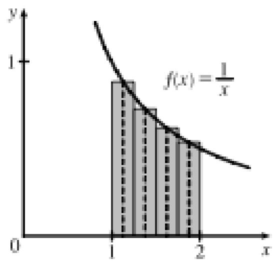
MATH 1042 **Answer-Keys of Review Problems for Test 1** **Fall 2016**

Section 5.2

4b. $M_4 = 0.69122$



34. **(a)** 4 **(b)** -2π **(c)** $\frac{9}{2} - 2\pi$

52. $F(0)$, $F(1)$. $F(3)$, and $F(4)$ are negative.
$F(2) = 0$ so $F(2)$ is the largest.

Section 5.3

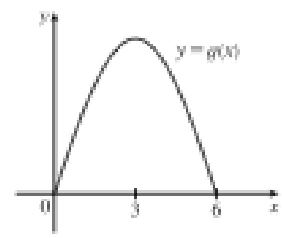
4. **(a)** $g(0) = 0$, $g(6) = 0$

(b) $g(1) \approx 2.8$, $g(2) \approx 4.9$,
$g(3) \approx 5.7$, $g(4) \approx 4.9$, and $g(5) \approx 2.8$.

(c) g is increases on the interval $(0, 3)$

(d) g has a maximum value at $x = 3$.

(e)



14. $h'(x) = \dfrac{\sqrt{x}}{2(x^2+1)}$ **18.** $y' = -\sqrt{1+\sin^2 x}\,\cos x$ **42.** $\dfrac{\pi}{3}$

66. Concave down on $(-1, 1)$ and concave up on $(-\infty, -1) \cup (1, \infty)$

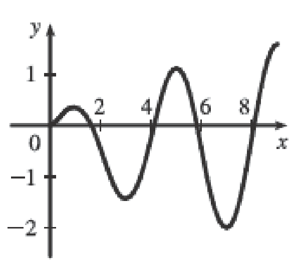
73.

(a) Local maxima at $x = 1$ and $x = 5$.
Local minima at $x = 3$ and $x = 7$.

(b) Absolute maxima at $x = 9$.
Absolute minima at $x = 7$.

(c) Con. dn on $(1/2, 2)$, $(4, 6)$, and $(8, 9)$.
Con. up on $(0, 1/2)$, $(2, 4)$, and $(6, 8)$.

(d)



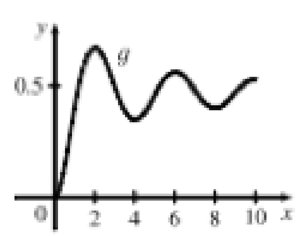
74.

(a) Local maxima at $x = 2$ and $x = 6$.
Local minima at $x = 4$ and $x = 8$.

(b) Absolute maxima at $x = 2$.
Absolute minima at $x = 0$.

(c) Con. dn on $(1, 3)$, $(5, 7)$, and $(9, 10)$.
Con. up on $(0, 1)$, $(3, 5)$, and $(7, 9)$.

(d)



Section 5.4

36. $\sqrt{2} - 1$ **60.** **(a)** $\frac{2}{3}$ m **(b)** 4 m

Section 5.5

10. $\frac{2}{3}(1+\cos t)^{3/2}+C$ **12.** $\frac{1}{2}\tan 2\theta + C$ **16.** $-\frac{1}{5}e^{-5r}+C$

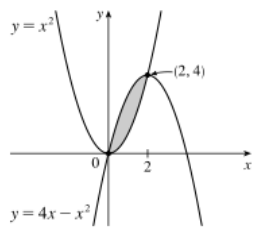
28. $-e^{\cos t}+C$ **68.** $\displaystyle\int_0^4 \frac{x}{\sqrt{2x+1}}\,dx = \frac{10}{3}$

Review Chapter 5

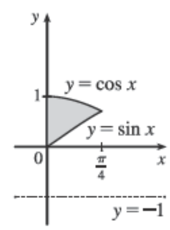
48. $g'(x) = \dfrac{\cos^3 x}{1+\sin^4 x}$ **58.** **(a)** $\frac{175}{6}$ meters **(b)** $\frac{177}{6}$ meters

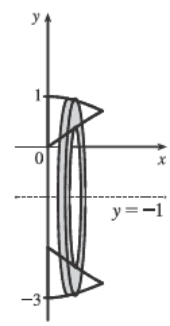
Section 6.1

14. Area= $\frac{8}{3}$



Section 6.2



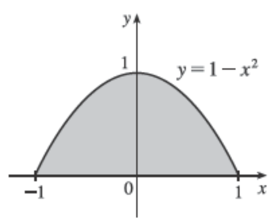


14. $V = \pi \displaystyle\int_0^{\pi/4} (\cos(2x) + 2\cos x - 2\sin x\,dx = (2\sqrt{2} - \frac{3}{2})\pi$

28. $V = \pi \displaystyle\int_0^1 (y^2 - y^8)\,dy$

30. $V = \pi \displaystyle\int_0^1 \left[(1-x)^2 - (1-\sqrt[4]{x})^2\right]\,dx = \pi \int_0^1 (x^2 - 2x - \sqrt{x} + 2\sqrt[4]{x})\,dx$

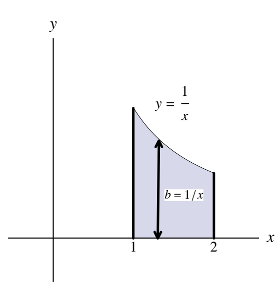
58. $V = \displaystyle\int_0^1 4(1-y)\,dy = 2$

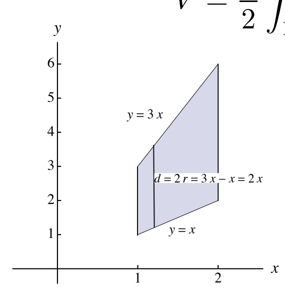


Additional Problem A6

1. **(a)** $V = \displaystyle\int_0^1 \sin(\pi x)\,dx = \frac{2}{\pi}$ **(b)** $V = \displaystyle\frac{1}{12}\int_1^2 \frac{1}{x^3}\,dx = \frac{1}{32}$, **(c)** Radius is x so $A(x) = \frac{1}{2}\pi(x)^2 = \frac{1}{2}x^2 \implies$

$$V = \frac{\pi}{2}\int_1^2 x^2\,dx = \frac{7}{6}\pi$$





Section 7.1

2. $\frac{2}{3}x^{3/2}\ln x - \frac{4}{3}x^{3/2} + C$ **12.** $y\tan^{-1}(2y) - \frac{1}{4}\ln(1+4y^2) + C$

Section 7.2

12. $\int_0^{\pi/2} (2-\sin\theta)^2\,d\theta = \int_0^{\pi/2} (2-4\sin\theta+\sin^2\theta) = \frac{9}{4}\pi - 4$

22. $\frac{1}{5}\tan^5\theta + \frac{1}{3}\tan^3\theta + C$

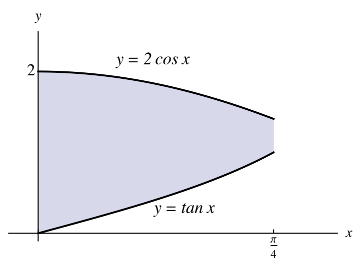
28. $\frac{1}{7}\sec^7 x - \frac{2}{5}\sec^5 x + \frac{1}{3}\sec^3 x + C$

58. $A = \int_0^{\pi/4} (\tan x - \tan^2 x)\,dx = \ln\sqrt{2} - 1 + \frac{\pi}{4}$

64. $V = \int_0^{\pi/3} \pi[(\sec x+1)^2 - (\cos x+1)^2]\,dx = 2\pi\ln(2+\sqrt{3}) - \frac{1}{6}\pi^2 - \frac{1}{8}\pi\sqrt{3}$

Additional Problem A7

2. **(a)**



(b) $V = \int_0^{\pi/4} (2\cos x - \tan x)^2\,dx = \frac{\pi}{4} + 2\sqrt{2} - 2,$

(c) $V = \pi\int_0^{\pi/4} (4\cos^2 x - \tan^2 x)\,dx = \frac{3}{4}\pi^2$