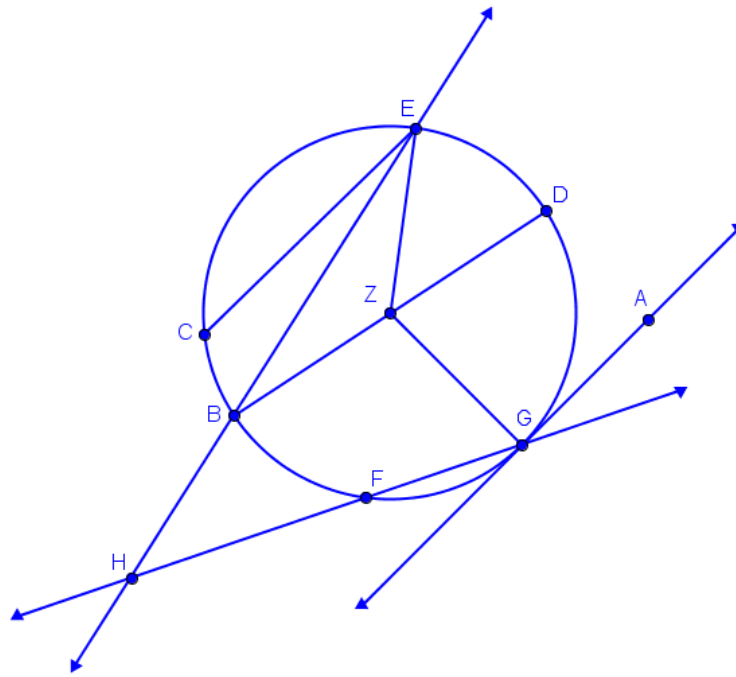# SM2 9.5: Central Angles

Problems:

Use the figure above to answer questions 1 through 10:

1) What is the name of the circle?

$$\odot Z$$

2) What is the name of each radius of the circle shown in the figure?

$$\overline{EZ}, \overline{GZ}, \overline{BZ}, \overline{DZ}$$

3) What is the name of each secant line of the circle shown in the figure?

$$\overleftrightarrow{HB} \text{ or } \overleftrightarrow{HE} \text{ or } \overleftrightarrow{BE}$$
$$\overleftrightarrow{HF} \text{ or } \overleftrightarrow{HG} \text{ or } \overleftrightarrow{FG}$$

4) What is the name of each chord of the circle shown in the figure?

$$\overline{CE}, \overline{BE}, \overline{BD}, \overline{FG}$$

5) What is the name of each diameter of the circle shown in the figure?

$$\overline{BD}$$

6) What is the name of each tangent line of the circle shown in the figure?

$$\overleftrightarrow{GA}$$

7) List each vocabulary term that $\overline{ZG}$ is an example of.

Radius

8) List each vocabulary term that $\overline{DB}$ is an example of.

Chord, Diameter

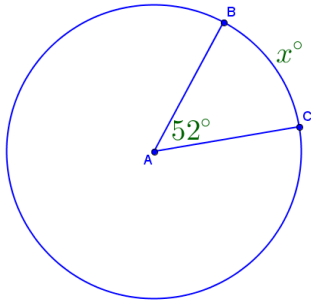9) List each vocabulary term that point G is an example of.

Point of Tangency

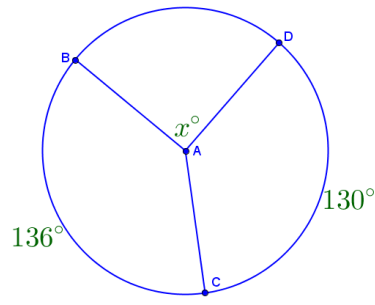10) List each vocabulary term that $\overleftrightarrow{BH}$ is an example of.

Secant Line

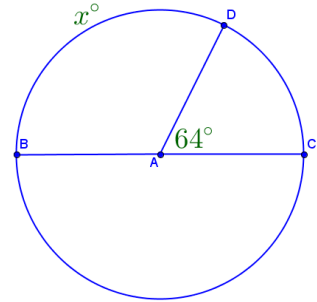Find the value of x, and circle the correct classification of the indicated angle:
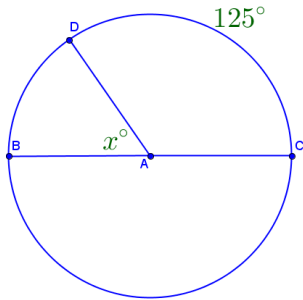
11)

$x = 52°$

12)

$x = 94°$

13)

$x = 116°$

14)

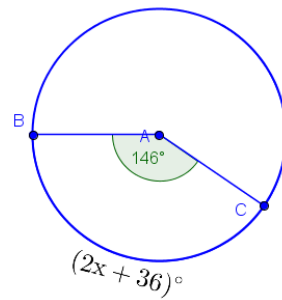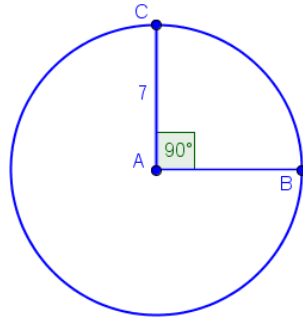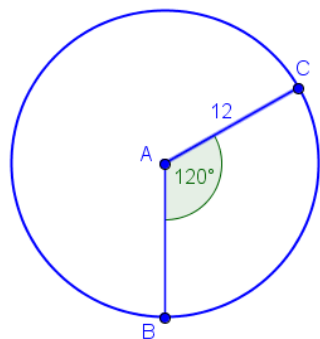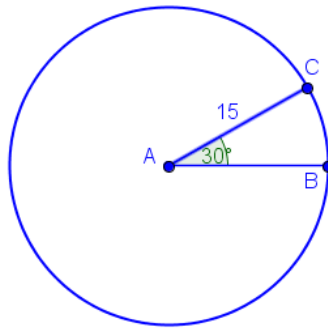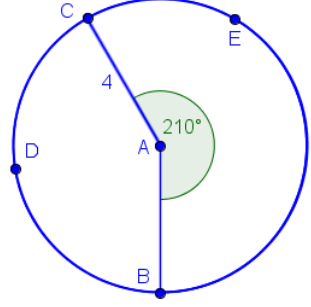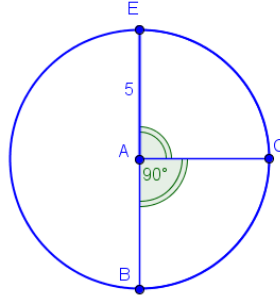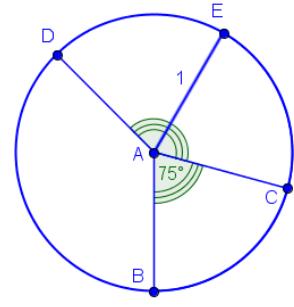
$x = 55°$

15)

$x = 55°$

Find the a) indicated arc length in terms of π, b) approximate the arc length to the nearest tenth, and c) circle the correct classification of the arc. **All lengths are in** *in*.

7 90°	12 120°	15 30°
16) Length of $\overset{\frown}{BC} =$	17) Length of $\overset{\frown}{CB} =$	18) Length of $\overset{\frown}{BC} =$
a) $\frac{7\pi}{2}$ *in* b) 10.996 *in* minor semicircle major	a) 8π *in* b) 25.133 *in* minor semicircle major	a) $\frac{5\pi}{2}$ *in* b) 7.854 *in* minor semicircle major
4 210°	5 90°	1 75°
19) Length of $\overset{\frown}{BEC} =$	20) Length of $\overset{\frown}{BCE} =$	21) Length of $\overset{\frown}{BED} =$
a) $\frac{14\pi}{3}$ *in* b) 14.661 *in* minor semicircle major	a) 5π *in* b) 15.708 *in* minor semicircle major	a) $\frac{5\pi}{4}$ *in* b) 3.927 *in* minor semicircle major

Find a) the exact area of the sector and b) the approximate area of the sector to the nearest tenth. **All lengths are in** *in.*

22)	23)	24)
a) $\frac{11\pi}{9} in^2$ b) $3.840 \ in^2$	a) $\frac{18\pi}{5} in^2$ b) $11.310 \ in^2$	a) $\frac{25\pi}{2} in^2$ b) $39.270 \ in^2$
25)	26) For b) round to the nearest hundredth.	27)
a) $\frac{333\pi}{40} in^2$ b) $26.154 \ in^2$	a) $\frac{\pi}{360} in^2$ b) $.009 \ in^2$	a) $\frac{16\pi}{9} in^2$ b) $5.585 \ in^2$
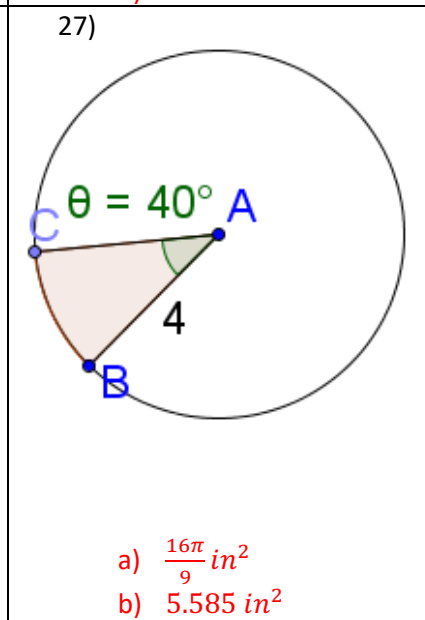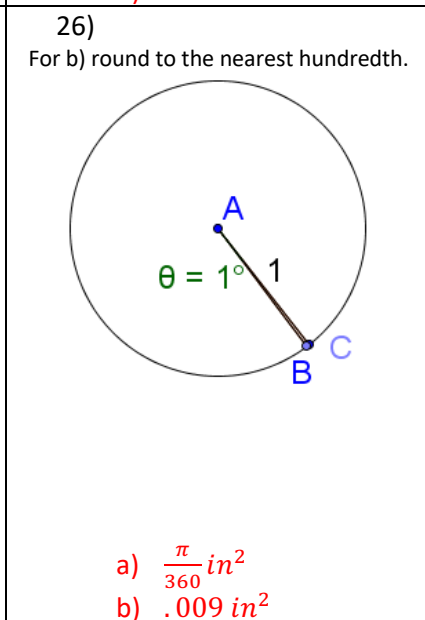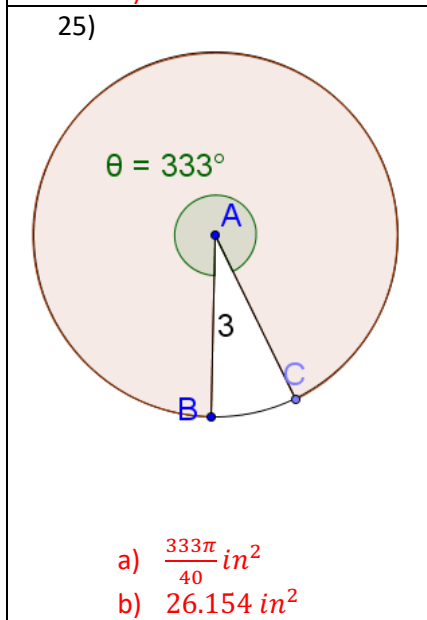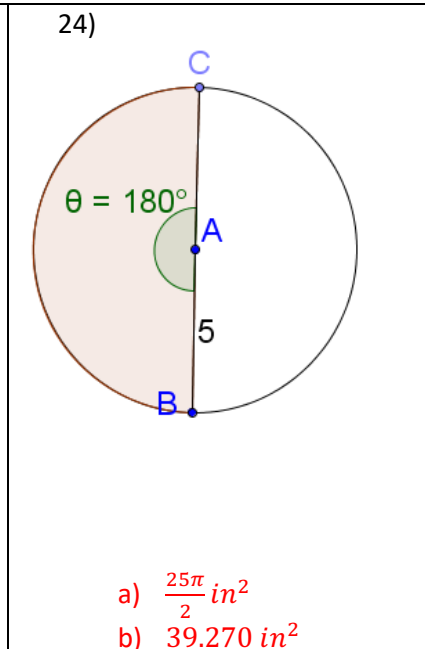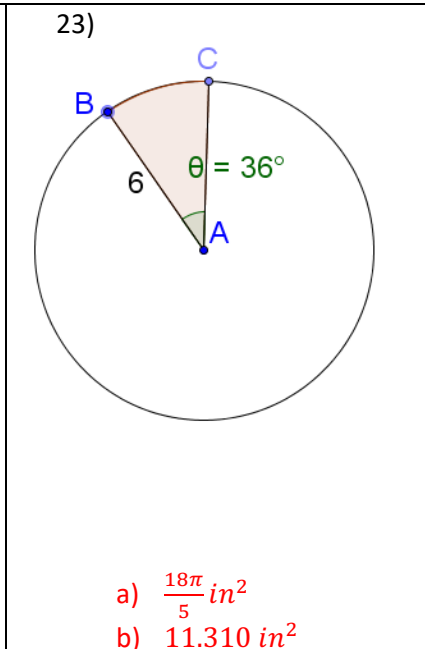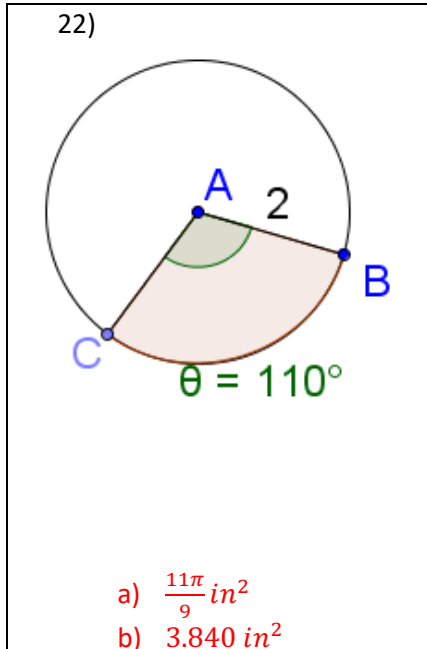
28) You and some friends are going out to lunch. After much discussion, you decide to go to the best pizza place in town, Orem π Pizza. You have three options for lunch, all three cost the same, and you can put as many toppings as you want on any of them. (Pizza sizes are given in diameters.)

    a.   A personal 6" pizza. $A = 3^2\pi \approx 28.274\ in^2$

    b.   Two slices that come from a 14" pizza that was cut into 12 slices

$$A = 7^2\pi * \left(\frac{1}{6}\right) \approx 25.656\ in^2$$

    c.   Share a 10" pizza equally with two friends $\pi(5)^2 = 25\pi = 78.5\ in^2$

        One third of the pizza: $78.5 \cdot \frac{1}{3} = 26.2\ in^2$

In which option, will you get the most pizza and why? Show your work for credit.

You get the most pizza by purchasing a 6" personal pizza.

Because of an overactive fault, an earthquake swallows up Superman's love interest, Lois Lane. Ignoring the fact that he'd likely kill everyone on the planet, Superman decides to use his ability to fly to zoom around the planet. He figures he can turn back time and prevent the death of his girlfriend by flying concentric circles around the planet, reversing the spin of Earth, making time move backwards (this would not work and would be a stupid plot for a movie).

The radius of Earth is about 3959 miles. Assume that Superman flies to a height where the atmospheric pressure is weak enough to consider it the start of "outer space", which is roughly 50 miles above the surface of the planet.

29) Approximate the distance Superman flies around the planet to the nearest whole mile.

$C = 2\pi \cdot r$

$C = 2\pi \cdot 4009$

$C = 8018\pi$ miles

$C \approx 25189$ miles

30) Suppose Superman flies around the planet 30 times before the Earth came to a stop. How far did Superman travel to the nearest mile?

$30 \cdot C = 30 \cdot 8018\pi = $ $240540\pi \approx 755679$ miles or if you used your answer from #20, 755670 miles

31) Suppose Superman drops his girlfriend off at Quito, Ecuador, which is located on the equator, to cover an important story for her newspaper. Then he flies to the north pole to stop Lex Luthor from melting the ice caps in an attempt to drown the residents of all coastal cities on the planet. Because it is important for him to get there quickly, assume that he flies along the surface of the planet to minimize the distance he has to travel. How far does he fly on his trip from Quito to the north pole to the nearest tenth of a mile?

Length of $QN = 2\pi r \cdot \frac{\theta°}{360°}$

$QN = 2\pi \cdot 3959 \cdot \frac{90°}{360°}$

$QN = 7918\pi \frac{1}{4}$

$QN = \frac{7918\pi}{4}$

$QN = \frac{3959\pi}{2}$

$QN \approx 6218.8$ miles

While deployed in a combat zone, your tank drives over a small mine, destroying your tread, immobilizing you at point A. Knowing you are not able to move and being aware of your firing capacities, 3 enemy Jackal Armored Vehicles at point B, which is the direction you are currently aimed at, set up a circular perimeter of about 2 kilometers, at points B, C, and D, assuming they are outside of your range of fire.

The jackal that moves from point B to point C takes 5 minutes to get there. The jackal that moves from point B to point D, which is directly behind you, takes 15 minutes to get there.
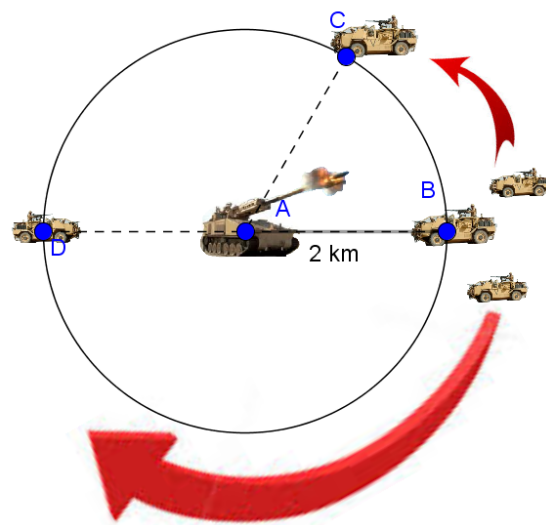
Fortunately for you, your tank is also equipped with a 3 missile firing system giving you an effective range of 5km with three shots!

32) After launching your first missile into the vehicle at point B, what angle do you turn your turret to strike the Jackal at point C?

<div style="text-align:center;color:red">60°</div>

33) After launching your first missile into the vehicle at point C, what angle do you turn your turret to strike the Jackal at point D?

<div style="text-align:center;color:red">120°</div>

34) How far to the nearest tenth did the jackal that moved from point B to point C travel?

$$A.L = 2\pi r \cdot \frac{\theta}{360} = 2\pi(2) \cdot \frac{60}{360} \approx 2.1 \; km$$

35) How far to the nearest tenth did the jackal that moved from point B to point D travel?

$$A.L. = 2\pi(2) \cdot \frac{180}{360} \approx 6.3 \; km$$