

Practice 10-1

Areas of Parallelograms and Triangles

Find the area of each triangle, given the base b and the height h . $\frac{1}{2}bh$

1. $b = 4, h = 4 = 8 u^2$

2. $b = 8, h = 2 = 8 u^2$

3. $b = 20, h = 6 = 60 u^2$

4. $b = 40, h = 12 = 240 u^2$

5. $b = 3.1, h = 1.7 = 2.635 u^2$

6. $b = 4.8, h = 0.8 = 1.92 u^2$

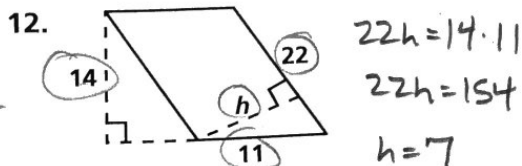
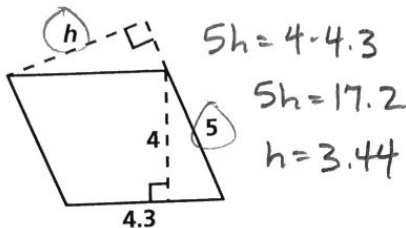
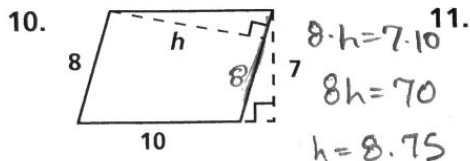
7. $b = 3\frac{1}{4}, h = \frac{1}{2} = \frac{13}{16} u^2$

8. $b = 8, h = 2\frac{1}{4} = 9 u^2$

9. $b = 100, h = 30 = 1500 u^2$

$\frac{13}{4} \cdot \frac{1}{2} = \frac{13}{8} \cdot \frac{1}{2}$

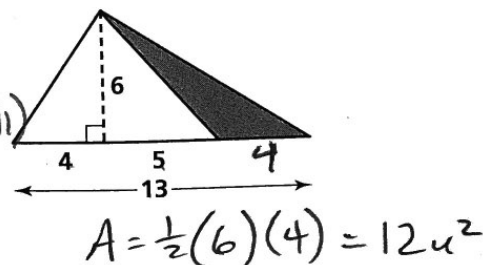
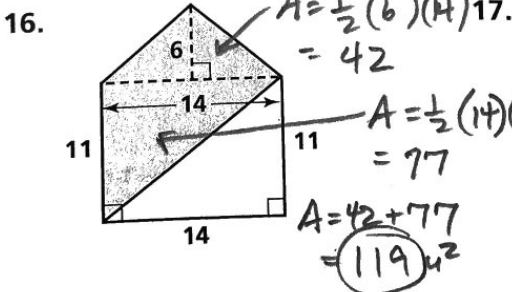
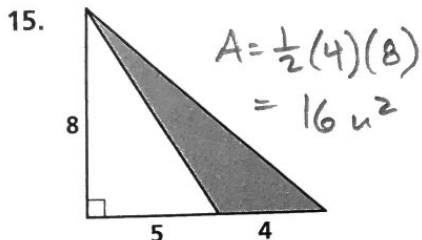
Find the value of h in each parallelogram bh



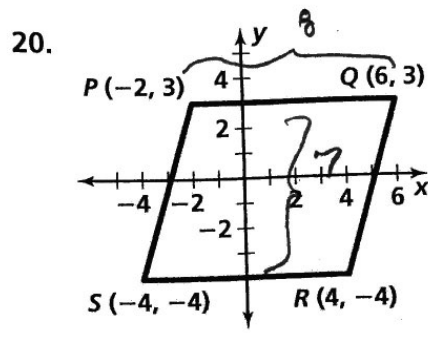
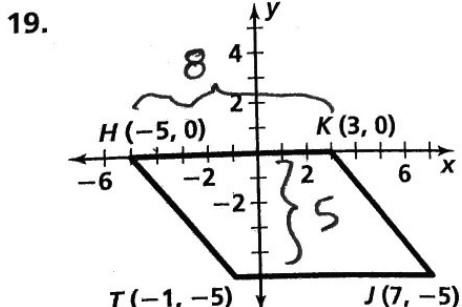
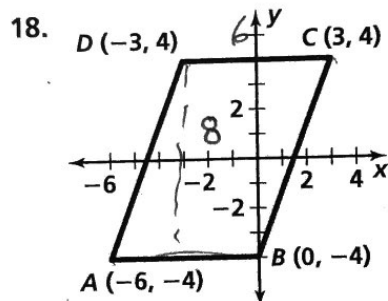
13. What is the area of $\square ABCD$ with vertices $A(-4, -6), B(6, -6), C(-1, 5),$ and $D(9, 5)$?

14. What is the area of $\triangle DEF$ with vertices $D(-1, -5), E(4, -5),$ and $F(4, 7)$?

Find the area of the shaded region.



Find the area of each parallelogram.



$A = 6 \cdot 8 = 48 u^2$

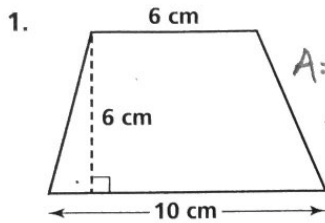
$A = 8 \cdot 5 = 40 u^2$

$A = 8 \cdot 7 = 56 u^2$

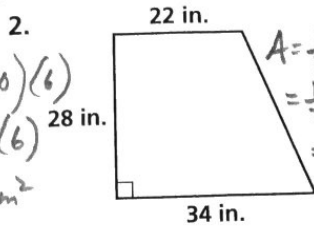
Practice 10-2

Areas of Trapezoids, Rhombuses, and Kites

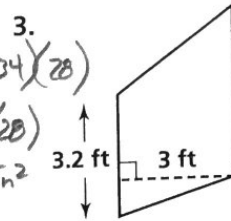
Find the area of each trapezoid. $\frac{1}{2}(b_1 + b_2)h$



$$A = \frac{1}{2}(6 + 10)(6) = \frac{1}{2}(16)(6) = 48 \text{ cm}^2$$

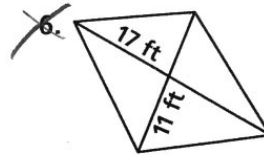
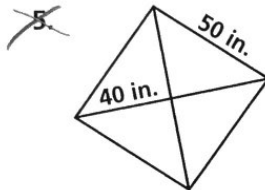
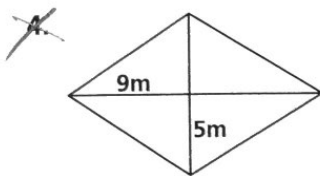


$$A = \frac{1}{2}(22 + 34)(28) = \frac{1}{2}(56)(28) = 784 \text{ in}^2$$

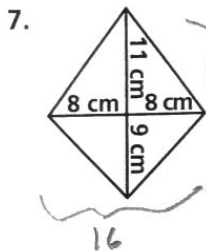


$$A = \frac{1}{2}(3.2 + 4.4)(3) = \frac{1}{2}(7.6)(3) = 11.4 \text{ ft}^2$$

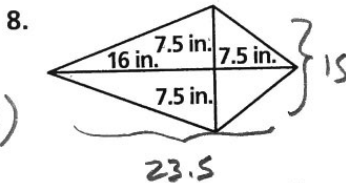
Find the area of each rhombus.



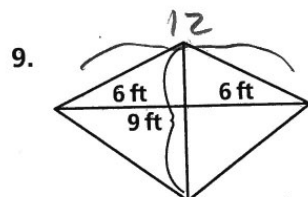
Find the area of each kite. $A = \frac{1}{2} \cdot d_1 \cdot d_2$



$$A = \frac{1}{2}(20)(16) = 160 \text{ cm}^2$$

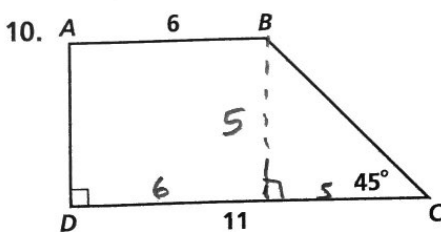


$$A = \frac{1}{2}(23.5)(15) = 176.25 \text{ in}^2$$

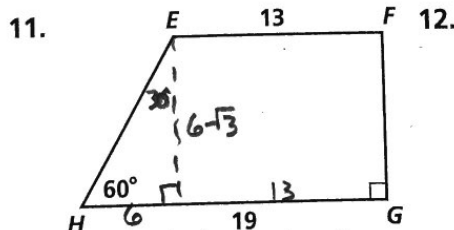


$$A = \frac{1}{2}(9)(12) = 54 \text{ ft}^2$$

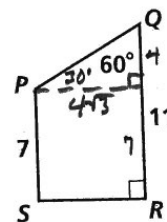
Find the area of each trapezoid. Leave your answers in simplest radical form.



$$A = \frac{1}{2}(6 + 11)(5) = \frac{1}{2}(17)(5) = 42.5 \text{ u}^2$$

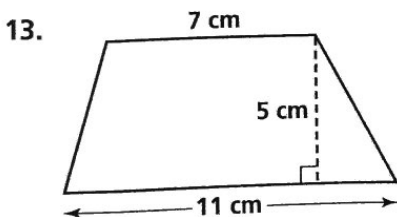


$$A = \frac{1}{2}(13 + 19)(6\sqrt{3}) = 96\sqrt{3} \text{ u}^2$$

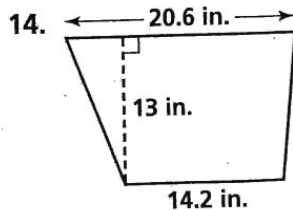


$$A = \frac{1}{2}(7 + 11)(4\sqrt{3}) = 36\sqrt{3} \text{ u}^2$$

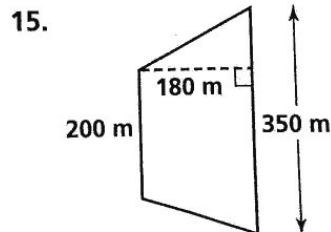
Find the area of each trapezoid to the nearest tenth.



$$A = \frac{1}{2}(7 + 11)(5) = 45 \text{ cm}^2$$



$$A = \frac{1}{2}(20.6 + 14.2)(13) = 226.2 \text{ in}^2$$

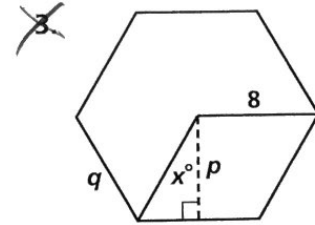
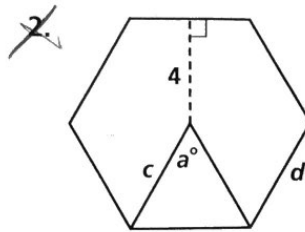
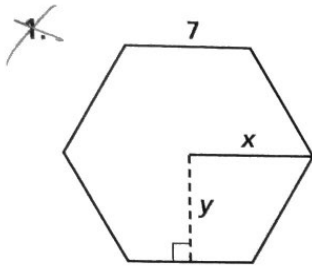


$$A = \frac{1}{2}(200 + 350)(180) = 49500 \text{ m}^2$$

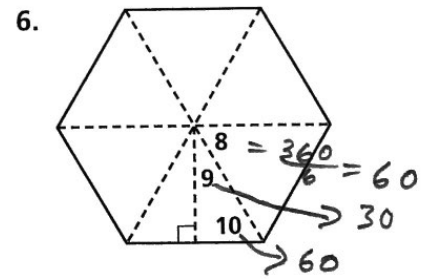
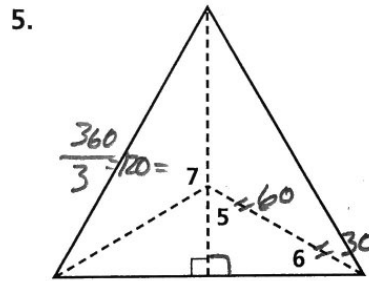
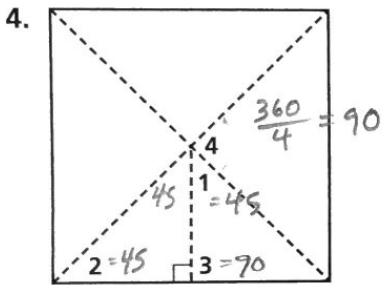
Practice 10-3

Areas of Regular Polygons

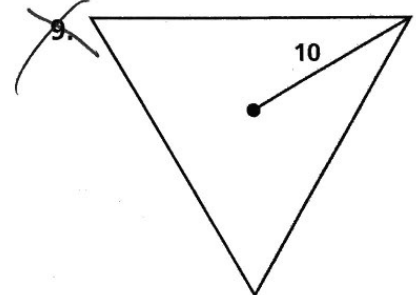
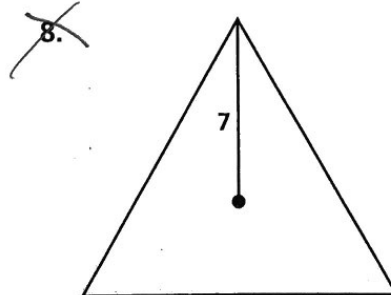
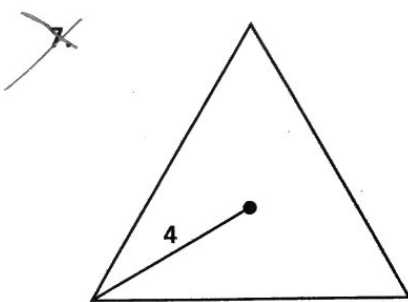
Find the values of the variables for each regular hexagon. Leave your answers in simplest radical form.



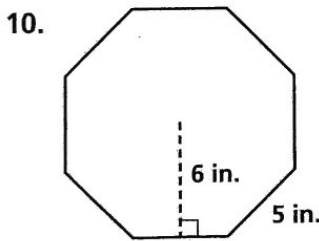
Each regular polygon has radii and an apothem as shown. Find the measure of each numbered angle.



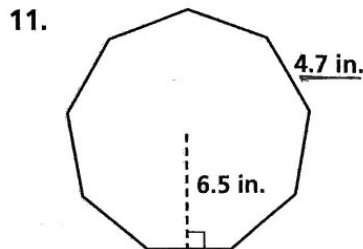
Find the area of each equilateral triangle, given the radius. Leave your answers in simplest radical form.



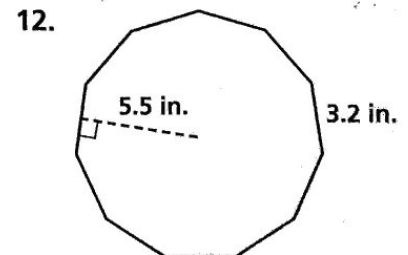
Find the area of each regular polygon to the nearest square inch. $A = \frac{1}{2} a \cdot P$



$$A = \frac{1}{2} (6) (8.5) = 120 \text{ in}^2$$



$$A = \frac{1}{2} (6.5) (9.47) = 137.475 \text{ in}^2$$

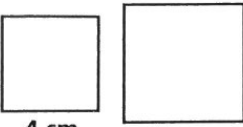


$$A = \frac{1}{2} (5.5) (11.32) = 96.8 \text{ in}^2$$

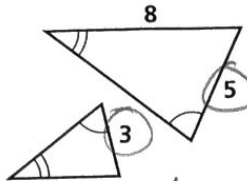
Practice 10-4

Perimeters and Areas of Similar Figures

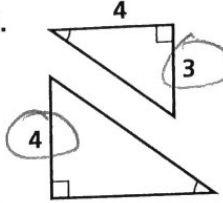
For each pair of similar figures, find the ratio of the perimeters and the ratio of the areas.

1. 

$$\frac{P}{4} = \frac{A}{4^2} = \frac{16}{25}$$

2. 

$$\frac{P}{3} = \frac{A}{9} = \frac{25}{25}$$

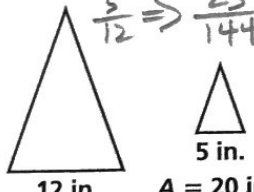
3. 

$$\frac{P}{3} = \frac{A}{9} = \frac{16}{16}$$

Find the similarity ratio of each pair of similar figures.

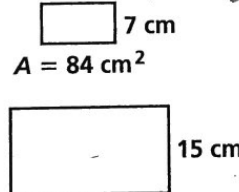
- two regular hexagons with areas 8 in.^2 and 32 in.^2 $\frac{8}{32} = \frac{1}{4} \Rightarrow \boxed{\frac{1}{2}}$
- two squares with areas 81 cm^2 and 25 cm^2 $\frac{81}{25} \Rightarrow \boxed{\frac{9}{5}}$
- two triangles with areas 10 ft^2 and 360 ft^2 $\frac{10}{360} = \frac{1}{36} \Rightarrow \boxed{\frac{1}{6}}$
- two circles with areas $128\pi \text{ cm}^2$ and $18\pi \text{ cm}^2$ $\frac{128\pi}{18\pi} = \frac{64}{9} \Rightarrow \boxed{\frac{8}{3}}$

For each pair of similar figures, the area of the smaller figure is given. Find the area of the larger figure.

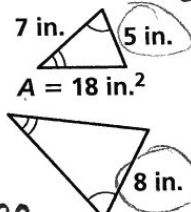
8. 

$$\frac{5}{12} \Rightarrow \frac{25}{144}$$

$A = 20 \text{ in.}^2$

9. 

$A = 84 \text{ cm}^2$

10. 

$A = 18 \text{ in.}^2$

$$\frac{5}{8} \Rightarrow \frac{25}{64}$$

$$\frac{25}{64} = \frac{18}{X}$$

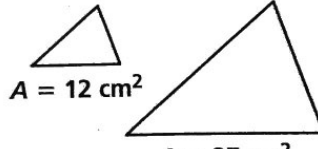
$$25X = 1152$$

$$X = 46.08 \text{ in.}^2$$

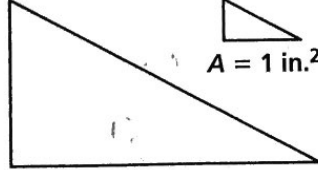
$$\frac{25}{144} = \frac{20}{X} \Rightarrow 25X = 2880 \Rightarrow X = 115.2 \text{ in.}^2$$

$$\frac{49}{225} = \frac{84}{X} \Rightarrow 49X = 18900 \Rightarrow X = 385.714 \text{ cm}^2$$

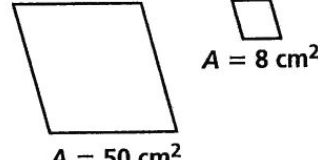
For each pair of similar figures, find the ratio of the perimeters.

11. 

$$\frac{12}{27} \Rightarrow \frac{4}{9} \Rightarrow \boxed{\frac{2}{3}}$$

12. 

$$\frac{1}{4} \Rightarrow \boxed{\frac{1}{2}}$$

13. 

$$\frac{8}{50} = \frac{4}{25} \Rightarrow \boxed{\frac{2}{5}}$$

14. The shorter sides of a rectangle are 6 ft. The shorter sides of a similar rectangle are 9 ft. The area of the smaller rectangle is 48 ft^2 . What is the area of the larger rectangle?

$$\frac{6}{9} = \frac{2}{3} \Rightarrow \frac{4}{9}$$

$$\frac{4}{9} = \frac{48}{X}$$

$$4X = 432$$

$$X = 108 \text{ ft}^2$$

Practice 10-5

Trigonometry and Area

Find the area of each polygon. Round your answers to the nearest tenth. **EVEN'S**

1. an equilateral triangle with apothem 5.8 cm
2. a square with radius 17 ft
3. a regular hexagon with apothem 19 mm
4. a regular pentagon with radius 9 m
5. a regular octagon with radius 20 in.
6. a regular hexagon with apothem 11 cm
7. a regular decagon with apothem 10 in.
8. a square with radius 9 cm

Handwritten notes for problem 4:

$\frac{360}{5} = 72 \rightarrow \frac{72}{2} = 36$

$\sin 36^\circ = \frac{x}{9}$

$\cos 36^\circ = \frac{a}{9}$

$a = 7.281$

$x = 5.290 \Rightarrow \text{side} = 2x = 10.580$

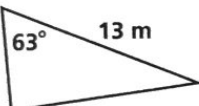
$A = \frac{1}{2} a P$

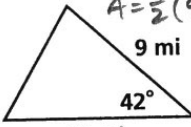
$A = \frac{1}{2} (7.281)(5 \cdot 10.580)$

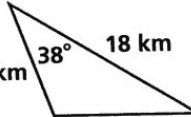
$A = 192.582$

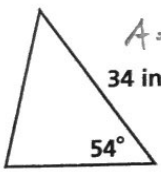
Diagram showing a right triangle with hypotenuse 9, angle 36°, and side x. Another diagram shows a right triangle with hypotenuse 9, angle 36°, and side a. A circled '4' is also present.

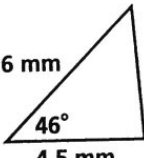
Find the area of each triangle. Round your answers to the nearest tenth. $= \frac{1}{2} ab \sin C$

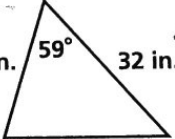
9.  $A = \frac{1}{2} (6.5)(13) \sin 63^\circ = 37.6 \text{ m}^2$

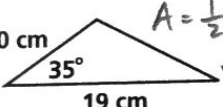
10.  $A = \frac{1}{2} (9)(10) \sin 42^\circ = 30.1 \text{ mi}^2$

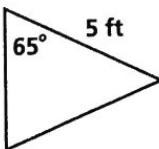
 $A = \frac{1}{2} (10)(18) \sin 38^\circ = 55.4 \text{ km}^2$

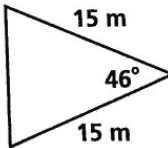
12.  $A = \frac{1}{2} (34)(26) \sin 54^\circ = 357.6 \text{ in}^2$

13.  $A = \frac{1}{2} (6)(4.5) \sin 46^\circ = 9.7 \text{ mm}^2$

14.  $A = \frac{1}{2} (28)(32) \sin 59^\circ = 384.0 \text{ in}^2$

15.  $A = \frac{1}{2} (10)(19) \sin 35^\circ = 54.5 \text{ cm}^2$

16.  $A = \frac{1}{2} (4)(5) \sin 65^\circ = 9.1 \text{ ft}^2$

17.  $A = \frac{1}{2} (15)(15) \sin 46^\circ = 80.9 \text{ m}^2$

Find the area of each regular polygon to the nearest tenth.

18. a triangular dog pen with apothem 4 m
19. a hexagonal swimming pool cover with radius 5 ft
20. an octagonal floor of a gazebo with apothem 6 ft
21. a square deck with radius 2 m
22. a hexagonal patio with apothem 4 ft

10-5

2

$\frac{360}{4} = 90 \Rightarrow \frac{90}{2} = 45$
 $\cos 45^\circ = \frac{a}{17}$
 $a = 17 \cdot \cos 45^\circ$
 $a = 12.021$

$\sin 45^\circ = \frac{x}{17}$
 $x = 17 \cdot \sin 45^\circ$
 $x = 12.021$
 $\text{side} = 2x = 2(12.021)$
 $= 24.042$

$A = \frac{1}{2} a P$
 $A = \frac{1}{2} (12.021)(4 \cdot 24.042)$
 $A = 578.018$

6

$\frac{360}{6} = 60 \Rightarrow \frac{60}{2} = 30$
 $\tan 30^\circ = \frac{x}{11}$
 $x = 11 \cdot \tan 30$
 $x = 6.351$

$\text{side} = 2x = 2(6.351)$
 $\text{side} = 12.702$

$A = \frac{1}{2} a P$
 $A = \frac{1}{2} (11)(6 \cdot 12.702)$
 $A = 419.166$

8

$\cos 45^\circ = \frac{a}{9}$
 $a = 9 \cdot \cos 45$
 $a = 6.364$

$\sin 45^\circ = \frac{x}{9}$
 $x = 9 \cdot \sin 45$
 $x = 6.364$
 $\text{side} = 2x = 2(6.364)$
 $= 12.728$

$A = \frac{1}{2} a P$
 $A = \frac{1}{2} (6.364)(4 \cdot 12.728)$
 $A = 162.002$

18

$\frac{360}{3} = 120 \Rightarrow \frac{120}{2} = 60$
 $\tan 60^\circ = \frac{x}{4}$
 $x = 4 \cdot \tan 60$
 $x = 6.928$

$\text{side} = 2x = 2(6.928)$
 $\text{side} = 13.856$

$A = \frac{1}{2} a P$
 $A = \frac{1}{2} (4)(3 \cdot 13.856)$
 $A = 83.136$

20

$\frac{360}{8} = 45 \Rightarrow \frac{45}{2} = 22.5$
 $\tan 22.5^\circ = \frac{x}{6}$
 $x = 6 \cdot \tan 22.5$
 $x = 2.485$

$\text{side} = 2x = 2(2.485)$
 $\text{side} = 4.970$

$A = \frac{1}{2} a P$
 $A = \frac{1}{2} (6)(8 \cdot 4.970)$
 $A = 119.280$

22

$\tan 30^\circ = \frac{x}{4}$
 $x = 4 \cdot \tan 30$
 $x = 2.309$

$\text{side} = 2x = 2(2.309)$
 $\text{side} = 4.618$

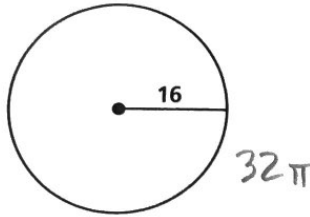
$A = \frac{1}{2} a P$
 $A = \frac{1}{2} (4)(6 \cdot 4.618)$
 $A = 55.416$

Practice 10-6

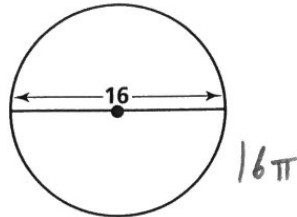
Circles and Arcs

Find the circumference of each circle. Leave your answers in terms of π .

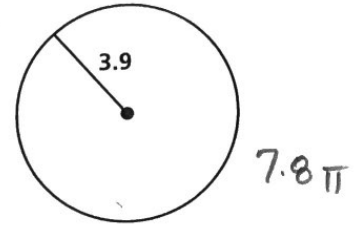
1.



2.

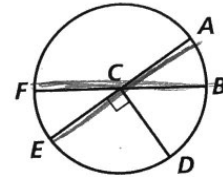


3.



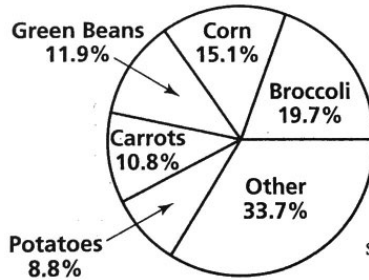
In $\odot C$, \overline{EA} and \overline{FB} are diameters. Identify the following.

- 4. two major arcs \overline{FBD} , \overline{ADF}
- 5. two minor arcs \overline{FE} , \overline{BD} , \overline{DE}
- 6. two semicircles \overline{FAB} , \overline{ADE}
- 7. a pair of adjacent arcs $\overline{AB} + \overline{BD}$
- 8. an acute central angle \overline{AB}
- 9. an obtuse central angle \overline{BE}



A market research survey found that adults' favorite vegetables are as shown below. Find the measure of the central angle for each of the following vegetables. Give your answers to the nearest degree.

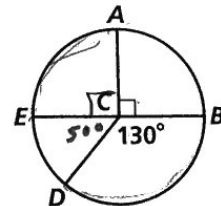
- 10. potatoes $\approx 32^\circ$
- 11. green beans $\approx 43^\circ$
- 12. corn $\approx 54^\circ$
- 13. carrots $\approx 39^\circ$
- 14. broccoli $\approx 71^\circ$



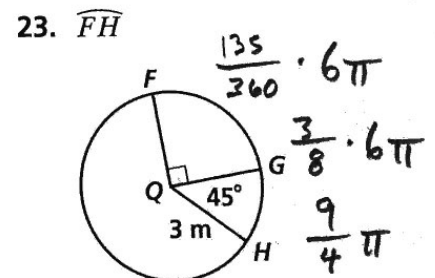
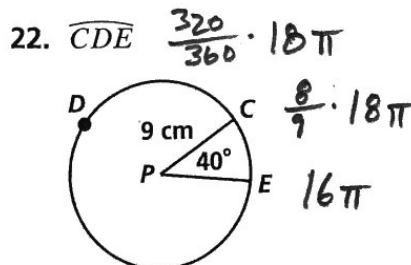
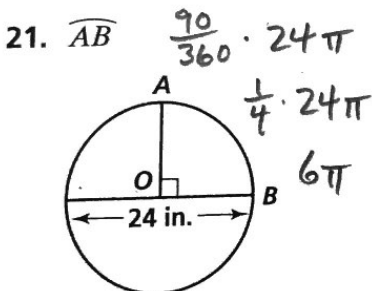
Source: USA Today

Find the measure of each arc in $\odot C$.

- 15. $\overline{AE} = 90^\circ$
- 16. $\overline{ED} = 50^\circ$
- 17. $\overline{DBA} = 220^\circ$
- 18. $\overline{AED} = 140^\circ$
- 19. $\overline{ABD} = 220^\circ$
- 20. $\overline{BD} = 130^\circ$



Find the length of each arc. Leave your answers in terms of π .



Practice 10-7

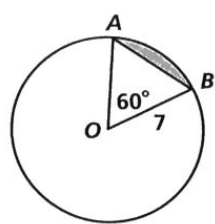
$$\pi r^2$$

Areas of Circles and Sectors

The radius of $\odot O$ is 7. Find the area of each of the following. Leave your answers in terms of π .

1. $\odot O$ 49π
 3. sector AOB $\frac{49\pi}{6}$
 $\frac{60}{360} \cdot 49\pi = \frac{1}{6} \cdot 49\pi$

2. $\triangle AOB$ $\frac{\sqrt{3}}{4} \cdot 7^2 = \frac{49\sqrt{3}}{4}$
 4. the shaded segment
 $\frac{49\pi}{6} - \frac{49\sqrt{3}}{4} = 4.439$



The radius of $\odot P$ is $\frac{1}{2}$. Find the area of each of the following. Leave your answers in terms of π .

5. $\odot P$ $\frac{1}{4}\pi$

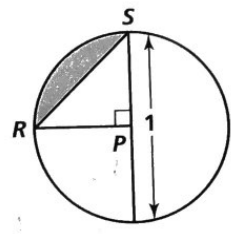
7. sector RPS $\frac{1}{16}\pi$

$\frac{90}{360} \cdot \frac{1}{4}\pi = \frac{1}{4} \cdot \frac{1}{4}\pi$

6. $\triangle RPS$ $\frac{1}{2}(\frac{1}{2})(\frac{1}{2}) = \frac{1}{8}$

8. the shaded segment

$\frac{1}{16}\pi - \frac{1}{8} = 0.071$



Find the area of each shaded sector of a circle. Leave your answers in terms of π .

9. $\frac{90}{360} \cdot 16\pi = 4\pi$

10. $\frac{36}{360} \cdot 36\pi = 3.6\pi$

11. $\frac{45}{360} \cdot 9\pi = \frac{9}{8}\pi$

12. $\frac{45}{360} \cdot 4\pi = \frac{3}{2}\pi$

13. $\frac{72}{360} \cdot 100\pi = 20\pi$

14. $\frac{120}{360} \cdot 36\pi = 12\pi$

15. $\frac{45}{360} \cdot 36\pi = 4.5\pi$

16. $\frac{60}{360} \cdot 25\pi = \frac{25}{3}\pi$

17. $\frac{180}{360} \cdot 4\pi = 2\pi$

Find the area of each shaded segment of a circle. Round your answers to the nearest whole number.

18. $\frac{90}{360} \cdot 9\pi = \frac{9}{4}\pi$
 $\frac{1}{4} \cdot 9\pi = \frac{9}{4}\pi$
 $\frac{9}{4}\pi - \frac{9}{4} = 2.569$

19. $\frac{60}{360} \cdot 25\pi = \frac{25}{6}\pi$
 $\frac{1}{6} \cdot 25\pi = \frac{25}{6}\pi$
 $\frac{25}{6}\pi - \frac{25\sqrt{3}}{4} = 2.265$

20. $\frac{120}{360} \cdot 16\pi = \frac{16}{3}\pi$
 $\frac{1}{3} \cdot 16\pi = \frac{16}{3}\pi$
 $\frac{16}{3}\pi - 6.928 = 9.827$

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