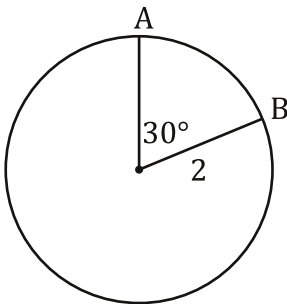# Finding Lengths of Arcs and Areas of Sectors

Doesn't that sound like fun?

Well okay, maybe not to you, but these problems are fun. Let's take a look...

Find the length (not the measure) of $\overset{\frown}{AB}$.

Step 1. Find the fraction of the circle's circumference that $\overset{\frown}{AB}$ represents. How? Like this....

$$\frac{30°}{360°} = \frac{1}{12}$$

This is the measure of the part of the circle we want over the total measure of the circle.

Step 2. Find the circumference of the circle...
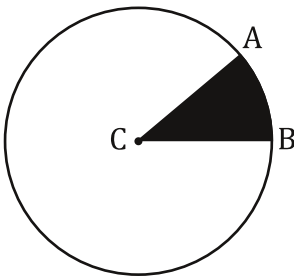
$C=2\pi r$
$C=2\pi 2$
$C=4\pi$

Step 3. Multiply the circumference by the fraction... and presto!

$$4\pi * \frac{1}{12} = \frac{4\pi}{12} = \frac{\pi}{3}$$
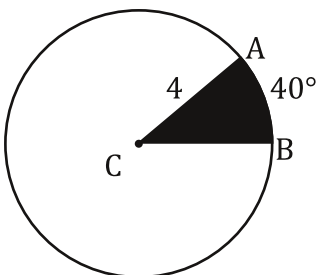
$$AB = \frac{\pi}{3} \approx 1.05$$

Next, let's look at <u>Sectors</u>. What the heck is a sector? A sector is a portion of the area of a circle enclosed by two radii and an arc. Huh? Well if you had a pie and you cut a piece out of it that piece would be a sector of the pie. Like this...

The shaded area in the the diagram is a sector.   Sector CAB is a sector of $\odot$C.

Find the area of sector CAB.

Step 1. Find the fraction of the circle that sector CAB represents. How? Like this....

$$\frac{40°}{360°} = \frac{1}{9}$$

Step 2. Find the area of the entire circle...
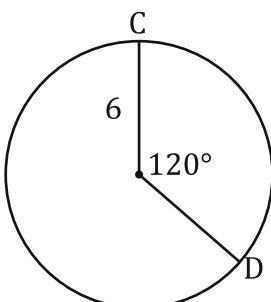
$A=\pi r^2$
$A=\pi 4^2$
$A=16\pi$

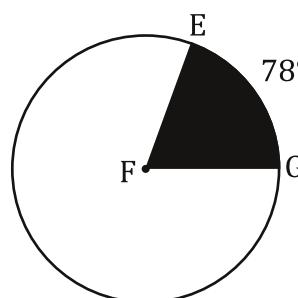**Step 3.** Multiply the area by the fraction... and presto!

$$16\pi * \frac{1}{9} = \frac{16\pi}{9}$$

$$mAB = \frac{16\pi}{9} \approx 5.59u^2$$

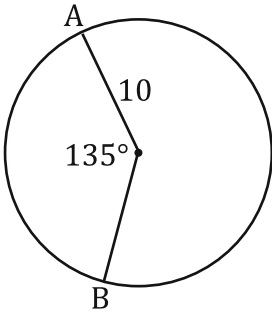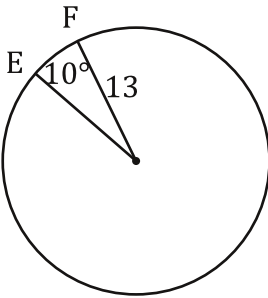You try! Find the length of $\overset{\frown}{CD}$.

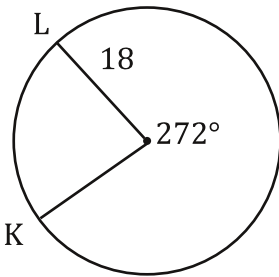You try! Find the area of sector EFG.

Calculate the length of each arc...

1.
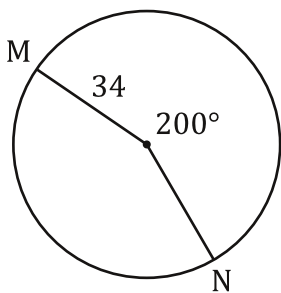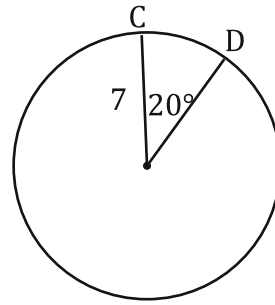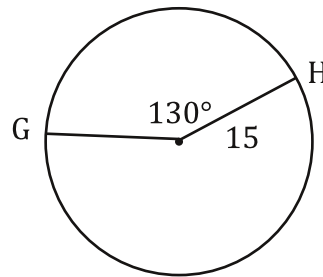

A
10
135°
B

2.

C
D
7 20°

3.

F
E 10° 13

4.

H
130°
G 15
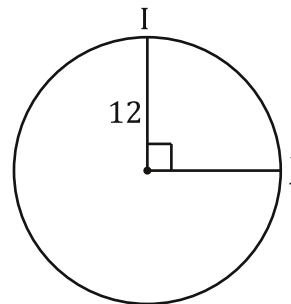
5.

L
18
272°
K

6.

I
12
J

7.

M
34
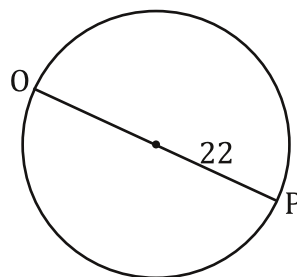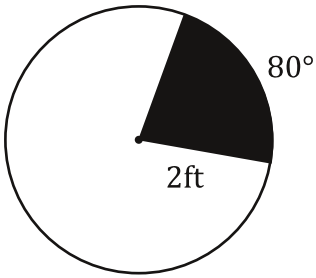200°
N

8.

O
22
P

Bubble all the correct answers from above. Don't bubble incorrect answers.

○ 38.56   ○ 23.56   ○ 34.03   ○ 2.55   ○ 85.45   ○ 76.39   ○ 118.68   ○ 2.27   ○ 25.34   ○ 37.48   ○ 69.12   ○ 49.57   ○ 18.85   ○ 2.44
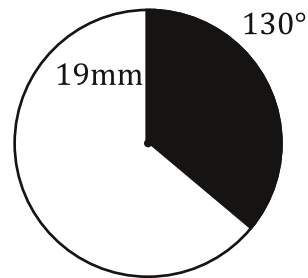
Find the area of each shaded sector...

9.

80°

2ft

10.

140°

5in

11.

12cm

90°

12.

19mm

130°

13.

320°

15m

14.

157°

31ft

15.

23in

276°

16.
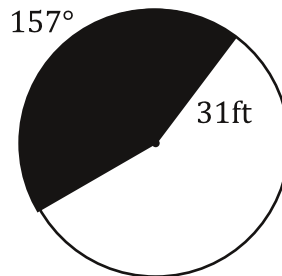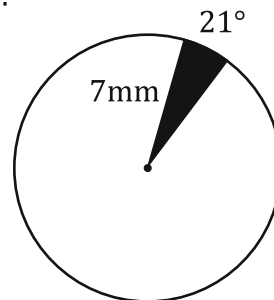

21°

7mm
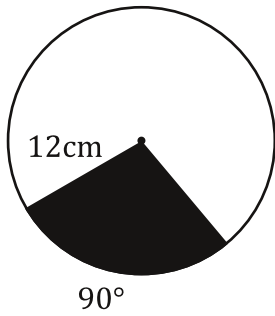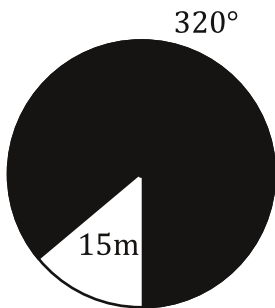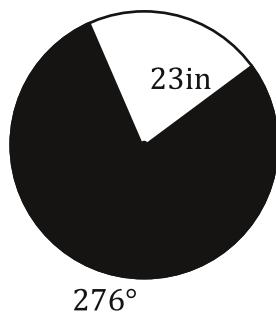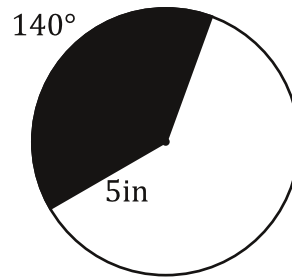
Bubble all the correct answers from above. Don't bubble incorrect answers.

◯ 2.79   ◯ 34.57   ◯ 1274.13   ◯ 146.91   ◯ 8.98   ◯ 628.32   ◯ 579.34   ◯ 67.09   ◯ 45.78   ◯ 698.87   ◯ 31.50   ◯ 113.1   ◯ 30.54   ◯ 1265.75