

# Assignment 4.5 Even Answers

2, 4, 6, 8, 10, 12, 20, 28, 30, 32, 38

2) a)  $L(x) = 5 - \frac{4}{5}(x-4)$

b)  $f(-3.9) \approx 4.9204$

$L(-3.9) = 4.92$

A difference of less than  $10^{-3}$

4) a)  $L(x) = x$

b)  $f(0.1) \approx 0.0953$

$L(0.1) = 0.1$

A difference of less than  $10^{-2}$

6) a)  $L(x) = -x + \frac{\pi}{2}$

b)  $f(0.1) \approx 1.47063$

$L(0.1) \approx 1.47080$

A difference of less than  $10^{-3}$

8) a)  $1 - 6x$     b)  $2 + 2x$

10) a)  $|f(x) - L(x)| \approx 0.021 < 10^{-1}$

b)  $|f(x) - L(x)| \approx 9 \cdot 10^{-6} < 10^{-5}$

12) Center = 8

$L(x) = 2 + \frac{1}{12}(x-8)$

20) a)  $dy = \frac{2-2x^2}{(1+x^2)^2} dx$

b)  $dy = -0.024$

28) a)  $\Delta f = 0.231$

b)  $df = 0.2$

c)  $|\Delta f - df| = 0.031$

30) a)  $\Delta f = 0.04060401$

b)  $df = 0.04$

c)  $|\Delta f - df| = 0.00060401$

32) Change in surface area is

$dS = 8\pi a dr$

38) a) Change in area is

$dA = 0.08\pi \approx 0.2513$

b)  $\frac{dA}{A} = \frac{0.08\pi}{4\pi} = 0.02 = 2\%$

The pages that follow contain selected solutions worked out in class

1.5) 1b)  $f(2.1) = (2.1)^3 - 2(2.1) + 3$   
 $L(2.1) = 10(2.1 - 2) + 7$  } Compare

8)  $(1+x)^k \approx 1+kx$  (centered at 0)

a)  $f(x) = (1-x)^6 \approx 1-6x$

b)  $f(x) = 2(1-x)^{-1} \approx 2(1+x) \approx 2+2x$

37) a)  $f(0) = 1$   $(0, 1)$   $f'(0) = \cos 0 = 1$

$L(x) = 1(x-0) + 1 = x+1$

b)  $f(0.1) \approx L(0.1) = 0.1 + 1 = (1.1)$

4.5

$$10) (1+x)^k \approx 1+kx$$

$$a) (1.002)^{100} = (1 + .002)^{100} \quad x = 0.002 \quad k = 100$$

$$\approx 1 + 100(.002) = 1 + .2 = \textcircled{1.2}$$

$$b) (1 + 0.009)^{\frac{1}{3}}$$

#12 choose 8 as center because  $\sqrt[3]{8} = 2$

$$f'(x) = \frac{1}{3} x^{-\frac{2}{3}} = \frac{1}{3 \sqrt[3]{x^2}} \Rightarrow f'(8) = \frac{1}{3 \sqrt[3]{64}} = \frac{1}{12}$$

$$L(x) = \frac{1}{12}(x-8) + 2$$