Lesson 7

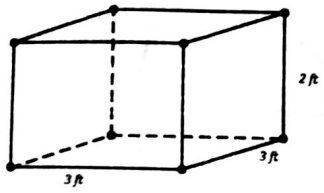
READY, SET, GO! Name Period Date

READY

Topic: Finding volume and surface area

Find the volume and surface area for the 3-dimensional shapes below.

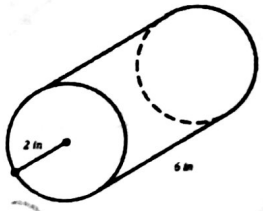
1.



a. Volume = $l \cdot w \cdot h$
$= 3(3)(2)$
$= 18 \text{ ft}^3$

b. Surface Area =
$= ph + 2B$
$= 12(3) + 2(3 \cdot 3)$
$= 42 + 18$

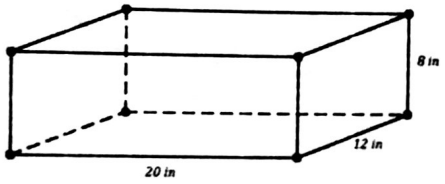
2.



a. Volume = $\pi r^2 \cdot h$
$= \pi(2)^2 \cdot 6$
$= 24\pi \text{ in}^3$

b. Surface Area =
$= 2\pi rh + 2\pi r^2$
$= 2\pi(2)(6) + 2\pi(2)^2$
$= 32\pi \text{ in}^2$

3.



a. Volume = $l \cdot w \cdot h$
$= 20(12)(8)$
$= 1920 \text{ in}^3$

b. Surface Area = $ph + 2B$
$= 24(8) + 2(20 \cdot 12)$
$= 992 \text{ in}^2$

SET

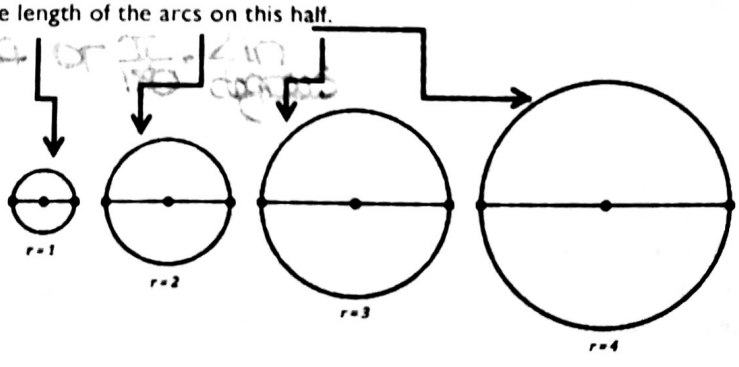
Topic: Radians

4. Below are circles of radius 1, 2, 3, and 4 units. Each of them has a diameter drawn that cuts them into two equal sectors. Find the arc length of one half of each of these circles. Then find the radian measure of the arc length for each one.

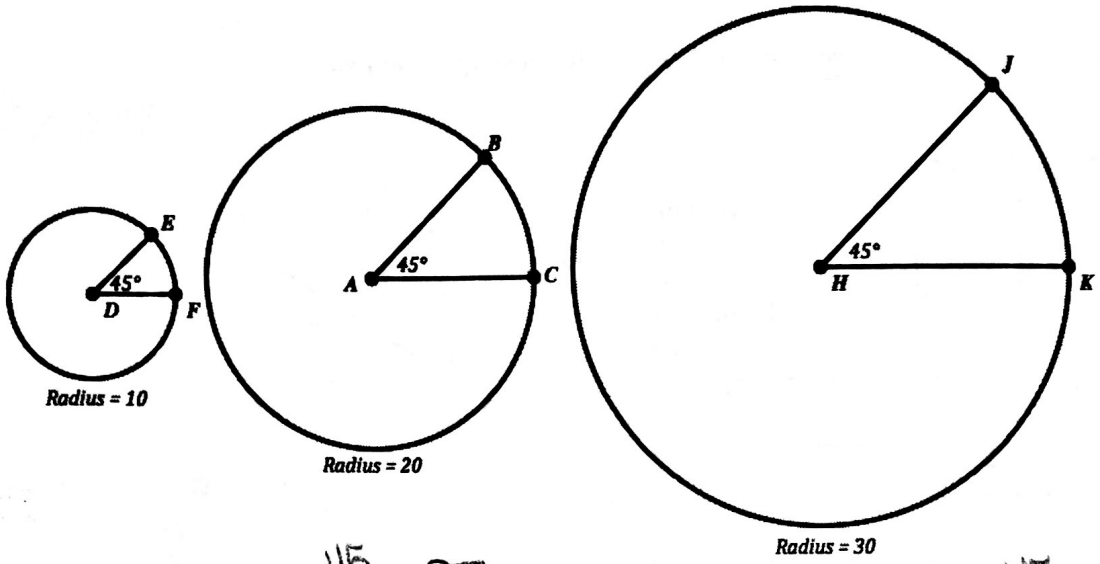
Find the length of the arcs on this half.

$\frac{180}{360} \cdot 2\pi r$ arc length / radius or $\frac{\pi}{4}$ in 180 degrees

Radius	Length of arc for half the circle	Radian measure of half the circle
1	π	π
2	2π	π
3	3π	π
4	4π	π



5. There are three circles below each with a different radius. The same size angle 45° has been used to create a sector in each circle. Fill in the table with the length of the arc measure for the sector, the radian measure and the area of the sector.



$\frac{45}{360} \cdot 2\pi r$ $\frac{\pi}{180} \cdot 45$ $\frac{45}{360} \cdot \pi r^2$

Radius	Length of arc	Radians	Area of sector
10	$5\pi/2$ or 7.85	$\pi/4$	$25\pi/2$ or 39.27
20	5π or 15.71	$\pi/4$	50π or 157.08
30	$15\pi/2$ or 23.56	$\pi/4$	$225\pi/2$ or 353.43

6. Use the three circles in problem 5 to find the following ratios. divide 1st by 2nd

arc lengths

a. $\widehat{EF}$ to $\widehat{BC}$ $\frac{1}{2}$ or 1:2 b. $\widehat{BC}$ to $\widehat{JK}$ $\frac{2}{3}$ or 2:3 c. $\widehat{EF}$ to $\widehat{JK}$ $\frac{1}{3}$ or 1:3

d. What do you notice about the ratios between the arc lengths?

They are the same as the ratios of the radii.
(Arc lengths & radii are directly proportional)

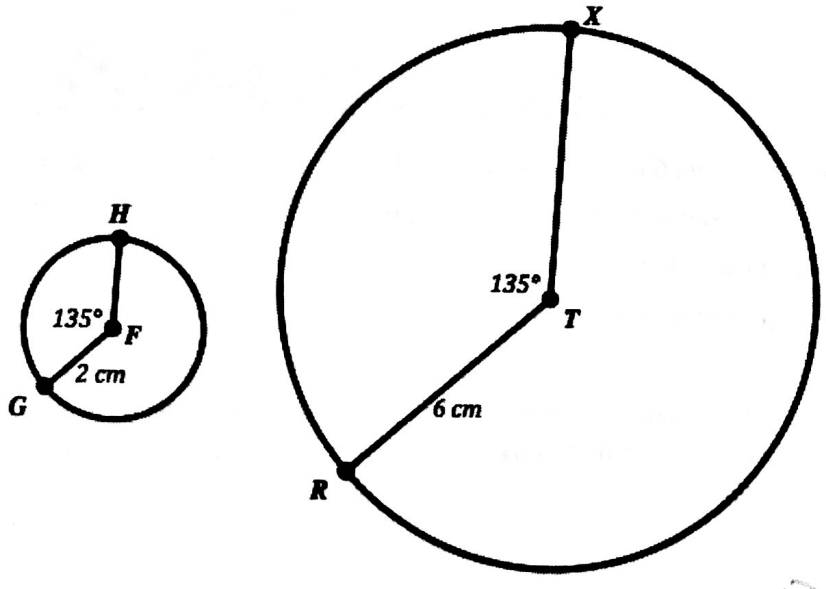
7. Considering $\widehat{EF}$ above in problem 5. (a) How many copies of this arc would be needed to be equal to the length of the entire circumference of circle D? (b) Would this be true for the other arcs and circles in the problem above? Why? (a) $360/45 = 8$ ∴ 8 copies

(b) Yes, because 45° is one-eighth of 360°.

GO

Topic: Same angle different size sectors and arcs, accompanying ratios

Consider the sectors and arc lengths in the two circles below to answer the questions.



8. Find the arc length of arc GH. $\text{arc length} = \frac{135}{360} \cdot 2\pi(2) = 1.5\pi \text{ cm}$ or 4.71 cm

9. Find the arc length of arc RX. $\text{arc length} = \frac{135}{360} \cdot 2\pi(6) = 4.5\pi \text{ cm}$ or 14.14 cm

10. Find the area of the small sector in circle F. $\text{area of sector} = \frac{135}{360} \cdot \pi(2)^2 = 1.5\pi \text{ cm}^2$ or 4.71 cm^2

11. Find the area of the small sector in circle T. $\text{area of sector} = \frac{135}{360} \cdot \pi(6)^2 = 13.5\pi \text{ cm}^2$ or 42.41 cm^2

12. The radian measure of the 135° sector in each circle. $\text{radian measure} = \frac{\pi}{180} \cdot 135 = \frac{3\pi}{4}$ (2.36)

13a. What is the ratio of arc GH to arc RX? divide $\frac{1.5\pi}{4.5\pi} = \frac{1}{3}$ or 1 to 3

b. What is the ratio of the areas of the two sectors? divide $\frac{1.5\pi}{13.5\pi} = \frac{1}{9}$ or 1 to 9