6.3

2. $y = 4x^2 + \ln|x| + C$
4. $r = -3\cos p + C$
8. $s = -16t^2 + 100t + 50$
12. a. $y = x^2 + x + C$
    c. $y = x^2 + x + 3$
18. $5/6$ mile
22. a. $v(t) = 1.6t$, b. $s(t) = .8t^2 + s_0$ where s_0 is its initial height.

6.4

4.

x	0	.5	1	1.5	2
$I(x)$	0	.50	1.09	2.03	3.65

14. $\cos\left(x^2\right)$
16. $\arctan\left(x^2\right)$
18. $-\ln x$
22. a. $F'(x) = \frac{1}{\ln x}$. b. $F(x)$ is increasing. Since $F''(x) = -\frac{1}{x(\ln x)^2} < 0$ for $x > 2$, it must be concave down

6.5

2. $h(t) = -4.9t^2 - 20t + 250$ meters
6.He goes 10 ft and is in the air for 4 seconds.
8. a. $t = \frac{s}{\frac{1}{2}v_{\max}}$, where t is the time it takes for an object to travel the distance s, starting from rest with uniform acceleration a. $v_{\max}$ is the highest velocity the object reaches. Since its initial velocity is 0, the mean of its highest velocity and initial velocity is $\frac{1}{2}v_{\max}$.

b. Look at problem 7. $s = \frac{1}{2}gt^2$ where g is the acceleration of gravity so it takes $\sqrt{200/32} = 5/2$ seconds for the body to hit the ground. Since $v = gt$, $v_{\max} = 32(5/2) = 80$ ft/s Galileo's statement predicts $100/40 = 5/2$ seconds, so his result is verified.

c. If the acceleration is a constant a, then $s = \frac{1}{2}at^2$ and $v_{\max} = at$, thus

$$\frac{s}{\frac{1}{2}v_{\max}} = \frac{\frac{1}{2}at^2}{\frac{1}{2}at} = t.$$

7.1

12. $\frac{1}{6}\left(x^2+3\right)^3+C$
20. $\frac{1}{7}\sin^7\theta+C$
50. $1/\pi$
66. $\ln 3$
68. $\frac{2V_0}{\omega}$
74. a. At $t=0$ the rate is $50,000$ liters/min, at $t=60$ the rate is $15,060$ liters/min.
    b. $1,747,000$ liters.