Name: _____   Date: _____

Lesson 11.2   Area of a Circle

Solve. Show your work.

> *Example*
>
> The radius of a circular plate is 6 inches. Find its area. Use 3.14 as an
> approximation for π.
>
> Area = πr^2
>
> $\approx$ ___3.14___ . ___6___ . ___6___
>
> = ___113.04___ in.^{2}
>
> The area of the plate is approximately ___113.04___ square inches.
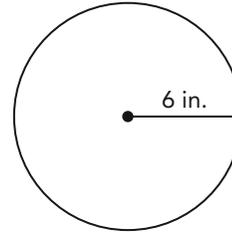
1. Find the area of a circle that has a radius of 5 centimeters. Use 3.14 as an
approximation for π.

Area = πr^2

$\approx$ _____ . _____ . _____

= _____ cm^2
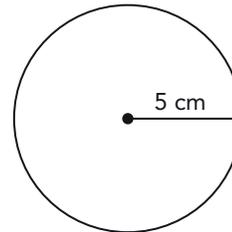
The area of the circle is approximately _____ square centimeters.

2. Find the area of a circle that has a radius of 63 millimeters. Use $\frac{22}{7}$ as an
approximation for π.
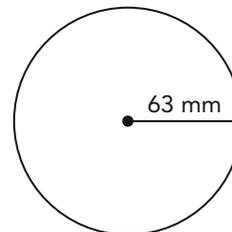
Name: _____   Date: _____

Solve. Show your work.

Example

The diameter of a circle is 18 centimeters. Find its area. Use 3.14 as an approximation for π.

Radius = diameter ÷ 2

$= \underline{\quad 18 \quad} ÷ 2$

$= \underline{\quad 9 \quad}$ cm
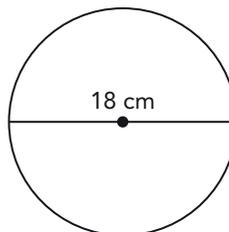
Area = πr^2

$\approx \underline{\quad 3.14 \quad} \cdot \underline{\quad 9 \quad} \cdot \underline{\quad 9 \quad}$

$= \underline{254.34}$ cm²

The area of the circle is approximately $\underline{254.34}$ square centimeters.

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3. Find the area of a circle that has a diameter of 56 feet. Use $\dfrac{22}{7}$ as an approximation for π.
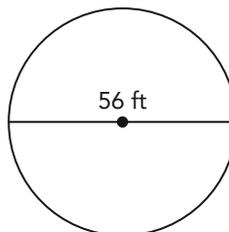
Radius = diameter ÷ 2

$= \underline{\qquad} ÷ 2$

$= \underline{\qquad}$ ft

Area = πr^2

$\approx \underline{\qquad} \cdot \underline{\qquad} \cdot \underline{\qquad}$

$= \underline{\qquad}$ ft²

The area of the circle is approximately _____ square feet.

4. Find the area of a circle that has a diameter of 210 meters. Use $\frac{22}{7}$ as an approximation for π.

210 m
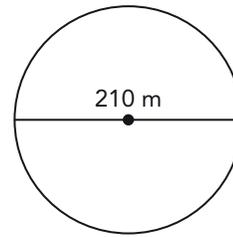
Solve. Show your work.

Example

The diameter of a circle is 30 inches. Find the area of a semicircle. Use 3.14 as an approximation for π.

Radius = diameter ÷ 2

$= $ ___30___ $ ÷ 2$

$= $ ___15___ in.

Area of semicircle $= \frac{1}{2} \cdot$ area of circle

$\quad\quad\quad\quad\quad = \frac{1}{2} \cdot \pi r^2$

$\quad\quad\quad\quad\quad \approx \frac{1}{2} \cdot$ ___3.14___ $\cdot$ ___15___ $\cdot$ ___15___

30 in.

$\quad\quad\quad\quad\quad = $ ___353.25___ in.^{2}
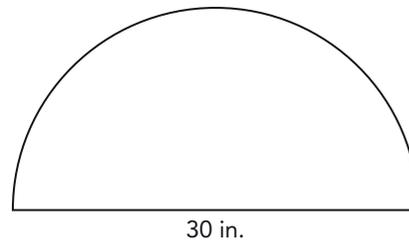
The area of the semicircle is approximately ___353.25___ square inches.

Name: _____ Date: _____

5. The diameter of a circle is 4 feet. Find the area of the semicircle. Use 3.14 as an approximation for π.

Radius = diameter ÷ 2

= _____ ÷ 2

= _____ ft

Area of semicircle = $\frac{1}{2}$ · area of circle

= $\frac{1}{2}$ · πr^2

≈ $\frac{1}{2}$ · _____ · _____ · _____

= _____ ft²
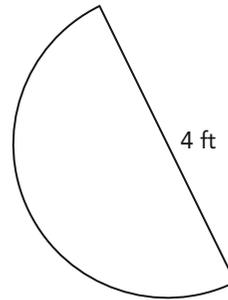
The area of the semicircle is approximately _____ square feet.

6. The radius of a circle is 10 centimeters. Find the area of the semicircle. Use 3.14 as an approximation for π.
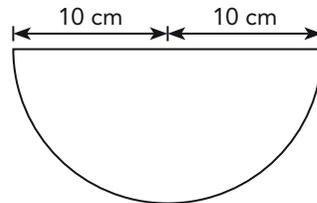
Name: _____   Date: _____

Solve. Show your work.

Example

The radius of a circle is 8 centimeters. Find the area of the quadrant. Use $\frac{22}{7}$ as an approximation for π.

8 cm
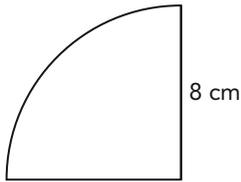
Area of quadrant $= \frac{1}{4} \cdot$ area of circle

$$= \frac{1}{4} \cdot \pi r^2$$

$$\approx \frac{1}{4} \cdot \frac{\frac{22}{7}}{} \cdot \underline{\quad 8 \quad} \cdot \underline{\quad 8 \quad}$$

$$= \underline{\quad 50\frac{2}{7} \quad} \text{ cm}^2$$

The area of the quadrant is approximately $\underline{\quad 50\frac{2}{7} \quad}$ square centimeters.

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7. The diameter of a circle is 12 inches. Find the area of the quadrant. Use $\frac{22}{7}$ as an approximation for π.

Radius = diameter ÷ 2

$$= \underline{\qquad} \div 2$$

$$= \underline{\qquad} \text{ in.}$$

Area of quadrant $= \frac{1}{4} \cdot$ area of circle

$$= \frac{1}{4} \cdot \pi r^2$$

$$\approx \frac{1}{4} \cdot \underline{\qquad} \cdot \underline{\qquad} \cdot \underline{\qquad}$$

$$= \underline{\qquad} \text{ in.}^2$$

The area of the quadrant is approximately $\underline{\qquad}$ square inches.

8. The radius of a circle is 20 meters. Find the area of the quadrant. Use $\frac{22}{7}$ as an approximation for π.
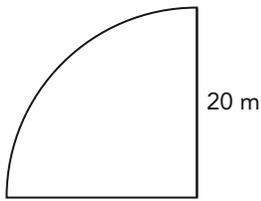
```
         ___
       /    |
      /     |
     /      | 20 m
    |       |
    |_____|
```

Area of quadrant $= \frac{1}{4} \cdot$ area of circle

$\qquad\qquad = \frac{1}{4} \cdot \pi r^2$

$\qquad\qquad \approx \frac{1}{4} \cdot$ _____ $\cdot$ _____ $\cdot$ _____

$\qquad\qquad =$ _____ m²

The area of the quadrant is approximately _____ square meters.

9. The diameter of a circle is 70 meters. Find the area of the quadrant. Use $\frac{22}{7}$ as an approximation for π.

Area of square $VWXY = \ell^2$

$\qquad = \underline{11} \cdot \underline{11}$

$\qquad = \underline{121}$ ft²

Area of trapezoid *STWX*

$\qquad$ = area of trapezoid *STVY*
$\qquad$ + area of square *VWXY*

$\qquad = \underline{242} + \underline{121}$

$\qquad = \underline{363}$ ft²

The area of trapezoid *STWX* is <u>363</u> square feet.

6. 65 square centimeters

7. 49.5 square feet

8. 495 square inches

Chapter 11

Lesson 11.1

1. 3.236 **2.** 5.051 **3.** 4.65

4. 7.755 **5.** 18.48 **6.** 18.84

7. 3.56 **8.** 0.34 **9.** 22

10. 60 **11.** 20.1 **12.** 1.0

13. $\overline{JM}$ and $\overline{KN}$.

14. $\overline{HK}$. It does not pass through the center *O*.

15. $\overline{OJ}$, $\overline{OK}$, $\overline{OL}$, $\overline{OM}$, and $\overline{ON}$.

16. Diameter = radius × <u>2</u>

$\qquad = \underline{13} \times \underline{2}$

$\qquad = \underline{26}$ ft

The diameter of the circle is <u>26</u> feet.

17. 6.5 feet

18. Radius = diameter ÷ <u>2</u>

$\qquad = \underline{32} \div \underline{2}$

$\qquad = \underline{16}$ in.

The radius of the circle is <u>16</u> inches.

19. 12.3 centimeters

20. Circumference = πd

$\qquad \approx \dfrac{\underline{22}}{\underline{7}} \cdot \underline{21}$

$\qquad = \underline{22} \cdot \underline{3}$

$\qquad = \underline{66}$ in.

The circumference of the wheel is approximately <u>66</u> inches.

21. 125.6 millimeters

22. Circumference = πd

$\qquad \approx \underline{3.14} \cdot \underline{15}$

$\qquad = \underline{47.1}$ in.

Length of semicircular arc

$= \dfrac{1}{2} \times$ circumference

$= \dfrac{1}{2} \times \underline{47.1}$

$= \underline{23.55}$ in.

The length of the ruler is approximately <u>23.55</u> inches.

23. 64.25 centimeters

24. Circumference = $2\pi r$

$\qquad \approx 2 \cdot \underline{3.14} \cdot \underline{25}$

$\qquad = \underline{157}$ in.

Length of arc of quadrant

$= \dfrac{1}{4} \times$ circumference

$= \dfrac{1}{4} \times \underline{157}$

$= \underline{39.25}$ in.

The length of the arc of the quadrant is approximately <u>39.25</u> inches.

25. 77 millimeters

26. Circumference = πd

$\qquad \approx \underline{3.14} \cdot \underline{26}$

$\qquad = \underline{81.64}$ cm

Length of arc of quadrant

$= \dfrac{1}{4} \times$ circumference

$= \dfrac{1}{4} \times \underline{81.64}$

$= \underline{20.41}$ cm

Distance around the figure

$=$ length of arc of quadrant $+ 6 \cdot \dfrac{26}{2} + 2 \cdot \underline{26}$

$= 20.41 + \underline{78} + \underline{52}$

$= \underline{150.41}$ cm

The distance around the figure is approximately <u>150.41</u> centimeters.

27. 50 inches **28.** 58.5 feet

Lesson 11.2

1. Area = πr^2

$\qquad \approx \underline{3.14} \cdot \underline{5} \cdot \underline{5}$

$\qquad = \underline{78.5}$ cm²

The area of the circle is approximately <u>78.5</u> square centimeters.

2. 12,474 square millimeters

3. Radius = diameter ÷ 2

$\qquad = \underline{56} \div 2$

$\qquad = \underline{28}$ ft

Area of circle = πr^2

$\qquad \approx \dfrac{22}{7} \times \underline{28} \times \underline{28}$

$\qquad = \underline{2,464}$ ft²

The area of the circle is approximately <u>2,464</u> square feet.

4. 34,650 square meters

5. Radius = diameter ÷ 2

$= \underline{4} ÷ 2$

$= \underline{2}$ ft

Area of semicircle

$= \dfrac{1}{2} \cdot$ area of circle

$= \dfrac{1}{2} \cdot \pi r^2$

$\approx \dfrac{1}{2} \cdot \underline{3.14} \cdot \underline{2} \cdot \underline{2}$

$= \underline{6.28}$ ft^2

The area of the semicircle is approximately
$\underline{6.28}$ square feet.

6. 157 square centimeters

7. Radius = diameter ÷ 2

$= \underline{12} ÷ 2$

$= \underline{6}$ in.

Area of quadrant

$= \dfrac{1}{4} \cdot$ area of circle

$= \dfrac{1}{4} \cdot \pi r^2$

$\approx \dfrac{1}{4} \cdot \dfrac{22}{7} \cdot \underline{6} \cdot \underline{6}$

$= \underline{28\dfrac{2}{7}}$ in.^{2}

The area of the quadrant is approximately

$\underline{28\dfrac{2}{7}}$ square inches.

8. Area of quadrant

$= \dfrac{1}{4} \cdot$ area of circle

$= \dfrac{1}{4} \cdot \pi r^2$

$\approx \dfrac{1}{4} \cdot \dfrac{22}{7} \cdot \underline{20} \cdot \underline{20}$

$= \underline{314\dfrac{2}{7}}$ m^2

The area of the quadrant is approximately

$\underline{314\dfrac{2}{7}}$ square meters.

9. $962\dfrac{1}{2}$ square meters

Lesson 11.3

1. Circumference = $2\pi r$

$\approx 2 \cdot \underline{3.14} \cdot \underline{6}$

$= \underline{37.68}$ in.

The circumference of the lid is approximately
$\underline{37.68}$ inches.

2. 75.36 millimeters

3. 50.24 inches

4. Radius = diameter ÷ 2

$= \underline{2.8} ÷ 2$

$= \underline{1.4}$ cm

Area = πr^2

$\approx \dfrac{22}{7} \cdot \underline{1.4} \cdot \underline{1.4}$

$= \underline{6.16}$ cm^2

The area of the circle is approximately
$\underline{6.16}$ square centimeters.

5. 19.625 square centimeters

6. Length of arcs of three quadrants

$= 3 \cdot \dfrac{1}{4} \cdot \pi d$

$\approx \dfrac{3}{4} \cdot \underline{3.14} \cdot \underline{5.2}$

$= \underline{12.246}$ in.

Side length of square $= \dfrac{\underline{5.2}}{4}$ in.

Distance around stencil

= length of arcs of three quadrants
 + 4 · side length of square

$= \underline{12.246} + 4 \cdot \dfrac{\underline{5.2}}{4}$

$= \underline{12.246} + \underline{5.2}$

$= \underline{17.446}$ in.

$\approx \underline{17.4}$ in.

The distance around the stencil is approximately
$\underline{17.4}$ inches.

7. 539.64 feet

8. Radius = diameter ÷ 2

$= \underline{10} ÷ 2$

$= \underline{5}$ cm

Area of circle = πr^2

$\approx \underline{3.14} \cdot \underline{5} \cdot \underline{5}$

$= \underline{78.5}$ cm^2

Area of quadrants

$= 2 \cdot \dfrac{1}{4} \cdot \pi r^2$

$\approx \dfrac{1}{2} \cdot \underline{3.14} \cdot \underline{2.5} \cdot \underline{2.5}$

$= \underline{9.8125}$ cm^2

Area of remaining paper
= area of circle − area of quadrants

$= \underline{78.5} - \underline{9.8125}$

$= \underline{68.6875}$

$\approx \underline{68.7}$ cm^2

The area of the remaining paper is approximately
$\underline{68.7}$ square centimeters.

9. 304.92 square centimeters