Name_____Period_____Date_____

NON-CALCULATOR SECTION

Vocabulary: **Directions** − Define each word *and* give an example.

1. Displacement

Short Answer

2. Describe the difference between the distance an object travels and its displacement.

3. In what situation would you have to use subregions to find the area between two curves?

Review

4. Evaluate $\int \frac{(\ln x)^5}{x} dx$.

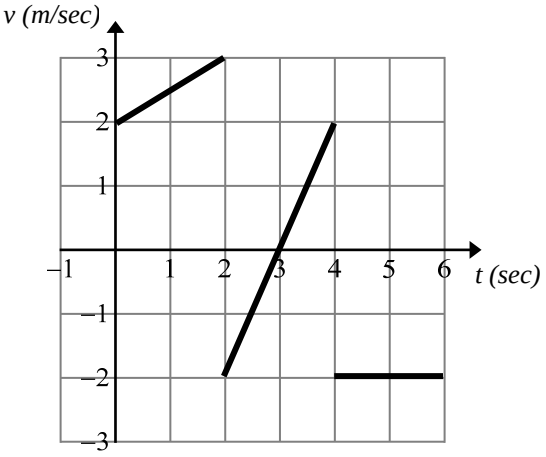
5. Water flows at a rate of 8 cubic feet per minute into a cylinder with radius 4. How fast is the water level rising?

Unit Eight Problems

Directions: Show all work completed to obtain your final answers. Partial credit may be given for incorrect answers. No credit may be given for problems without work if it is required to obtain the answer. Circle or box in your final answers.

6. Find the area of the region enclosed by the line $y = 3x + 4$ and the parabola $y = x^2 - 3x - 12$.

7. The graph shows the velocity of a particle moving on the *x*-axis. The particle starts at $x = -3$ when $t = 0$.



a) Find where the particle is at the end of the trip $(t = 6)$.

b) Find the total distance traveled by the particle.

8. A region is bounded by $y = \sqrt{16 + x^2}$ and $y = 5$ for $x \geq 0$. find the volume of the solid generated by revolving this region about the *y*-axis.

9. Find the area between the curves $g(y) = 3 - y^2$ and $f(y) = y + 1$.

Multiple Choice Questions: **Circle the best answer**.

10. Find the area of the region enclosed by $y = \sin 2x$ and $y = \cos x$ for $-\frac{\pi}{2} \le x \le \frac{\pi}{6}$.

(A) 2.25 (B) 2.75 (C) 3 (D) $\frac{\pi}{2}$ (E) $\frac{3\pi}{4}$

11. A region is bounded by the curves $y = \sqrt{x}$, $y = x - 2$, and $y = 0$. Find the volume of the solid generated by rotating this region about the *x*-axis.

(A) $\frac{8\pi}{3}$ (B) $\frac{16\pi}{3}$ (C) $\frac{20\pi}{3}$ (D) $\frac{24\pi}{3}$ (E) $\frac{32\pi}{3}$

Name_____Period_____Date_____

CALCULATOR SECTION

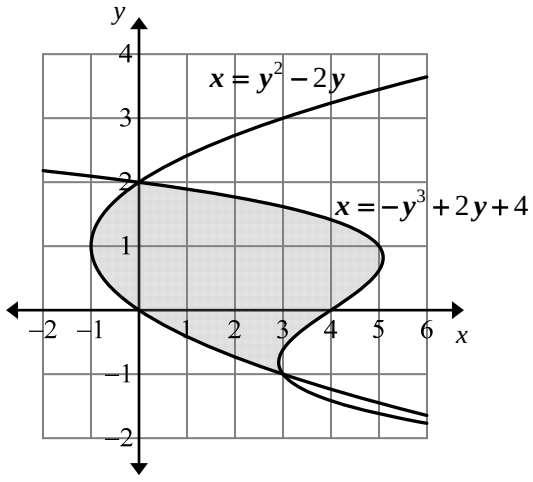
Directions: Show all work completed to obtain your final answers. Partial credit may be given for incorrect answers. No credit may be given for problems without work if it is required to obtain the answer. Circle or box in your final answers.

12. The rate of expenditures on public elementary and secondary schools (in billions of dollars per year) in the United States can be modeled by the function $S = 6.22e^{0.086t}$, where *t* is the number of years after January 1, 1950. Find the total expenditures from January 1, 1950 to January 1, 1990.

13. 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?

Multiple Choice Question: **Circle the best answer**.

14. Find the area of the shaded region. (Round to the nearest whole number.)



(A) 10 (B) 11 (C) 12 (D) 13 (E) 14