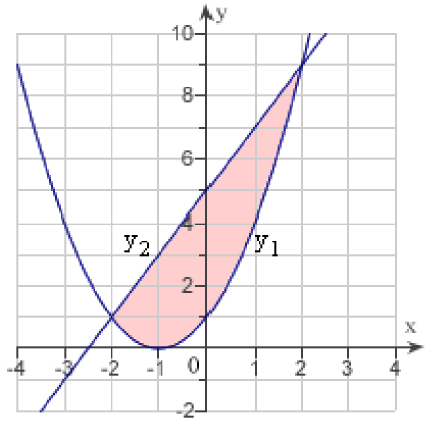
Name: _____ **Block:** _____ **Seat:** _____ **ID: A**

Ch 7 MC Practice

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Set up the definite integral that gives the area of the region bounded by the graph of $y_1 = x^2 + 2x + 1$ and $y_2 = 2x + 5$.



a. $\int_{-2}^{2} \left(-x^2 + 4\right) dx$

b. $\int_{-2}^{2} \left(x^2 + 2x + 1\right) dx$

c. $\int_{-2}^{2} \left(-x^2 + 4\right) dy$

d. $\int_{-2}^{2} \left(x^2 + 4x + 6\right) dy$

e. $\int_{-2}^{2} \left(x^2 + 4x + 6\right) dx$

____ 2. Find the area of the region bounded by the equations by integrating (i) with respect to x and (ii) with respect to y.

$x = 16 - y^2$

$x = y - 4$

a. $A = \frac{727}{12}$

b. $A = \frac{365}{12}$

c. $A = \frac{243}{4}$

d. $A = \frac{243}{2}$

e. $A = \frac{365}{6}$

____ 3. Find the area of the region bounded by equations by integrating (i) with respect to x and (ii) with respect to y.

$y = x^2$

$y = 72 - x$

a. $A = \frac{819}{4}$

b. $A = \frac{1637}{4}$

c. $A = \frac{819}{2}$

d. $A = \frac{4913}{12}$

e. $A = \frac{4913}{6}$

____ 4. Find the area of the region bounded by the graphs of the algebraic functions.

$f(x) = x^2 + 30x + 225$

$g(x) = 17(x + 15)$

a. $A = \frac{4913}{12}$

b. $A = \frac{5363}{6}$

c. $A = \frac{4913}{6}$

d. $A = \frac{6263}{6}$

e. $A = \frac{4913}{3}$

____ 5. Find the area of the region bounded by the graphs of the algebraic functions.

$f(x) = \sqrt[3]{x - 8}$

$g(x) = x - 8$

a. $A = \frac{1}{2}$

b. $A = \frac{1}{17}$

c. $A = \frac{1}{24}$

d. $A = \frac{23}{24}$

e. $A = \frac{15}{16}$

____ 6. Find the area of the region bounded by the graphs of the algebraic functions.

$f(y) = y^2 + 12$, $g(y) = 0$, $y = -12$, $y = 13$

a. $A = \frac{3097}{3}$

b. $A = \frac{2414}{3}$

c. $A = \frac{4825}{3}$

d. $A = \frac{3097}{6}$

e. $A = \frac{4828}{3}$

____ 7. Find the area of the region bounded by the graphs of the function $f(x) = \frac{9x}{x^2 + 1}$, $y = 0$, $0 \le x \le 3$.

Round your answer to three decimal places.

a. 20.723
b. 11.182
c. 6.238
d. 10.362
e. 22.364

____ 8. Find the area of the region bounded by the graphs of the function $f(x) = \sin 5x$, $g(x) = \cos 10x$, $\frac{-\pi}{10} \le x \le \frac{\pi}{30}$. Round your answer to three decimal places.

a. 0.260
b. 0.289
c. 0.416
d. 0.139
e. 0.462

____ 9. Find the area of the region bounded by the graphs of the equations.

$f(x) = \sin(x),\ g(x) = \cos(2x),\ \frac{-\pi}{2} \le x \le \frac{\pi}{6}.$

a. $A = \frac{9}{2}$

b. $A = \frac{9}{8}$

c. $A = \frac{3}{8}$

d. $A = \frac{3^{3/2}}{4}$

e. $A = \frac{3}{2}$

____ 10. If the accumulation function $F(x)$ is given by $F(x) = \int_0^x \left(\frac{1}{11} t^2 + 5 \right) dt$, evaluate $F(9)$.

a. $A = \frac{738}{11}$

b. $A = \frac{356}{33}$

c. $A = \frac{852}{11}$

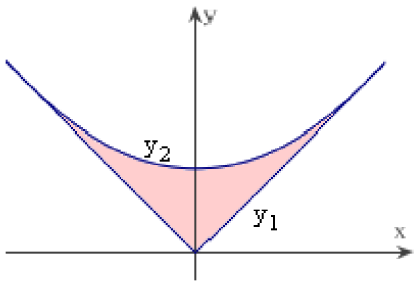
d. $A = \frac{298}{11}$

e. $A = \frac{1068}{11}$

____ 11. Suppose that $R_1 = 6.81 + 0.86t$ and $R_2 = 6.81 + 0.35t$ model the revenue (in billions of dollars) for a large corporation. The model R_1 gives projected annual revenues from 2008 through 2015, with $t = 8$ corresponding to 2008, and R_2 gives projected revenues if there is a decrease in the rate of growth of corporate sales over the period. Approximate the total reduction in revenue if corporate sales are actually closer to the model R_2. Round your answer to three decimal places.

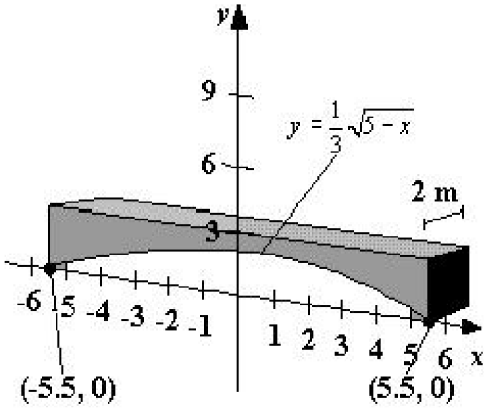
a. $3.570 billion
b. $24.990 billion
c. $19.763 billion
d. $29.645 billion
e. $12.495 billion

____ 12. The surface of a machine part is the region between the graphs of $y_1 = |x|$ and $y_2 = 0.080x^2 + k$ as shown in the figure. Find k if the parabola is tangent to the graph of y_1. Round your answer to three decimal places.



a. 3.125
b. 0.160
c. 0.080
d. 0.320
e. 6.250

____ 13. Concrete sections for the new building have the dimensions (in meters) and shape as shown in the figure (the picture is not necessarily drawn to scale). Find the area of the face of the section superimposed on the rectangular coordinate system. Round your answer to three decimal places.



a. $25.031\ \text{m}^2$
b. $31.075\ \text{m}^2$
c. $29.151\ \text{m}^2$
d. $30.515\ \text{m}^2$
e. $28.031\ \text{m}^2$

____ 14. Set up and evaluate the integral that gives the volume of the solid formed by revolving the region bounded by $y = 8$ and $y = 16 - \frac{x^2}{16}$ about the x-axis.

a. $V = \pi \int_{-16}^{16} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{7168}{15} \sqrt{2}\, \pi$

b. $V = \pi \int_{-8\sqrt{2}}^{8\sqrt{2}} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{14336}{15} \sqrt{2}\, \pi$

c. $V = \pi \int_{-16}^{16} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{28672}{15} \sqrt{2}\, \pi$

d. $V = \pi \int_{-8\sqrt{2}}^{8\sqrt{2}} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{28672}{15} \sqrt{2}\, \pi$

e. $V = \pi \int_{-16}^{16} \left(\left(16 - \frac{x^2}{16} \right)^2 - 64 \right) dx = \frac{14336}{15} \sqrt{2}\, \pi$

____ 15. Set up and evaluate the integral that gives the volume of the solid formed by revolving the region bounded by $y = x^8$ and $y = 256$ in the first quadrant about the y-axis.

a. $V = \pi \int_0^8 y^{\frac{1}{8}}\, dy = \frac{4,096}{5}\pi$

b. $V = \pi \int_0^8 y^{\frac{1}{4}}\, dy = \frac{2,048}{5}\pi$

c. $V = \pi \int_0^{256} y^{\frac{1}{4}}\, dy = \frac{2,048}{5}\pi$

d. $V = \pi \int_0^{256} y^{\frac{1}{8}}\, dy = \frac{2,048}{5}\pi$

e. $V = \pi \int_0^{256} y^{\frac{1}{4}}\, dy = \frac{4,096}{5}\pi$

____ 16. Set up and evaluate the integral that gives the volume of the solid formed by revolving the region bounded by $y = x^{\frac{3}{4}}$, $y = 1$, and $x = 0$ about the y-axis.

a. $V = \pi \int_0^1 y^{\frac{8}{3}}\, dy = \frac{3}{11}\pi$

b. $V = \pi \int_0^1 y^{\frac{8}{3}}\, dy = \frac{3}{22}\pi$

c. $V = \pi \int_0^1 y^{\frac{4}{3}}\, dy = \frac{3}{11}\pi$

d. $V = \pi \int_0^1 y^{\frac{3}{4}}\, dy = \frac{3}{22}\pi$

e. $V = \pi \int_0^1 y^{\frac{3}{8}}\, dy = \frac{3}{11}\pi$

____ 17. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations $y = 2x^2$, $y = 0$, and $x = 2$ about the line $x = 2$.

a. $\frac{16}{3}\pi$

b. $\frac{8}{3}\pi$

c. $\frac{16}{3}$

d. $\frac{32}{3}$

e. $\frac{32}{3}\pi$

____ 18. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the given lines.

$y = x^2, y = 8x - x^2$

(i) x-axis; (ii) the line $y = 18$

a. $\frac{1,024}{3}\pi; \frac{1,280}{3}\pi$

b. $\frac{16}{3}\pi; \frac{1,280}{3}\pi$

c. $\frac{64}{3}\pi; \frac{128}{3}\pi$

d. $\frac{64}{3}\pi; \frac{1,280}{3}\pi$

e. $\frac{16}{3}\pi; \frac{128}{3}\pi$

____ 19. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the given lines.

$x = y^2, x = 8y - y^2$

(i) y-axis; (ii) the line $x = 18$

a. $\frac{1,024}{3}\pi; \frac{1,280}{3}\pi$

b. $\frac{16}{3}\pi; \frac{128}{3}\pi$

c. $\frac{64}{3}\pi; \frac{128}{3}\pi$

d. $\frac{64}{3}\pi; \frac{1,280}{3}\pi$

e. $\frac{16}{3}\pi; \frac{1,280}{3}\pi$

____ 20. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the line $y = 8$.

$y = x, y = 7, x = 0$

a. $\frac{245}{3}\pi$

b. $\frac{637}{6}\pi$

c. $\frac{637}{3}\pi$

d. $\frac{490}{3}\pi$

e. π

____ 21. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the line $y = 2$.

$y = \frac{1}{2}x^2, y = 2, x = 0$

a. $\frac{8}{15}\pi$

b. $\frac{32}{15}\pi$

c. $\frac{64}{15}\pi$

d. $\frac{4}{15}\pi$

e. $\frac{16}{15}\pi$

____ 22. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the line $y = 14$.

$y = \sin x,\ y = 0,\ 0 \le x \le \dfrac{\pi}{2}$

a. $\pi\left(14 - \dfrac{\pi}{2}\right)$

b. $\pi\left(14 - \dfrac{\pi}{4}\right)$

c. $\pi\left(56 - \dfrac{\pi}{4}\right)$

d. $\pi\left(28 - \dfrac{\pi}{2}\right)$

e. $\pi\left(28 - \dfrac{\pi}{4}\right)$

____ 23. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the x-axis.

$y = \dfrac{1}{x},\ y = 0,\ x = 8,\ x = 10$

a. $\dfrac{13}{80}\pi$

b. $\dfrac{9}{40}\pi$

c. $\dfrac{9}{80}\pi$

d. $\dfrac{1}{40}\pi$

e. $\dfrac{1}{80}\pi$

____ 24. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the x-axis. Verify your results using the integration capabilities of a graphing utility.

$y = \sin(x), y = 0, x = 0, x = \frac{\pi}{3}$

a. $\frac{1}{3}\pi^2 - \frac{\sqrt{3}}{8}\pi$

b. $\frac{1}{6}\pi^2 + \frac{\sqrt{3}}{8}\pi$

c. $\frac{1}{6}\pi^2 - \frac{\sqrt{3}}{8}\pi$

d. $\frac{1}{3}\pi^2 + \frac{\sqrt{3}}{8}\pi$

e. $\frac{1}{6}\pi^2 - \frac{\sqrt{3}}{4}\pi$

____ 25. A tank on the wing of a jet aircraft is formed by revolving the region bounded by the graph of $y = \frac{1}{15}x^2\sqrt{2-x}$ and the x-axis $(0 \le x \le 2)$ about the x-axis, where x and y are measured in meters. Find the volume of the tank. Round your answer to two decimal places.

a. 0.45 m^3
b. 0.33 m^3
c. 0.03 m^3
d. 1.79 m^3
e. 0.12 m^3

Ch 7 MC Practice
Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 1 DIF: Easy REF: Section 7.1
   OBJ: Write the definite integrals needed to calculate the area of a bounded region
   MSC: Skill
2. ANS: D PTS: 1 DIF: Medium REF: Section 7.1
   OBJ: Calculate the area of a region bounded by two curves MSC: Application
3. ANS: E PTS: 1 DIF: Medium REF: Section 7.1
   OBJ: Calculate the area of a region bounded by two curves MSC: Application
4. ANS: C PTS: 1 DIF: Medium REF: Section 7.1
   OBJ: Calculate the area of a region bounded by two curves MSC: Application
5. ANS: A PTS: 1 DIF: Medium REF: Section 7.1
   OBJ: Calculate the area of a region bounded by two curves MSC: Application
6. ANS: C PTS: 1 DIF: Medium REF: Section 7.1
   OBJ: Calculate the area of a region bounded by several curves
   MSC: Application
7. ANS: D PTS: 1 DIF: Medium REF: Section 7.1
   OBJ: Calculate the area of a region bounded by several curves
   MSC: Application NOT: Section 7.1
8. ANS: A PTS: 1 DIF: Medium REF: Section 7.1
   OBJ: Calculate the area of a region bounded by two curves MSC: Application
9. ANS: D PTS: 1 DIF: Medium REF: Section 7.1
   OBJ: Calculate the area between two curves MSC: Application
10. ANS: A PTS: 1 DIF: Easy REF: Section 7.1
    OBJ: Evaluate the accumulation function at a value MSC: Skill
11. ANS: E PTS: 1 DIF: Easy REF: Section 7.1
    OBJ: Evaluate definite integrals in applications MSC: Application
12. ANS: A PTS: 1 DIF: Medium REF: Section 7.1
    OBJ: Calculate slopes of tangent lines in applications MSC: Application
13. ANS: E PTS: 1 DIF: Medium REF: Section 7.1
    OBJ: Calculate the area of a region bounded by several curves in applications
    MSC: Application
14. ANS: D PTS: 1 DIF: Medium REF: Section 7.2
    OBJ: Calculate the volume using the washer method of the solid formed by revolving a region about the x-axis MSC: Application
15. ANS: E PTS: 1 DIF: Medium REF: Section 7.2
    OBJ: Calculate the volume using the disk method of the solid formed by revolving a region about the y-axis MSC: Application
16. ANS: A PTS: 1 DIF: Medium REF: Section 7.2
    OBJ: Calculate the volume using the disk method of the solid formed by revolving a region about the y-axis MSC: Application
17. ANS: A PTS: 1 DIF: Difficult REF: Section 7.2
    OBJ: Calculate the volume using the disk method of the solid formed by revolving a region about a vertical line MSC: Application

18. ANS: A PTS: 1 DIF: Medium REF: Section 7.2
OBJ: Calculate the volume using the washer method of the solid formed by revolving a region about a horizontal line MSC: Application
19. ANS: A PTS: 1 DIF: Medium REF: Section 7.2
OBJ: Calculate the volume using the washer method of the solid formed by revolving a region about a vertical line MSC: Application
20. ANS: D PTS: 1 DIF: Medium REF: Section 7.2
OBJ: Calculate the volume using the washer method of the solid formed by revolving a region about a horizontal line MSC: Application
21. ANS: C PTS: 1 DIF: Medium REF: Section 7.2
OBJ: Calculate the volume using the disk method of the solid formed by revolving a region about a horizontal line MSC: Application
22. ANS: E PTS: 1 DIF: Medium REF: Section 7.2
OBJ: Calculate the volume using the washer method of the solid formed by revolving a region about a horizontal line MSC: Application
23. ANS: D PTS: 1 DIF: Medium REF: Section 7.2
OBJ: Calculate the volume using the disk method of the solid formed by revolving a region about the x-axis MSC: Application
24. ANS: C PTS: 1 DIF: Medium REF: Section 7.2
OBJ: Calculate the volume using the disk method of the solid formed by revolving a region about the x-axis MSC: Application
25. ANS: C PTS: 1 DIF: Medium REF: Section 7.2
OBJ: Calculate the volume using the disk method of the solid formed by revolving a region about the x-axis MSC: Application