Section 3.9 (page 240)

1. $T(x) = 4x - 4$

x	1.9	1.99	2	2.01	2.1
$f(x)$	3.610	3.960	4	4.040	4.410
$T(x)$	3.600	3.960	4	4.040	4.400

3. $T(x) = 80x - 128$

x	1.9	1.99	2	2.01	2.1
$f(x)$	24.761	31.208	32	32.808	40.841
$T(x)$	24.000	31.200	32	32.800	40.000

5. $T(x) = (\cos 2)(x - 2) + \sin 2$

x	1.9	1.99	2	2.01	2.1
$f(x)$	0.946	0.913	0.909	0.905	0.863
$T(x)$	0.951	0.913	0.909	0.905	0.868

7. $\Delta y = 0.331$; $dy = 0.3$ **9.** $\Delta y = -0.039$; $dy = -0.040$

11. $6x\,dx$ **13.** $-\dfrac{3}{(2x-1)^2}\,dx$ **15.** $\dfrac{1-2x^2}{\sqrt{1-x^2}}\,dx$

17. $(3 - \sin 2x)\,dx$ **19.** $-\pi \sin\left(\dfrac{6\pi x - 1}{2}\right) dx$

21. (a) 0.9 (b) 1.04 **23.** (a) 1.05 (b) 0.98

25. (a) 8.035 (b) 7.95 **27.** $\pm\frac{5}{8}$ in.^{2} **29.** $\pm 8\pi$ in.^{2}

31. (a) $\frac{5}{6}\%$ (b) 1.25%

33. (a) $\pm 5.12\pi$ in.^{3} (b) $\pm 1.28\pi$ in.^{2} (c) 0.75%, 0.5%

35. 80π cm^3 **37.** (a) $\frac{1}{4}\%$ (b) 216 sec = 3.6 min

39. (a) 0.87% (b) 2.16% **41.** 6407 ft

43. $f(x) = \sqrt{x}$, $dy = \dfrac{1}{2\sqrt{x}}\,dx$

$f(99.4) \approx \sqrt{100} + \dfrac{1}{2\sqrt{100}}(-0.6) = 9.97$

Calculator: 9.97

45. $f(x) = \sqrt[4]{x}$, $dy = \dfrac{1}{4x^{3/4}}\,dx$

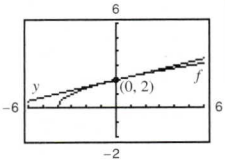
$f(624) \approx \sqrt[4]{625} + \dfrac{1}{4(625)^{3/4}}(-1) = 4.998$

Calculator: 4.998

47. $y - f(0) = f'(0)(x - 0)$

$y - 2 = \frac{1}{4}x$

$y = 2 + x/4$



49. The value of dy becomes closer to the value of Δy as Δx decreases.

51. (a) $f(x) = \sqrt{x}$; $dy = \dfrac{1}{2\sqrt{x}}\,dx$

$f(4.02) \approx \sqrt{4} + \dfrac{1}{2\sqrt{4}}(0.02) = 2 + \dfrac{1}{4}(0.02)$

(b) $f(x) = \tan x$; $dy = \sec^2 x\,dx$

$f(0.05) \approx \tan 0 + \sec^2(0)\,(0.05) = 0 + 1(0.05)$

53. True **55.** True