Warm up Monday February 25

ARC LENGTH Find the length of the arc associated with the given central angle and radius.

1. 120°; radius 4 $2\pi(4)\left(\frac{120}{360}\right) \approx 8.38$
2. 135°; radius 1.5 $2\pi(1.5)\left(\frac{135}{360}\right) \approx 3.53$

CONVERSION Convert the degree measure to radian measure.

3. 15° $\frac{2\pi 15}{360} = \frac{30}{360}\pi = \frac{1}{12}\pi$
4. 70° $= \frac{2\pi 70}{360}\pi = \frac{140}{360}\pi = \frac{7}{18}\pi$

CONVERSION Convert the radian measure to degree measure.

5. $\frac{4\pi}{3}$ radians

$2\pi\left(\frac{\text{degree}}{360}\right) = \text{Radian}$

$360\left[\frac{2\pi(\text{degree})}{360}\right] = \left[\frac{4}{3}\pi\right]360$

$\frac{2\pi(\text{degree})}{2\pi} = \frac{480\pi}{2\pi}$

Degree = 240°

6. $\frac{11\pi}{12}$ radians

$\frac{2\pi(\text{degree})}{360} = \frac{11}{12}\pi$

multiply by 360

$2\pi(\text{degree}) = \frac{11}{12\pi}(360)$

$\frac{2\pi(\text{degree})}{2\pi} = \frac{330\pi}{2\pi}$

degree = 165°

Feb 24-8:55 PM

What's the radian?

15°

$2\pi\left(\frac{\text{degree}}{360}\right) = \text{Radian}$

$\frac{2\pi}{1} \cdot \frac{15}{360}$

$\frac{2\pi 15}{360} = \frac{30}{360}\pi = \frac{3}{36}\pi = \frac{1}{12\pi}$

Feb 25-9:33 AM

FINDING AREA Find the area of the shaded region.

26. 5 in.

$\pi(34)^2 - \pi(17)^2$

$867\pi = 2723.76$

$\frac{2723.76}{2} = 361.88\ \text{cm}^2$

27. 109°, 5.2 ft

28. 20 in., 20 in.

29. 17 cm, 180°

$\frac{\pi r^2}{2} - \frac{\pi r^2}{2}$

30. 2 ft

31. 4 m

πr^2 (4π)

$2\left(\frac{1}{2}bh\right)$

$\frac{1}{2}bh$

$2\left[\frac{1}{2}(4)(2.65)\right]$

10.6

2 Triangles

$2^2 + x^2 = 3^2$

$4 + x^2 = 9$

$x^2 = 5$

$x = 2.65$

height

Feb 24-9:03 PM

Find shaded area

26. 5 in.

πr^2 area $-$ $\frac{1}{2}bh$

height = 3.54

base = 2(3.54)

r = 3.54

$\pi(3.54)^2 - \frac{1}{2}(2)(3.54)(3.54)$

base height

$39.37 - 12.53$

$\approx 26.8\ \text{in}^2$

$a^2 + b^2 = c^2$

$x^2 + x^2 = 5^2$

$2x^2 = 25$

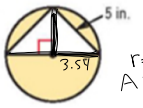
$x^2 = 12.5$

$x = \sqrt{12.5}$

$x = 3.54$

Feb 25-9:51 AM

Shaded area?

26. 

πr^2 − $\frac{1}{2}bh$

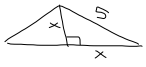
$r = 3.54$ $h = 3.54$ base $= 2(3.54)$

$A = \pi r^2$ $\frac{1}{2}(3.54)\,7.08$

$\pi(3.54)^2$ −

$39.27 - 12.52$

$\approx 26.75\ in^2$



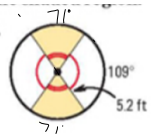
$x^2 + x^2 = 5^2$

$2x^2 = 25$

$x^2 = 12.5$

$x = 3.54$

Feb 25-8:13 AM

27. 

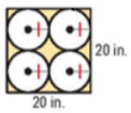
$\pi r^2\left(\frac{142}{360}\right)$

$\pi(5.2)^2\left(\frac{142}{360}\right)$

$33.51 ft^2$

Feb 25-8:21 AM

Area of Yellow?

28. 

$r = 5$

Area LW $4(\pi r^2)$

$20 \times 20 - 4(\pi)(5)^2$

$400 - 100\pi$

$85.84\ in^2$

Feb 25-10:01 AM

30. 

πr^2 $\pi(8)^2$ 64π − πr^2 $\pi(6)^2$ 36π

28π = Big Yellow Ring

πr^2 $\pi(4)^2$ − $\pi(2)^2$

12π Little Yellow Ring

$28\pi + 12\pi = 40\pi$

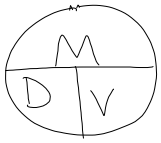
answer $125.66 ft^2$

Feb 25-8:24 AM

P 761

1. **METALS** Toni found an irregular piece of metal. She dropped it into a container partially filled with water and measured that the water level rose 4.8 centimeters. The square base of the container is 8 centimeters on a side. Toni measures the mass of the metal to be 450 grams. What is the density of the metal? Round to the nearest tenth.

V = 4.8
M = 450



2. **POPULATION DENSITY** The population of Colorado in 2009 was about 5,024,748. The land area can be approximated by a rectangle with coordinates (0, 0), (369, 0), (369, 281), and (0, 281), with each unit on the coordinate plane being 1 mile. What was the population density of Colorado in 2009?

3. **POPULATION DENSITY** In 2000, Texas had about 2.74 persons per household, 7,393,354 households, and a land area of about 261,797 square miles. What was the population density of Texas in 2000? If the population in 2009 was about 24,782,302, how did the density in 2009 compare to the density in 2000?

4. **COOLING** On average during the summer, a 30,000 cubic foot house costs $7 per day to cool, while a 25,000 cubic foot house costs $6.50 per day to cool. Which house costs less per cubic foot to cool? *Explain.*

$\frac{7}{30{,}000}$ $\frac{6.50}{25{,}000}$

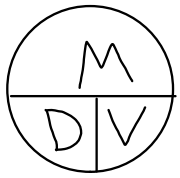
.00023 Dollars/cubic feet .00026 Dollars/cubic feet

761

Feb 24-9:04 PM

$D = \frac{M}{V}$

Density = $\frac{\text{mass}}{\text{Volume}}$



mass = Density x Volume

Feb 25-7:34 AM

Polyhedron - a solid figure made out of polygons

Euler's Theorem

F + v = E +2

faces + vertices = Edges +2

5 vertices
8 Edges
how many faces?

$x + 5 = 8 + 2$ (x = faces)

$x + 5 = 10$
$-5 \quad -5$
$x = 5$ faces

Feb 25-10:27 AM

Use Euler's formula to find n

$F + V = E + 2$

Ex 1
Vertices = 12
Edges = 18
Faces = n

$n + 12 = 18 + 2$
$n + 12 = 20$
$-12 \quad -12$
$n = 8$
# of faces = 8

Ex 2
V = n
E = 8
F = 5

$5 + n = 8 + 2$
$n = 5$
# of vertices = 5

Ex 3
V = 16
E = n
F = 10

$10 + 16 = n + 2$
$26 = n + 2$
$-2 \quad -2$
$24 = n$
# of Edges = 24

Feb 25-10:34 AM

P746 Euler's Theorem

$F + V = E + 2$

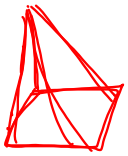
Faces + Vertices = Edges + 2

$6 + 8 = E + 2$

$14 = E + 2$

$12 = E$

Feb 25-8:40 AM



$F + V = E + 2$

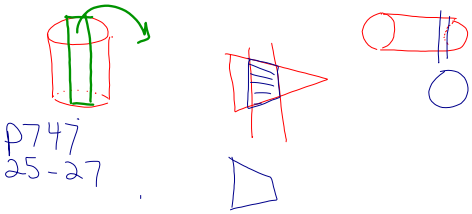
$5 + 5 = E + 2$

$8 = E$

Feb 25-8:47 AM

Cross Section

Cutting a section out of a solid



P747
25-27

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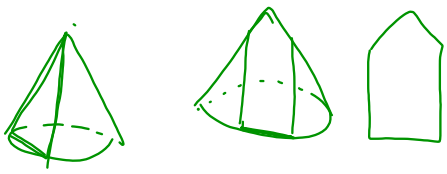
CROSS SECTION



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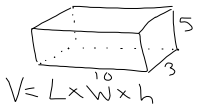
$V = Bh$

B = area of base

b = length of base



$V = L \times W \times h$

$\therefore 5$

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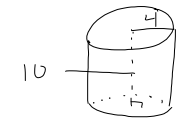
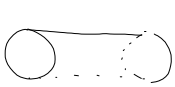
Cylinder

$V = Bh$





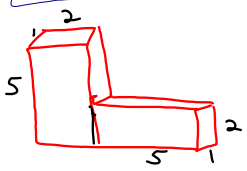
πr^2

$\pi(4)^2(10) = 160\pi$

Feb 25-8:35 AM

p 755 Volume

Numbers 4-20



$35 - 15$

$20 u^2$

Feb 25-8:38 AM

Feb 25-8:51 AM