#46 p 324: 5, 7, 9

#47 p 325-26: 17, 19, 20, 21, 22, 35, 41, 43, 45, 58, 59, 61, 63

20. $\int_2^5 x\sqrt{1+x^3}\,dx$

21. $\int_2^7 (5x^3 - 4x)\,dx$

22. $\int_1^3 \frac{x}{x^2+4}\,dx$

58. $\int_4^8 f(x)\,dx = 1.4$

#49 – #52 ALL SOLUTIONS ARE IN PRINCETON REVIEW BOOKS

#53 p 335-338: 2, 3, 9-13 (ODD), 25-29 (ODD)

2. $g(x) = \int_0^x f(t)\,dt$

a. $g(0) = \int_0^0 f(t)\,dt = 0$

$g(1) = \int_0^1 f(t)\,dt = \frac{1}{2}$

$g(2) = 0$

$g(3) = -\frac{1}{2}$

$g(4) = 0$

$g(5) = 1.5$

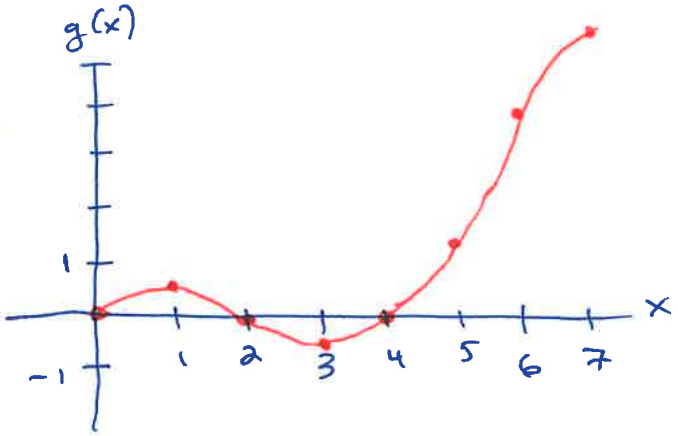
$g(6) = 4$

b. $g(7) \approx 5.75$

c. MAX WHEN $x = 7$

MIN WHEN $x = 3$

d.



#54 p 335-38: 15-19 (ODD), 31-45 (ODD), 47-53 (ODD), 63, 71

#55 - #56 P.R.

#57 p 346: 51, 53, 56, 57, 58, 59, 60

56. $\int_3^5 f(x)\,dx$ REPRESENTS THE ELEVATION DIFFERENCE WHEN COMPARING THE ELEVATION AT MILE 3 TO THE ELEVATION AT MILE 5 ON THE TRAIL.

58. UNITS FOR $\frac{da}{dx}$ ARE $\frac{lbs/ft}{ft}$ OR $\frac{lbs}{ft^2}$.

$\int_0^8 a(x)\,dx$ HAS UNITS OF POUNDS.

60.
a. $s(2) = 5$
$s(4) = 10.5$
$s(6) = 12.5$
$s(8) = 12.5$
$s(10) = 8.5$
$s(12) = 4.5$

b. VEHICLE FURTHEST FROM STATION FROM $6 < t < 8$ SECONDS

c. TOTAL DISTANCE = 20.5 m

#58 p 346-47 : 61, 63, 67, 69, 71

#59 p 355-56 : 1-31 (ooo)

#60 - #61 P.R.

#62 p 355 : 37-51 (ooo)

#63 p 370 : 1, 2, 3, 4, 5, 6

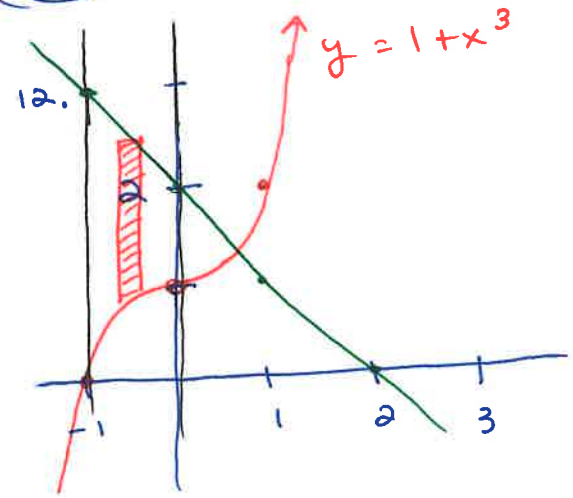
2. $\int_1^4 \left(\sqrt{x} - \frac{1}{x^2}\right) dx$

4. $\int_0^3 \left[(2y - y^2) - (y^2 - 4)\right] dy$

6. $\int_{-2}^{1} \left[\left(\frac{2x+16}{3}\right) - (x^2)\right] dx + \int_1^2 \left[(-2x+8) - x^2\right] dx$

#64 p 371 : 11, 12, 13, 14, 15, 16, 17, 18

12.



$$A = \int_{-1}^{0} \left[(2 - x) - (1 + x^3)\right] dx$$

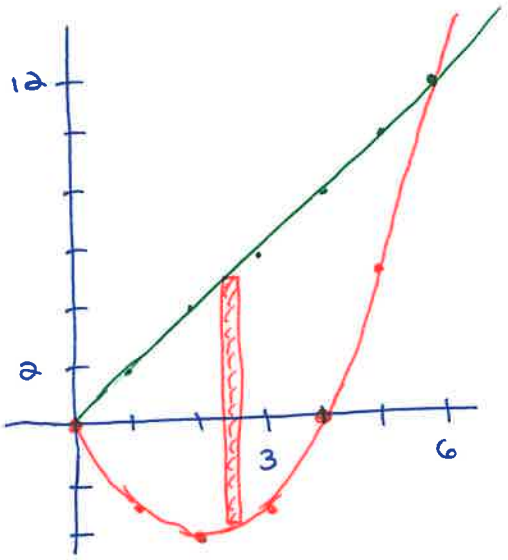
$$= \int_{-1}^{0} (-x^3 - x + 1)\, dx$$

$$= \left[-\frac{1}{4}x^4 - \frac{1}{2}x^2 + x\right]_{-1}^{0}$$

$$= (0) - \left(-\frac{1}{4} - \frac{1}{2} - 1\right)$$

$$= 1.75$$

14.



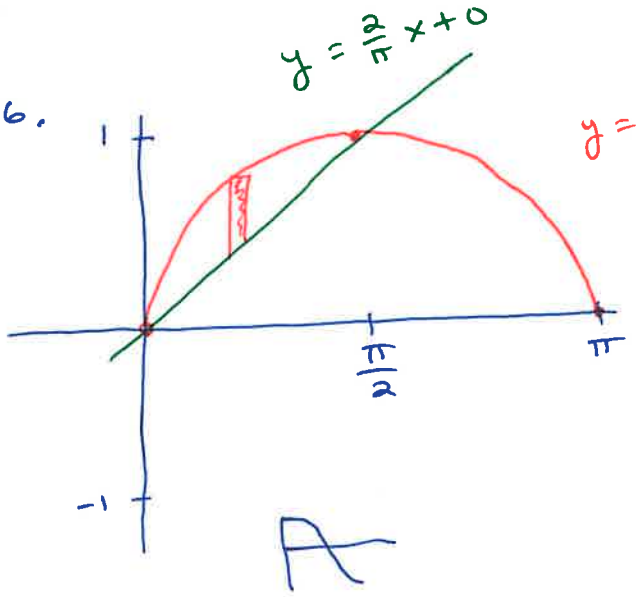
$$A = \int_0^6 [2x - (x^2 - 4x)]\,dx$$

$$= \int_0^6 (-x^2 + 6x)\,dx$$

$$= -\frac{1}{3}x^3 + 3x^2 \Big]_0^6$$

$$= (-72 + 3\cdot 36) - (0) = \boxed{36}$$

16.



$$A = \int_0^{\pi/2} \left(\sin x - \frac{2}{\pi}x\right) dx$$

$$= -\cos x - \frac{1}{\pi}x^2 \Big]_0^{\pi/2}$$

$$= \left(0 - \frac{1}{\pi}\cdot\frac{\pi^2}{4}\right) - (-1 - 0)$$

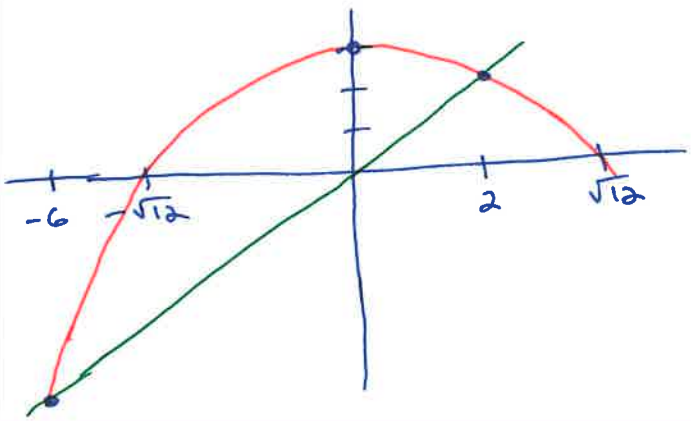
$$= \boxed{1 - \frac{\pi}{4}}$$

18. $4x + y^2 = 12$, $x = y$

OR

$4y + x^2 = 12$, $x = y$

$$y = \frac{12 - x^2}{4} = 3 - \frac{1}{4}x^2$$



$x^2 + 4x - 12 = 0$

$(x+6)(x-2) = 0$

$x = -6, 2$

$$A = \int_{-6}^{2} \left[\left(3 - \frac{1}{4}x^2\right) - x\right] dx$$

$$= \int_{-6}^{2} \left(-\frac{1}{4}x^2 - x + 3\right) dx$$

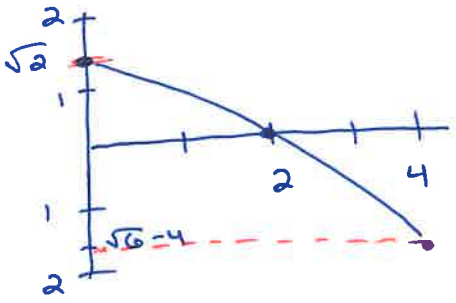
$$= -\frac{1}{12}x^3 - \frac{1}{2}x^2 + 3x \Big]_{-6}^{2}$$

$$= \boxed{\left(-\frac{8}{12} - 2 + 6\right) - \left(\frac{6^3}{12} - 18 - 18\right)}$$

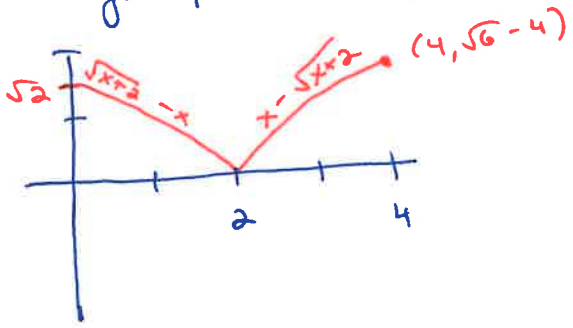
#65 p 371 : 21, 23, 27, 31, 35, 42, 53, 54, 55, 56, 59, 62

42.

$y = \sqrt{x+2} - x$



$y = |\sqrt{x+2} - x|$



$$A = \int_0^2 (\sqrt{x+2} - x)\,dx + \int_2^4 (x - \sqrt{x+2})\,dx$$

$$= \left[\frac{2}{3}(x+2)^{3/2} - \frac{1}{2}x^2\right]_0^2 + \left[\frac{1}{2}x^2 - \frac{2}{3}(x+2)^{3/2}\right]_2^4$$

$$= \left(\frac{16}{3} - 2\right) - \left(\frac{2\sqrt{2}^3}{3}\right) + \left(8 - \frac{2\sqrt{6}^3}{3}\right) - \left(2 - \frac{2\sqrt{2}^3}{3}\right)$$

54.

0 to 7.2 | 7.2 to 5.6 | 5.6 to 4.8 | 4.8 to 0

$$A \approx 2(6.2) + 2(6.8) + 2(5.0) + 2(4.8) = 45.6\ m^2$$

56. $\int_0^{10} (b(t) - d(t))\,dt \approx 8822$ PEOPLE MEANS THAT OVER THIS 10 yr PERIOD THERE WERE 8822 MORE PEOPLE BORN THAN WHO PASSED AWAY.

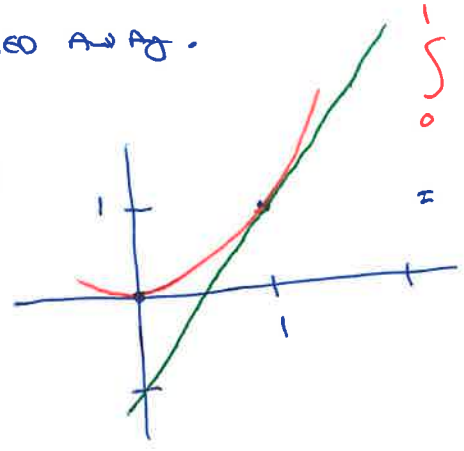
62. $y = x^2$

$y' = 2x$

$y'(1) = 2$

$y - 1 = 2(x-1)$

$y = 2x - 1$



$$\int_0^1 x^2\,dx - \int_{\frac{1}{2}}^1 (2x-1)\,dx$$

$$= \frac{1}{3} - \frac{1}{4} = \frac{1}{12}$$

#66 p 384: 1, 3, 5

#67 p 384: 11–19 (odd)

#68 p 384: 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40

dy
30. $V = \pi \int_0^1 (1)^2\,dy - \pi \int_0^1 (y)^2\,dy$

dx
32. $V = \pi \int_0^1 (1)^2\,dx - \pi \int_0^1 (1-x)^2\,dx$

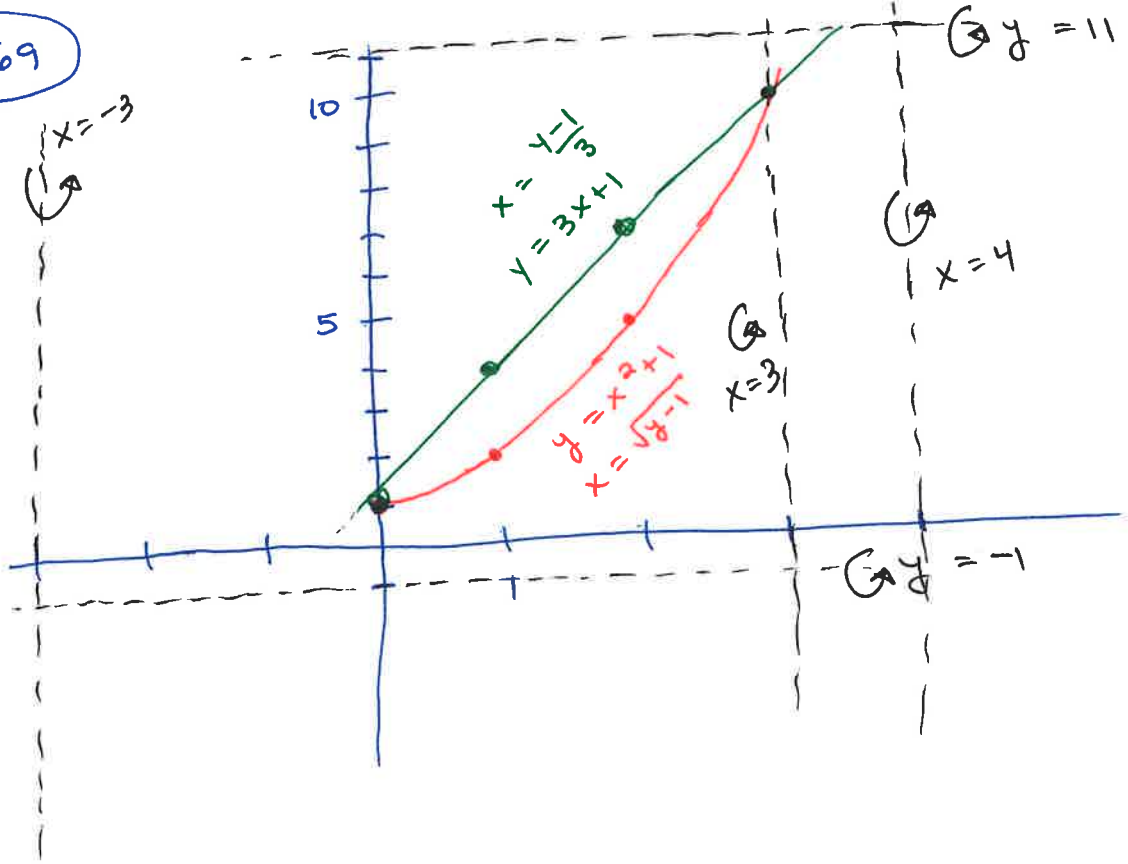
dy
34. $V = \pi \int_0^1 (y^4)\,dy$

dx
36. $V = \pi \int_0^1 (1-\sqrt[4]{x})^2\,dx$

dy
38. $V = \pi \int_0^1 (y)^2\,dy - \pi \int_0^1 (y^4)^2\,dy$

dx
40. $V = \pi \int_0^1 (1-x)^2\,dx - \pi \int_0^1 (1-\sqrt[4]{x})^2\,dx$

#69



a. $x = 3$ $\quad dy$

$$V = \pi \int_1^{10} \left(3 - \left(\frac{y-1}{3}\right)\right)^2 dy - \pi \int_1^{10} \left(3 - \sqrt{y-1}\right)^2 dy$$

b. $x = 4$ $\quad dy$

$$V = \pi \int_1^{10} \left(4 - \left(\frac{y-1}{3}\right)\right)^2 dy - \pi \int_1^{10} \left(4 - \sqrt{y-1}\right)^2 dy$$

c. $x = -3$ $\quad dy$

$$V = \pi \int_1^{10} \left(3 + \sqrt{y-1}\right)^2 dy - \pi \int_1^{10} \left(3 + \left(\frac{y-1}{3}\right)\right)^2 dy$$

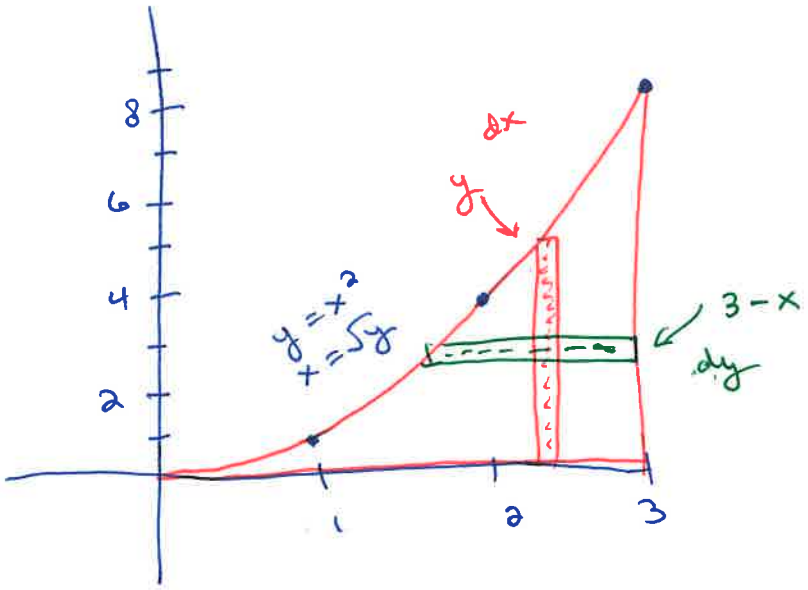
d. $y = -1$ $\quad dx$

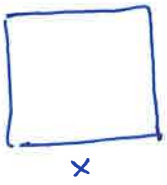
$$V = \pi \int_0^{3} \left(1 + (3x+1)\right)^2 dx - \pi \int_0^{3} \left(1 + (x^2+1)\right)^2 dx$$

e. $y = 11$ $\quad dx$

$$V = \pi \int_0^{3} \left(11 - (x^2+1)\right)^2 dx - \pi \int_0^{3} \left(11 - (3x+1)\right)^2 dx$$

#70

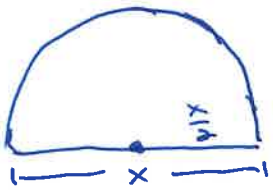


a. 

$A = x^2$

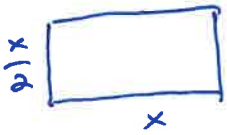
⊥ y-axis, dy

$$V = \int_0^9 (3 - \sqrt{y})^2 \, dy$$

b. 

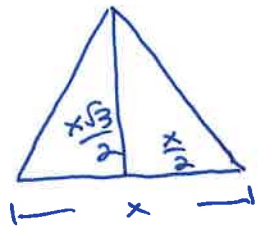
$A = \frac{1}{2}\pi\left(\frac{x}{2}\right)^2 = \frac{\pi}{8}x^2$

$$V = \frac{\pi}{8}\int_0^9 (3 - \sqrt{y})^2 \, dy$$

c. 

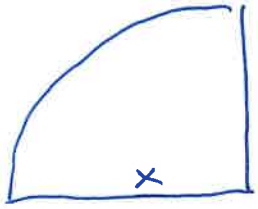
$A = \frac{1}{2}x^2$

$$V = \frac{1}{2}\int_0^9 (3 - \sqrt{y})^2 \, dy$$

d. 

$A = \left(\frac{x}{2}\right)\left(\frac{x\sqrt{3}}{2}\right) = \frac{\sqrt{3}}{4}x^2$

$$V = \frac{\sqrt{3}}{4}\int_0^9 (3 - \sqrt{y})^2 \, dy$$

e. 

$A = \frac{1}{4}\pi x^2 = \frac{\pi}{4}x^2$

$$V = \frac{\pi}{4}\int_0^3 (x^2)^2 \, dx$$