

Calculus Chapter 6 Review for Test

1. Category #10

- A) Sketch the region in the 1st Quadrant that is bounded by $y = x^3$, $y = 4x$, $2x + y - 3 = 0$ and that lies below both straight lines. Shade this region.
- B) Find coordinates of intersection of $y = 4x$ and $2x + y - 3 = 0$
- C) Find the Area of the shaded region

2. Category #11

Let R be the region enclosed by the graphs of $y = x^2$ and $y = \sqrt{x}$

- A) Sketch the region
- B) Find the Area of R
- C) Find the Volume of the solid generated by revolving R about the x-axis

3. Category #14

Consider the curve $y = 4\sqrt[3]{x}$ from $x = 1$ to $x = 3$

Set up, but do not integrate, an integral expression in terms of a single variable for the length of the curve

4. Category #11

- A) A solid has an elliptical base with major axis 6 units and minor axis 3 units. Each cross section perpendicular to the major axis is a square. One side of the square is a chord of the ellipse parallel to the minor axis. Sketch the figure in a two-dimensional form.
- B) Sketch the figure in a three-dimensional form
- C) Find the volume of this solid

5. Category #16

A cylindrical water tank of radius 10 feet and height 30 feet is half-filled with water. How much work will it take to pump all the water out over the top?

6. Category #10

A) Graph $y^3 = x^2$ and the chord joining the points $(-1,1)$ and $(8,4)$. Shade the region bounded by the graph of the equation and the chord.

B) Find the Area of the shaded region.

7. Category #11

The shaded regions R_1 and R_2 shown are enclosed by the graphs $f(x) = x^2$ and $g(x) = 2^x$

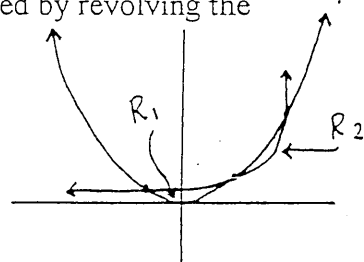
A) Find the x and y coordinates of the three points of intersection of the graphs of f and g . Answers to 3 decimal places, if needed.

B) Without using absolute value, set up an expression involving 2 integrals that gives the total area enclosed by the graphs of f and g . Do not evaluate.

C) Evaluate (B) by using your calculator

D) Without using absolute value, set up an expression involving one or two integrals that gives the volume of the solid generated by revolving the region R_1 about the line $y = 5$. Do not evaluate.

E) Evaluate (D) by using your calculator



8. Category #11

Let R be the region in the first quadrant that is enclosed by the graph of $y = \tan x$, the x -axis, and the line $x = \frac{\pi}{3}$

A) Sketch and shade the region

B) Find the area of R . (Note: $\int \tan x = \ln|\sec x|$)

C) Find the volume of the solid formed by revolving R about the x -axis

9. Category #11

- A) Region R is enclosed by $y = \sqrt{x+2}$, $y = x$, and $y = 0$. Find the Area of Region R
- B) Region T is enclosed by $y = \frac{1}{x^2}$, $y = x$, and $y = 4$. Find the Area of Region T.
- C) Find the Volume of (A) revolved about the x-axis.
- D) Find the Volume of (B) revolved about the line $x = -1$

10. Category #11

The base of a certain solid is the region enclosed by $y = \sqrt{x}$, $y = 0$, and $x = 4$. Every cross section perpendicular to the x-axis is a semicircle with its diameter across the base. Find the volume of the solid.

11. Category #14

Find the length of the arc from $x = 2$ to $x = 3$

$$y = \frac{x^4}{16} + \frac{1}{2x^2}$$

12. Category #16

A spring whose natural length is 24 inches exerts a force of 5 lb when stretched 10 inches beyond its natural length.

- A) Find the spring constant K
- B) How much work is required to stretch the spring from its natural length to a length of 42 inches.

13. Category #11

Region R is enclosed by $y = x^3$, $x = 2$, and $y = 0$. Find the volume of Region R revolved about $x = 3$