## Answers

1. Arc length is a fraction of the circumference proportional to the central angle. Sector area is a fraction of the circle area proportional to the central angle.

2. Luke used the formula for arc length for central angles or arc measures in degrees, but the diagram gives the central angle in radians.

3. A segment of a circle has as one of its boundaries a segment connecting two points on a circle.

4. A quarter of a circle corresponds to a central angle of 90°. A sector with a central angle of 90° has an area of $\frac{90}{360}\pi r^2 = \frac{1}{4}\pi r^2$.

5. measure: 134°; length: $\frac{134}{45}\pi$

6. measure: 277°; length: $\frac{277}{45}\pi$

7. $\frac{\pi}{2}$ radians

8. $\frac{320}{9}\pi$

9. $9\pi - 18$

Answers

10. No; arc length depends on arc measure and radius of the circle, so if the circles have different radii, the arc measures will be different.

11. Steve subtracted the triangle area from the arc length, not the sector area.

12. 90°; Circle T has center (2, 3) and radius 5. $\overline{XT}$ has slope $-\frac{3}{4}$ and $\overline{YT}$ has slope $\frac{4}{3}$, so these radii are perpendicular.

13. 24.3%; Each central angle is 72°, so the area of each triangle is about 11.89.

$$\frac{\pi(5)^2 - 5(11.89)}{\pi(5)^2} \times 100 \approx 24.3$$
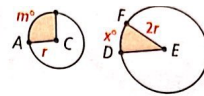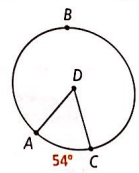
14. The length of the arc is given by the equation $s = \frac{a}{360}2\pi r$. For any value of a, the expression $\frac{a}{360}2\pi$ is a constant, so this represents a proportional relationship.

15. $\frac{m}{4}$; $\frac{m}{360}\pi r^2 = \frac{x}{360}\pi(2r)^2$, so $\frac{m}{360}\pi r^2 = \frac{x}{360}4\pi r^2$, or $m = 4x$.

20. $\frac{44}{9}\pi$

21. $\frac{415}{4}\pi$

22. 65.3

23. 115.2

24. 74.3

25. 4.8

26. 20.6 ft

Answers

27. $x = 22.25$, $y = 29.31$

28. 20.2 cm

29. 933 in.^{2}; Using the Pythagorean Theorem, the height of the trian associated with the segments is 11.1 in. Using trigonometry, the of the sector is 119.5°. So, the ar each segment is about 293.8 in. $\pi(22)^2 - 2(293.8) \approx 933$.

30. 16

32. **Part A** 765 ft^2; The stage is a re and a circle, but one segment c circle is included in both of the so it needed to be subtracted t area. The central angle of the about 73.7°, and the area of th corresponding to the segment

   Part B 102.5 ft; From Part A, t measure of the arc not includ stage :