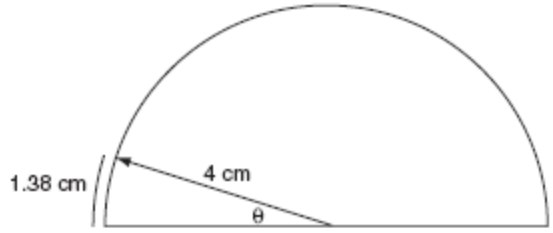
NAME:_____

A2.A.61: Determine the length of an arc of a circle, given its radius and the measure of its central angle

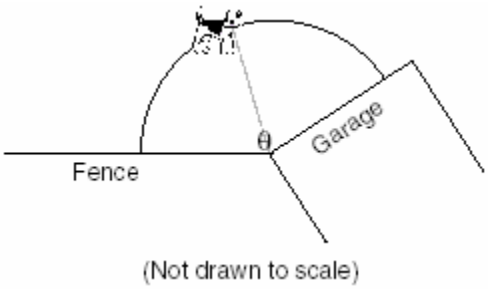
1. 010725b, P.I. A2.A.61
As shown in the accompanying diagram, a dial in the shape of a semicircle has a radius of 4 centimeters. Find the measure of θ, in radians, when the pointer rotates to form an arc whose length is 1.38 centimeters.



2. 080116b, P.I. A2.A.61
A wedge-shaped piece is cut from a circular pizza. The radius of the pizza is 6 inches. The rounded edge of the crust of the piece measures 4.2 inches. To the *nearest tenth,* the angle of the pointed end of the piece of pizza, in radians, is

[A] 25.2 [B] 1.4 [C] 7.0 [D] 0.7

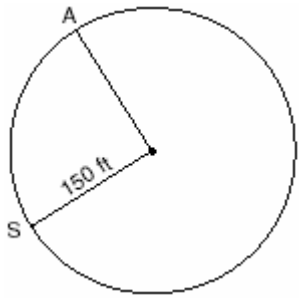
3. 080309b, P.I. A2.A.61
A dog has a 20-foot leash attached to the corner where a garage and a fence meet, as shown in the accompanying diagram. When the dog pulls the leash tight and walks from the fence to the garage, the arc the leash makes is 55.8 feet.



What is the measure of angle θ between the garage and the fence, in radians?

[A] 0.36 [B] 160 [C] 3.14 [D] 2.79

4. 060531b, P.I. A2.A.61
Kathy and Tami are at point *A* on a circular track that has a radius of 150 feet, as shown in the accompanying diagram. They run counterclockwise along the track from *A* to *S*, a distance of 247 feet. Find, to the *nearest degree*, the measure of minor arc *AS*.



5. 010526b, P.I. A2.A.61
An arc of a circle that is 6 centimeters in length intercepts a central angle of 1.5 radians. Find the number of centimeters in the radius of the circle.

6. 010910b, P.I. A2.A.61
A central angle of a circular garden measures 2.5 radians and intercepts an arc of 20 feet. What is the radius of the garden?

[A] 100 ft [B] 8 ft

[C] 125 ft [D] 50 ft

7. 060626b, P.I. A2.A.61
The pendulum of a clock swings through an angle of 2.5 radians as its tip travels through an arc of 50 centimeters. Find the length of the pendulum, in centimeters.

8. 010307b, P.I. A2.A.61
Ileana buys a large circular pizza that is divided into eight equal slices. She measures along the outer edge of the crust from one piece and finds it to be $5\frac{1}{2}$ inches. What is the diameter of the pizza to the *nearest inch*?

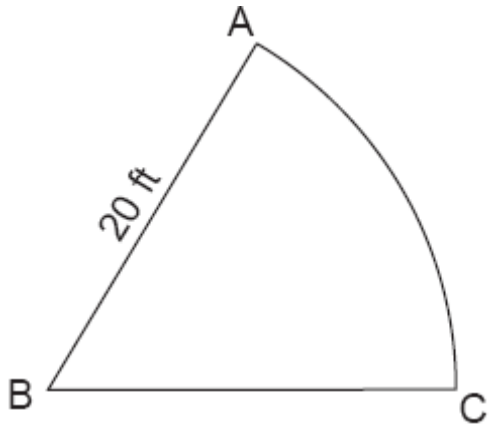
[A] 7 [B] 4 [C] 14 [D] 8

9. fall9932b, P.I. A2.A.61
If an arc of 60° on circle *A* has the same length as an arc of 45° on circle *B*, what is the ratio of the area of circle *B* to the area of circle *A*?

10. 010806b, P.I. A2.A.61
Jack wants to plant a border of flowers in the shape of an arc along the edge of a circular walkway. If the circle has a radius of 5 yards and the angle subtended by the arc measures $1\frac{1}{2}$ radians, what is the length, in yards, of the border?

[A] 7.5 [B] 5 [C] 0.5 [D] 2

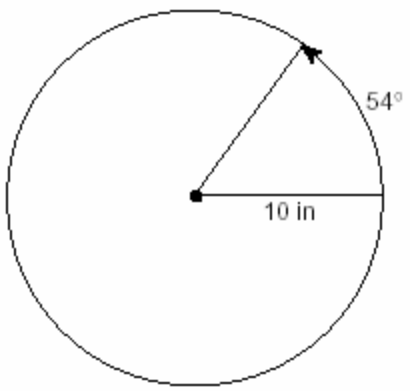
11. 060818b, P.I. A2.A.61
A sprinkler system is set up to water the sector shown in the accompanying diagram, with angle *ABC* measuring 1 radian and radius *AB*=20 feet.



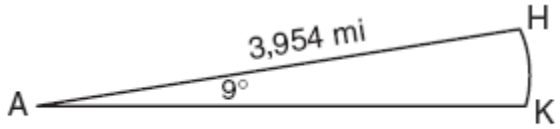
What is the length of arc *AC*, in feet?

[A] 10 [B] 20 [C] 63 [D] 31

12. 010223b, P.I. A2.A.61
A ball is rolling in a circular path that has a radius of 10 inches, as shown in the accompanying diagram. What distance has the ball rolled when the subtended arc is 54°? Express your answer to the *nearest hundredth of an inch.*

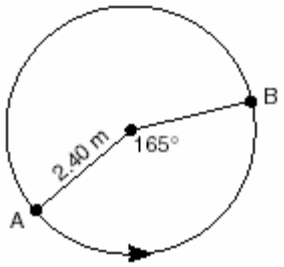


13. 080426b, P.I. A2.A.61
Cities *H* and *K* are located on the same line of longitude and the difference in the latitude of these cities is 9°, as shown in the accompanying diagram. If Earth's radius is 3,954 miles, how many miles north of city *K* is city *H* along arc *HK*? Round your answer to the *nearest tenth of a mile*.



(Not drawn to scale)

14. 080524b, P.I. A2.A.61
The accompanying diagram shows the path of a cart traveling on a circular track of radius 2.40 meters. The cart starts at point *A* and stops at point *B*, moving in a counterclockwise direction. What is the length of minor arc *AB*, over which the cart traveled, to the *nearest tenth of a meter*?



A2.A.61: Determine the length of an arc of a circle, given its radius and the measure of its central angle

[2] 0.345, and appropriate work is shown, such as solving the equation $\theta = \frac{1.38}{4}$.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] 0.345, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[1] incorrect procedure.

[2] D

[3] D

[4] 94, and appropriate work is shown.
[3] Appropriate work is shown, but one computational or rounding error is made.
[2] Appropriate work is shown, but two or more computational or rounding errors are made.
or [2] Appropriate work is shown, but one conceptual error is made.
or [2] Appropriate work is shown, and the correct radian value is found for è, but it is not converted to degrees.
or [2] Both formulas are set up correctly, but no further correct work is shown.
or [2] An incorrect radian value is found for è, but it is converted correctly to degrees.
[1] Only one formula is set up correctly, and no further correct work is shown.
or [1] 94, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[4] incorrect procedure.

[2] 4, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] 4, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[5] incorrect procedure.

[6] B

[2] 20, and appropriate work is shown, such as using the formula $S = r\theta$.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] 20, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[7] incorrect procedure.

[8] C

[4] $\frac{16}{9}$ or 16:9 is found by determining the ratio of their radii and the correct areas ratio.
[3] Incorrectly identifies radian measure, but produces a ratio based on areas.
or [3] Incorrect statement of correct area ratio such as 9:16.
[2] Gets correct ratio of radii, but uses $C = 2\pi r,$ instead of $A = \pi r^2$, giving answer of 4:3.
[1] Finds correct ratio of radii, 4:3 only.
or [1] $\frac{16}{9}$ with no work.
[0] A zero response is completely incorrect, irrelevant, or incoherent; or is a correct response that was obtained by an obviously
[9] incorrect procedure.

[10] A

[11] B

[2] 9.42, and appropriate work is shown, such as changing the angle to radians and finding s.
[1] The formula $s = \theta r$ is stated, but 54° is not converted to radian measure.
or [1] Appropriate work is shown, but one computational or rounding error is made.
or [1] 9.42, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[12]

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[2] 621.1, and appropriate work is shown.
[1] Appropriate work is shown, but one computational or rounding error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] A correct formula is written, but incorrect substitutions are made.
or [1] An incorrect proportion is written, but an appropriate solution is found.
or [1] The correct circumference is found, but no further correct work is shown.
or [1] 621.1, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[13]

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[2] 6.9. and appropriate work is shown, such as $2.4 \cdot 165 \cdot \frac{\pi}{180}$.
[1] Appropriate work is shown, but one computational or rounding error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] Appropriate work is shown, but the calculations are performed in radians.
or [1] Correct substitution is made into the equation for the length of the arc, but no further correct work is shown.
or [1] 6.9, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[14]