AP Calculus - More Int App. Review

Find the _area_ of the following:

1. $y = 3x$, $y = x^3 - 6x^2 + 11x$ 2. $x = 1$, $x = 16y - y^3 + 1$

3. $2x + y = -2$, $x - y = -1$, $7x - y = 17$

4. Consider the region bounded by $y = \frac{1}{x^2}$, $x = 1$, $x = 6$, + the x-axis. Determine c so that $x = c$ bisects the area of the region.

5. A solid has its base in the xy plane bounded by $x^2 + y^2 = 16$. Every cross-section $\perp$ to y-axis is a rectangle whose height is half that of the side in the xy plane. Find the volume.

6. A solid has its base in the xy plane bounded by $y = x^2 + 2$ and $y = 5$. Every cross-section $\perp$ to the x-axis is a semicircle with diameter in the xy plane. Find the volume.

id the volumes of the solid obtained by rotating the given region about the given line.

7. $y - 1 = x^3 + 1$, $x = 1$, $y = 1$ around $y = 1$

8. $y = 6 - 2x - x^2$, $y = x + 6$ around $y = 3$

9. $y = x$, $y = \sqrt{x}$ about $x = 2$

10. $y = \frac{1}{x}$, $x = 1$, $x = 2$, $y = 0$ about x-axis

11. $y = x^{2/3}$, $x = 1$, $y = 0$ about y-axis

Find arclength of following:

12. $y = \int_5^x (5 + \cos t)\, dt$ $x \in [6, 10]$ 13. $y = 3x^2 - 4|x - 3| + 6$ $x \in [0, 6]$

4. $(x+1)^2 = (y-2)^3$ from $(-2, 3)$ to $(7, 6)$

15. The velocity of an object is $v(t) = -2t^3 + 3t^2 + 8$. At $t = 0$, the object is at 3 m. Ⓐ Determine displacement from $t = 0$ to $t = 4$ sec. Ⓑ Determine position at 4 sec. Ⓒ Determine the distance traveled from 0 to 4 sec.

Key - More Int App Review

1. 8   2. 128   3. 16   4. $\frac{12}{7}$ 5. $\int_{-4}^{4} \frac{1}{2}(2\sqrt{16-y^2})^2 dy = \frac{512}{3}$

$\frac{1}{2}\pi \int_{-1.73205}^{1.73205} \left[\frac{5-(x^2+2)}{2}\right]^2 dx = 6.5297$ 7. $\pi \int_{-1}^{1} (x^3+2-1)^2 dx = \frac{16}{7}\pi$

8. $\pi \int_{-3}^{0} \left[(6-2x-x^2-3)^2 - (x+6-3)^2\right] dx = 21.6\pi$ 9. $\pi \int_{0}^{1} (2-y^2)^2 - (2-y)^2 dy$
$= \frac{8}{15}\pi$

10. $\pi \int_{1}^{2} \left(\frac{1}{x}\right)^2 dx = \frac{\pi}{2}$ 11. $\pi \int_{0}^{1} \left((1)^2 - (y^{3/2})^2\right) dy = \frac{3\pi}{4}$

12. $\int_{6}^{10} \sqrt{1+(5+\cos x)^2} dx = 20.146$ 13. $\int_{0}^{3} \sqrt{1+(6x+4)^2} dx + \int_{3}^{6} \sqrt{1+(6x-4)^2} dx$
$= 108.210$

14. $\int_{3}^{6} \sqrt{1+\left[\frac{3}{2}(y-2)^{1/2}\right]^2} dy = 7.6337$ 15. a) $\int_{0}^{4} (-2t^3+3t^2+8) dt = -32m$

b) $-29m$ c) $\int_{0}^{4} |-2t^3+3t^2+8| dt$
$= 65.162m$