

CALCULATORS ARE PERMITTED—

But all CALCULUS work (integrating, deriving) must be shown by hand. You may use your calculator for simple arithmetic with large quantities and to check your work.

This review is identical in format to the exam. Only the actual values in the questions will vary.

Multiple-Choice Answers: (#1-10) You may write on the actual exam, but only answers recorded HERE will count towards your grade. Please write in capital letters to clearly distinguish between A and D. (4 points each)

Free-Response: (Total 30 points.)

You must show a reasonable amount of work that leads to your answer. Where it is impossible to show work, explain the mental leaps that you made to draw your conclusion.

11.

Let R be the region in the first quadrant bounded by the x -axis and the curve $y = 2x - x^2$.

- (a) Find the volume produced when R is revolved about the x -axis.
- (b) Find the volume produced when R is revolved about the y -axis.

12.

Let R be the region bounded by the curves $f(x) = \frac{4}{x}$ and $g(x) = (x-3)^2$.

- (a) Find the area of R .
- (b) Find the volume of the solid generated by revolving R about the x -axis.

Ch.6 Review

For each problem, find the area under the curve over the given interval.

1) $y = 3\sqrt{x}$; $[6, 7]$

A) $14\sqrt{7} - 12\sqrt{6} - 2 \approx 5.647$

B) $42\sqrt{7} - 36\sqrt{6} \approx 22.94$

C) $14\sqrt{7} - 12\sqrt{6} \approx 7.647$

D) $14\sqrt{7} - 12\sqrt{6} + 1 \approx 8.647$

For each problem, find the area of the region enclosed by the curves.

2) $y = -x^2 + 6$, $y = -x^2 + 4x - 2$,
 $x = -1$, $x = 3$

A) 19 B) 20

C) $\frac{41}{2} = 20.5$ D) 21

For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the the x -axis.

3) $y = \sqrt[3]{x}$, $y = 0$, $x = 1$

A) $\frac{13}{5}\pi \approx 8.168$

B) $\frac{3}{5}\pi \approx 1.885$

C) $\frac{11}{10}\pi \approx 3.456$

D) $\frac{2}{5}\pi \approx 1.257$

4) $y = -x^2 + 6$, $y = x^2 + 4$, $x = 0$, $x = 1$

A) $\frac{77}{6}\pi \approx 40.317$

B) $\frac{37}{3}\pi \approx 38.746$

C) $\frac{41}{3}\pi \approx 42.935$

D) $\frac{40}{3}\pi \approx 41.888$

For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the the y -axis.

5) $x = y^2 + 1$, $x = 0$, $y = 0$, $y = 1$

A) $\frac{28}{5}\pi \approx 17.593$

B) $\frac{43}{15}\pi \approx 9.006$

C) $\frac{28}{15}\pi \approx 5.864$

D) $\frac{2}{15}\pi \approx 0.419$

For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the the given axis.

6) $y = -4$, $y = -x^2 - 3$

Axis: $y = 1$

A) $\frac{184}{15}\pi \approx 38.537$

B) $\frac{383}{30}\pi \approx 40.108$

C) $\frac{199}{15}\pi \approx 41.678$

D) $\frac{179}{15}\pi \approx 37.49$

For each problem, use the method of cylindrical shells to find the volume of the solid that results when the region enclosed by the curves is revolved about the the y -axis.

7) $y = x^2 + 1$, $y = 1$, $x = 2$

A) 16π B) $\frac{17}{2}\pi$

C) 8π D) $\frac{23}{3}\pi$

For each problem, find the volume of the specified solid.

8) The base of a solid is the region enclosed by $y = -\frac{x^2}{9} + 4$ and $y = 0$. Cross-sections perpendicular to the x -axis are squares.

A) $\frac{512}{5} = 102.4$ B) $\frac{500}{3} \approx 166.667$

C) $\frac{16}{5} = 3.2$ D) $\frac{1024}{15} \approx 68.267$

9) The base of a solid is the region enclosed by $y = 4$ and $y = x^2$. Cross-sections perpendicular to the x -axis are rectangles with heights twice that of the side in the xy -plane.

A) $\frac{1024}{5} = 204.8$ B) $\frac{1024}{15} \approx 68.267$

C) $\frac{32}{5} = 6.4$ D) $\frac{32}{15} \approx 2.133$

10) The base of a solid is the region enclosed by the semicircle $y = \sqrt{25 - x^2}$ and the x -axis. Cross-sections perpendicular to the x -axis are equilateral triangles.

A) $\frac{343\sqrt{3}}{3} \approx 198.031$

B) $72\sqrt{3} \approx 124.708$

C) $9\sqrt{3} \approx 15.588$

D) $\frac{125\sqrt{3}}{3} \approx 72.169$

Answers to Ch.6 Review

1) C
5) C
9) B

2) B
6) A
10) D

3) B
7) C

4) D
8) A