

REVIEW ANSWERS (I hope that I have keyed them in carefully and that they are the right answers)

$$1. \text{ (a) } S = \frac{\pi}{4} \left[(1 + 2 \sin 0) + \left(1 + 2 \sin \frac{\pi}{4}\right) + \left(1 + 2 \sin \frac{\pi}{2}\right) + \left(1 + 2 \sin \frac{3\pi}{4}\right) \right]$$

$$= \frac{3 + \sqrt{2}}{2} \pi \approx 6.934$$

$$\text{(b) } A = 2 \left[\frac{1}{2} (f(0) + 2f(2) + 2f(4) + 2f(6) + 2f(8) + f(10)) \right]$$

$$= [2 + 4 + 20 + 52 + 100 + 82] = 260$$

$$\text{(c) } \int_{.2698}^{2.248} [(1 + 2 \sin x) - (x^2 - 2x + 2)] dx$$

$$\text{(d) } \pi \int_{.2698}^{2.248} [(1 + 2 \sin x)^2 - (x^2 - 2x + 2)^2] dx$$

$$\text{(e) } \frac{\pi}{8} \int_{.2698}^{2.248} [(1 + 2 \sin x) - (x^2 - 2x + 2)]^2 dx$$

2. (a) 36,409 microbes per day

(b) draw a graph--constant value for daily microbe growth that would produce the same total accumulated microbes as integration does--the "ideal" height for a single rectangle Riemann sum. You should get (for the 10 days) a value about 364 (100's of microbes) so 36,400

(c) 3,640,957 microbes

$$3. \text{ (a) } \frac{1}{6} \sin(3x^2) + C$$

$$\text{(b) } \frac{1}{9} \ln|8 + 3x^3| + C$$

$$\text{(c) } -\frac{5}{3} e^{\cos 3x} + C$$

$$\text{(d) } \ln|1 + \tan x| + C$$

$$\text{(e) } \frac{\sin^4 4x}{16} + C$$

$$4. \text{ (a) } v(3) = 24 \frac{\text{ft}}{\text{sec}}$$

$$\text{(b) } 31.5 \text{ ft}$$

$$5. \text{ (a) } g(1) = 0 \quad g(4) = \frac{9}{2} \quad g(-1) = 3$$

(b) rel max at $x = -2$ and $x = 4$ (don't forget to use a number line to justify or discuss increasing and decreasing nature of the function or something else that explains it)

(c) $(-2, 1) \cup (4, 5)$

(d) $g(4) = \frac{9}{2}$ $g'(4) = 0$ $y = \frac{9}{2}$

(e) $x = -1$ and $x = 3$ (don't forget to use a number line to justify or discuss the change of concavity)

6. (a) 12 (b) 24.5 (c) 28

7. (a) $\frac{1}{1+x^2}$ (b) $e^2 \cos 2$

8. (a) You draw the graphs. $(1.150, 2.122), (7.025, 3.1518)$
(b) 38.799

9. $\frac{1}{5} \int_2^{17} \left(\frac{u-2}{5} \right)^2 \sqrt{u} du$

10. (a) $\frac{dy}{dt} = ky$ (b) $y = 20e^{\frac{\ln 25}{3}t}$

11. (a) e (b) 28

12. .3516

13. (a) $y = e^{\frac{x^2}{2}-7}$ (b) $9y^2 = 2x^3 - 6x + 36$ or more precisely
 $y = \frac{\sqrt{2x^3 - 6x + 36}}{3}$

14. .206

15. (a) $w = 5000 - 4900e^{-\frac{\ln(40)}{49}t} = 5000 - 4900e^{-.0507t}$ (b) 5000 (c) 63 weeks