

Chapter 6 Additional Review v.17

1. Given $f(x) = \sqrt{x - 1}$, find the value of c such that $f(c)$ is the average value on $[1, 10]$.
2. Given $f(x) = x^2$, find the value of c such that $f(c)$ is the average value on $[0, 6]$.
3. Find the volume of the solid obtained by revolving about the x -axis, the region bounded by the graphs of $y = x^2 + 4$, the x -axis, the y -axis and the line $x = 3$.
4. Find the volume of the solid bounded by $y = x^3$, $x = 2$ and the x -axis revolved about the line $x = 2$.
5. Find the volume of the solid that results when the region bounded by $y = \sqrt{x}$, $y = 2x - 1$, $y = 0$ and $x = 0$ is revolved around the y -axis.

6. Ben is about to haul up a 32 m length of rope hanging from the top of a building (which is 32 m above the ground also). How much work will it take to haul up the rope if it weighs 1.8 N/m? Assume uniform weight.

7. Suppose $f(x) = xe^x$ and $g(x) = \sin x + 1$

a) Find the area of the region in the first quadrant bounded by the graphs of $f(x)$, $g(x)$ and $x = 0$.

b) The volume of the region in part (a) about the x-axis.

c) Suppose the region in part (a) is the base of a solid. For this solid, the cross sections perpendicular to the x-axis are squares with bases extending from $y = f(x)$ to $y = g(x)$. Find the volume of this solid.

8. Find the area between $y = 2\cos x$ and $y = \cos(x)$ on $[0, \pi/2]$

9. Ravin Industries, a manufacturer of cookies, stores it cases of cookies in an air-conditioned warehouse for shipment every 14 days. RVR (the owner) tries to keep 600 cases on reserve to meet occasional peaks in demand, so a typical 14-day inventory function can be expresses as:

$$I(t) = 600 + 600t, 0 \leq t \leq 14$$

Find RVR's average daily inventory for the 14-day period.

Answers:

1. $c = 5$ 2. $c = 2\sqrt{3}$ 3. $843\pi/3$ 4. $16\pi/5$ 5. $23\pi/60$ 6. 921.6 J

7.a) $0.54901 u^2$ b) $0.96679\pi u^3$ c) $0.45159 u^3$ 8. $1 u^2$ 9. 4800 cases