AB Calculus Ch 8 MC Review **SHOW WORK on your own paper!!** **NO Calculator**
No work = No credit

1. What is the area of the region between the graphs of $y = x^2$ and $y = -x$ from $x = 0$ to $x = 2$?

a) $\frac{2}{3}$ b) $\frac{8}{3}$ c) 4 d) $\frac{14}{3}$ e) $\frac{10}{3}$

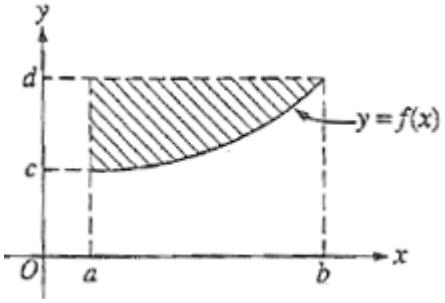
2. The area of the region enclosed by the graph of $y = x^2 + 1$ and the line $y = 5$ is

a) $\frac{14}{3}$ b) $\frac{16}{3}$ c) $\frac{28}{3}$ d) $\frac{32}{3}$ e) 8π

3. If the region enclosed by the y-axis, the line y = 2, and the curve $y = \sqrt{x}$ is revolved about the y-axis, the volume of the solid generated is

a) $\frac{32\pi}{5}$ b) $\frac{16\pi}{3}$ c) $\frac{16\pi}{3}$ d) $\frac{8\pi}{3}$ e) π

4. Which of the following represent the area of the shaded region in the figure above?



a) $\int_c^d f(y)dy$ b) $\int_a^b (d - f(x))dx$

c) $f'(b) - f'(a)$ d) $(b-a)\left[f(b) - f(a)\right]$

e) $(d-c)\left[f(b) - f(a)\right]$

5. The area of the region enclosed by the curve $y = \frac{1}{x-1}$, the x-axis, and the lines x = 3 and x = 4 is a) $\frac{5}{36}$ b) $\ln\frac{2}{3}$ c) $\ln\frac{4}{3}$ d) $\ln\frac{3}{2}$ e) $\ln 6$

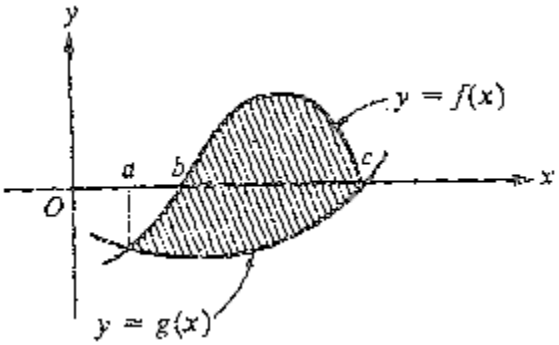
6. The region enclosed by the x-axis, the line x = 3, and the curve $y = \sqrt{x}$ is rotated about the x-axis. What is the volume of the solid generated?

a) 3π b) $2\sqrt{3}\,\pi$ c) $\frac{9}{2}\pi$ d) 9π e) $\frac{36\sqrt{3}}{5}\pi$

7. The area of the region enclosed by the graphs of y = x and $y = x^2 - 3x + 3$ is

a) $\frac{2}{3}$ b) 1 c) $\frac{4}{3}$ d) 2 e) $\frac{14}{3}$

8. The area of the shaded region in the figure above is represented by which of the following integrals?



a) $\int_a^c (|f(x)| - |g(x)|)dx$ b) $\int_b^c f(x)dx - \int_a^c g(x)dx$

c) $\int_a^c (g(x) - f(x))dx$ d) $\int_a^c (f(x) - g(x))dx$

e) $\int_a^b (g(x) - f(x))dx + \int_b^c (f(x) - g(x))dx$

9. Find the area of the region whose boundaries are $y^2 = x$ and $x + y = 2$.

a) $\frac{5}{2}$ b) $\frac{3}{2}$ c) $\frac{11}{6}$ d) $\frac{9}{2}$ e) $\frac{29}{6}$

10. Find the area of the region whose boundaries are the parabolas $x = y^2 - 5y$ and $x = 3y - y^2$.

a) $\frac{32}{3}$ b) $\frac{139}{6}$ c) $\frac{64}{3}$ d) $\frac{128}{3}$ e) none of these

11. Find the area of the region whose boundaries are in the first quadrant, bounded below by the x-axis and above by the curves of $y = \sin x$ and $y = \cos x$.

a) $2 - \sqrt{2}$ b) $2 + \sqrt{2}$ c) 2 d) $\sqrt{2}$ e) $2\sqrt{2}$

12. Find the area of the region which is bounded above by $y = \sin x$ and below by $y = \cos x$ from $x = \frac{\pi}{4}$ to $x = \frac{5\pi}{4}$. a) $2\sqrt{2}$ b) $\frac{2}{2\sqrt{2}}$ c) $\frac{1}{2\sqrt{2}}$ d) $2(\sqrt{2} - 1)$ e) $2(\sqrt{2} + 1)$

13. The area of the region bounded by the curve of y= $x^3 - 2x^2 - 3x$ and the x-axis is equal to

(A) $\frac{28}{3}$ (B) $\frac{79}{6}$ (C) $\frac{45}{4}$ (D) $\frac{71}{6}$ (E) None of these

14. The total area bounded by the cubic $x = y^3 - y$ and the line $x = 3y$ is equal to

(A) 4 (B) $\frac{16}{3}$ (C) 8 (D) $\frac{32}{3}$ (E) 16

For #17 – 20, the region whose boundaries are given is rotated about the line indicated. Choose the answer which gives the volume of the solid generated.

15. $y = x^2, x = 2$, and y =0 about the x-axis.

(A) $\frac{64\pi}{3}$ (B) $\frac{32\pi}{5}$ (C) $\frac{8\pi}{3}$ (D) $\frac{128\pi}{5}$ (E) 8π

16. $y = x^2, x = 2$, and y = 0 about the y-axis.

(A) $\frac{16\pi}{3}$ (B) 4π (C) $\frac{32\pi}{5}$ (D) 8π (E) $\frac{8\pi}{3}$

17. $y = x^2, x = 2$, and y=0 about the line x =2.

(A) 4π (B) $\frac{4\pi}{3}$ (C) $\frac{88\pi}{3}$ (D) $\frac{16\pi}{3}$ (E) 8π

18. The first quadrant region bounded by $y = x^2$, the y-axis, and y=4; about the y-axis.

(A) 8π (B) 4π (C) $\frac{64\pi}{3}$ (D) $\frac{32\pi}{3}$ (E) $\frac{16\pi}{3}$

19. $y = 3x - x^2$ and y = x about the x-axis.

(A) $\pi \int_0^{3/2} [(3x - x^2)^2 - x^2]dx$ (B) $\pi \int_0^{2} (9x^2 - 6x^3)dx$ (C) $\pi \int_0^{2} [(3x - x^2)^2 - x^2]dx$

(D) $\pi \int_0^{3} [(3x - x^2)^2 - x^4]dx$ (E) $\pi \int_0^{3} (2x - x^2)^2 dx$

20. The base of a solid is a circle of radius *a*, and every plane section perpendicular to a diameter is a square. The solid has volume

(A) $\frac{8}{3}a^3$ (B) $2\pi a^3$ (C) $4\pi a^3$ (D) $\frac{16}{3}a^3$ (E) $\frac{8\pi}{3}a^3$

21. The base of a solid is the region bounded by the parabola $x^2 = 8y$ and the line y = 4, and each plane section perpendicular to the y-axis is an equilateral triangle. The volume of the solid is

(A) $\frac{64\sqrt{3}}{3}$ (B) $64\sqrt{3}$ (C) $32\sqrt{3}$ (D) 32 (E) None of these

Calculator Section:

22. The area bounded by $y = e^x, y = 1, y = 2$ and $x = 3$ is equal to

(A) $3 + \ln 2$ (B) 3 – 3 ln 3 (C) 4 + ln 2 (D) 3 - $\frac{1}{2}\ln^2 2$ (E) 4 – ln 4

23. The base of a solid is a region in the first quadrant bounded by the x-axis, the y-axis, and the line $x + 2y = 8$. If cross sections of the solid perpendicular to the x-axis are semicircles, what is the volume of the solid?

(A) 12.566 (B) 14.661 (C) 16.775 (D) 67.021 (E) 134.041

24. What is the area of the region in the first quadrant enclosed by the graphs of $y = \cos x$, $y = x$, and the y-axis?

(A) 0.127 (B) 0.385 (C) 0.400 (D) 0.600 (E) 0.947

25. The base of a solid S is the region enclosed by the graph of $y = \sqrt{\ln x}$, the line $x = e$, and the x-axis. If the cross sections of S perpendicular to the x-axis are squares, then the volume of S is

(A) $\frac{1}{2}$ (B) $\frac{2}{3}$ (C) 1 (D) 2 (E) $\frac{1}{3}(e^3 - 1)$

Multiple Choice Answers:

1. D	2. D	3. A	4. B	5. D	6. C	
7. C	8. D	9. D	10. C	11. A	12. A	
13. D	14. C	15. B	16. D	17. C	18. A	
19. C	20. D	21. B	22. E	23. C	24. C	25. C

Ab Calculus Ch 8 FRQ Review **SHOW WORK on your own paper.** **No Work = No Credit**

1. Find the area bounded by $y = \frac{1}{x^3}$, $x = 4$ *and* $x = 5$.

2. Find the area bounded by $x = y^2 + 1$ *and* $x = y + 3$.

3. Find the area bounded by $y = e^x$, $y = e^2$ *and* $x = 0$.

4. Let R be the region bounded by $y = \sqrt{x}$, $y = 0$ *and* $x = 9$. Find the value of k such that the line $x = k$ divides the region R into two regions of equal area.

5. Find the volume of the solid bounded by the region $y = x$, $y = 0$ *and* $x = 4$ revolved about

   a) the *x*-axis b) the *y*-axis c) the line $x = 4$

6. Find the volume of the solid bounded by the region $y = \sqrt{x}$, $y = 2$ *and* $x = 0$ revolved about

   a) the *x*-axis b) the line $y = 2$

7. Find the volume of the solid bounded by the region $y = e^{-x}$, $y = 0$, $x = 0$ *and* $x = 1$ revolved about the *x*-axis.

8. Find the volume of the solid whose base is bounded by $y = 2\sin x$, $y = 0$ *for* $0 \le x \le \pi$, with the indicated cross sections taken perpendicular to the x-axis.

   a) squares b) semicircles c) equilateral triangles

Chapter 8 Review Answers:

1. 9/800 2. 4.5 3. $e^2 + 1$ 4. $\left(\frac{27}{2}\right)^{\frac{2}{3}} = \frac{9}{\sqrt[3]{4}}$ 5. a. $\frac{64\pi}{3}$

5. a.? b. $\frac{128\pi}{3}$ c. $\frac{64\pi}{3}$ 6. a. 8π b. $\frac{8\pi}{3}$ 7. $\frac{\pi}{2} - \frac{\pi}{2e^2}$

8. a. 2π b. $\frac{\pi^2}{4}$ c. $\frac{\sqrt{3}}{2}\pi$