot \frac{1}{3/2} t^{3/2} - 4 \cdot \frac{1}{1/2} t^{1/2} + 3t + C$$

$$= \frac{4}{3} t^{3/2} - 8t^{1/2} + 3t + C$$

#60

$$V(t) = t^2 - 3\sqrt{t}, \quad s(4) = 8$$

$$V(t) = t^2 - 3t^{1/2}$$

so

$$s(t) = \frac{1}{3} t^3 - 3 \cdot \frac{1}{3/2} t^{3/2} + C$$

$$s(t) = \frac{1}{3} t^3 - 2t^{3/2} + C$$

plug in $t=4$, $s(4) = 8$

$$8 = \frac{1}{3} \cdot 4^3 - 2 \cdot 4^{3/2} + C$$

$$8 = \frac{64}{3} - 16 + C$$

$$C = \frac{8}{3}$$

so

$$\underline{s(t) = \frac{1}{3} t^3 - 2t^{3/2} + \frac{8}{3}}$$