

1. The base of a solid is in the first quadrant between the curve $y = x^2$ and the curve $y = \sqrt{x}$ for $0 \leq x \leq 1$. The cross sections of the solid perpendicular to the x -axis are isosceles right triangles whose legs run between the curves. Find the volume of the solid.

(A) $\frac{3}{70}$ (C) $\frac{\sqrt{2}}{25}$ (E) $\frac{9}{35}$ (G) $\frac{37}{70}$

(B) $\frac{3}{35}$ (D) $\frac{9}{140}$ (F) $\frac{9}{70}$ (H) $\frac{9\sqrt{3}}{280}$

2. Find the volume of the solid generated by revolving the region bounded by $y = x$, $y = -x$, and $x = 2$, about the line $x = -3$.

(A) $\frac{74\pi}{4}$ (C) $\frac{97\pi}{12}$ (E) $\frac{26\pi}{3}$ (G) $\frac{208\pi}{3}$

(B) $\frac{115\pi}{3}$ (D) $\frac{85\pi}{6}$ (F) $\frac{104\pi}{3}$ (H) $\frac{52\pi}{9}$

3. Find the volume of the solid generated by revolving the region bounded by $y = \sqrt{x}$, $x = 0$, and $y = 1$ about the line $y = -1$.

(A) $\frac{7\pi}{6}$ (C) $\frac{5\pi}{12}$ (E) $\frac{5\pi}{4}$ (G) $\frac{5\pi}{6}$

(B) $\frac{5\pi}{3}$ (D) $\frac{9\pi}{5}$ (F) $\frac{7\pi}{3}$ (H) $\frac{7\pi}{12}$

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4. Find the volume of the solid generated by revolving the region bounded by $y = \sqrt{x}(x^2 + 16)^{1/4}$, $x = 3$ and $y = 0$, about the x -axis. See the graph below.

(A) $\frac{17\pi}{3}$

(C) $\frac{23\pi}{3}$

(E) $\frac{61\pi}{3}$

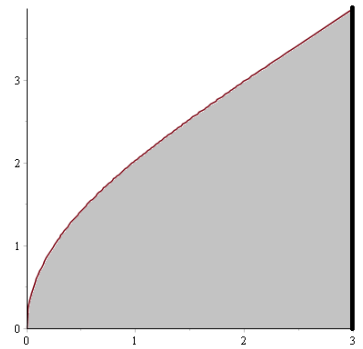
(G) $\frac{67\pi}{3}$

(B) $\frac{19\pi}{3}$

(D) $\frac{53\pi}{3}$

(F) $\frac{47\pi}{3}$

(H) $\frac{81\pi}{2}$



5. Find the arclength of the curve $y = (4 - x^{2/3})^{3/2}$ for $1 \leq x \leq 8$.

(A) 8

(C) 9

(E) 6

(G) 21

(B) 2

(D) 4

(F) 15

(H) 27

6. Find the area of the surface generated by revolving the curve

$$y = \frac{1}{3}(x^2 + 2)^{3/2} \quad \text{for } 0 \leq x \leq \sqrt{6} \quad \text{about the } y\text{-axis.}$$

- (A) $6\pi\sqrt{6}$ (C) 67π (E) $12\pi\sqrt{6}$ (G) 24π
(B) $3\pi\sqrt{6}$ (D) 12π (F) 36π (H) 6π

7. Find the x coordinate of the centroid (center of mass) of the triangular region with vertices $(0,0)$, $(0,4)$, and $(6,0)$.

- (A) 1 (C) 3 (E) $\frac{5}{2}$ (G) $\frac{7}{4}$
(B) 2 (D) $\frac{4}{3}$ (F) $\frac{9}{4}$ (H) $\frac{3}{2}$

Answers:

1. D
2. F
3. A
4. E
5. C
6. G
7. B