Interactive Chalkboard

GLENCOE MATHEMATICS

Geometry

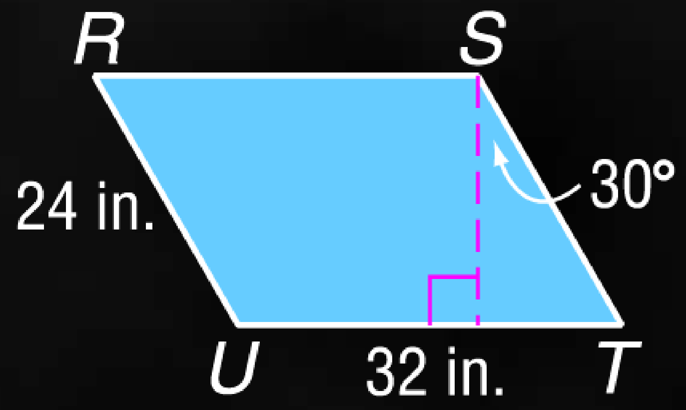
CHAPTER 11
Areas of Polygons and Circles

EXIT

Lesson 11-1 Contents

Example 1

Find the perimeter and area of $\square RSTU$.



Base and Side: Each pair of opposite sides of a parallelogram has the same measure. Each base is 32 inches long, and each side is 24 inches long.

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Example 1

Perimeter: The perimeter of a polygon is the sum of the measures of its sides. So, the perimeter of $\square RSTU$ is $2(32) + 2(24)$ or 112 inches.

Height: Use a 30°-60°-90° triangle to find the height. Recall that if the measure of the leg opposite the 30° angle is *x*, then the length of the hypotenuse is 2*x*, and the length of the leg opposite the 60° angle is $x\sqrt{3}$.

$24 = 2x$ Substitute 24 for the hypotenuse.

$12 = x$ Divide each side by 2.

So, the height of the parallelogram is $x\sqrt{3}$ or $12\sqrt{3}$ inches.

STOP! End of slide—continued on the next slide

Example 1

Area: $A = bh$ Area of a parallelogram

$= 32\left(12\sqrt{3}\right)$ $b = 32,\ h = 12\sqrt{3}$

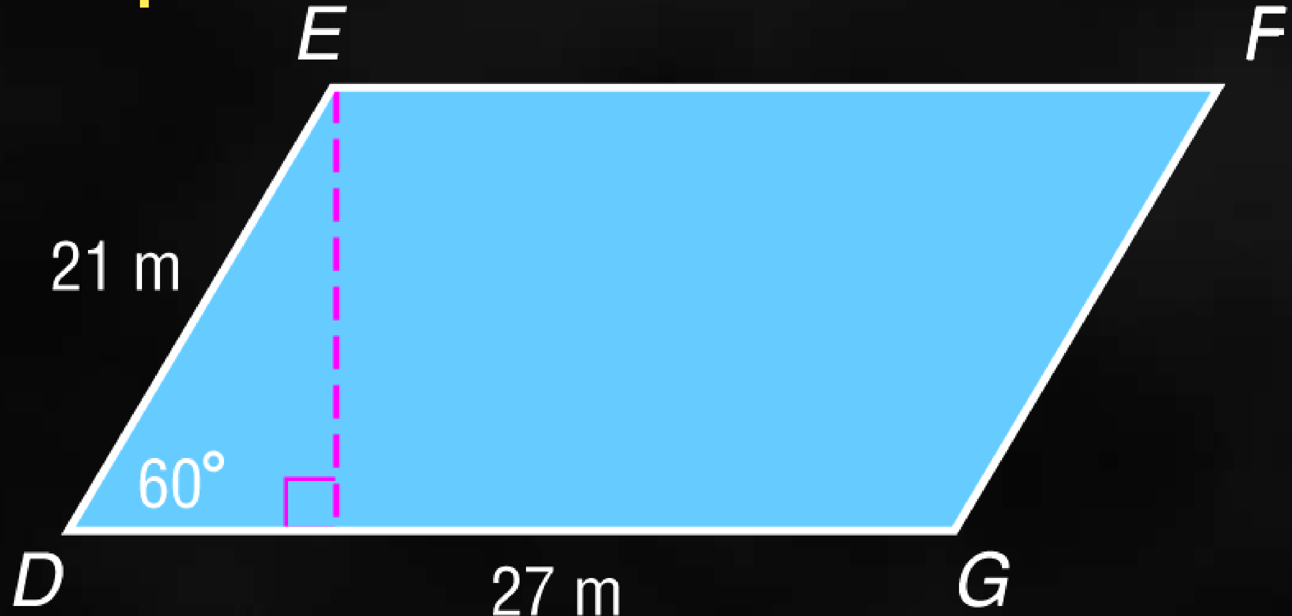
$= 384\sqrt{3}$ or about 665.1

Answer: The perimeter of $\square RSTU$ is 112 inches, and the area is about 665.1 square inches.

End of slide

Your Turn

Find the perimeter and area of $\square DEFG$

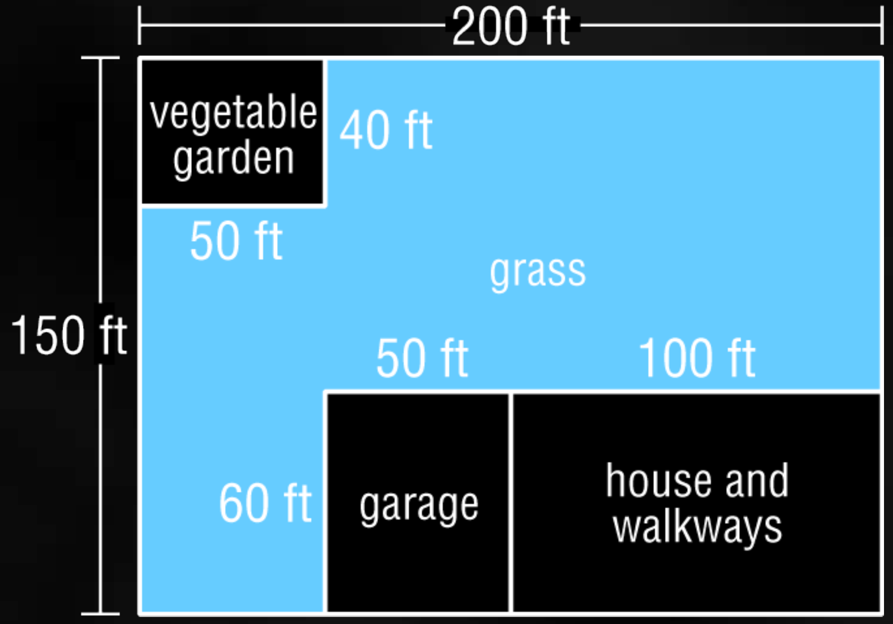


Answer: $P = 96$ m; $A = 491.0$ m^2

Example 2

The Kanes are planning to sod some parts of their yard. Find the number of square yards of grass needed.

To find the number of square yards of grass needed, find the number of square yards of the entire lawn and subtract the number of square yards where grass will not be needed. Grass will not be needed for the vegetable garden, the garage, or the house and walkways.



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Example 2

Entire lawn: $w = 200\text{ ft}, \ \ell = 150\text{ ft}$

Vegetable Garden: $w = 50\text{ ft}, \ \ell = 40\text{ ft}$

Garage: $w = 50\text{ ft}, \ \ell = 60\text{ ft}$

House and Walkways: $w = 100\text{ ft}, \ \ell = 60\text{ ft}$

Area

Entire Lawn	Vegetable Garden	Garage	House and Walkways
$A = \ell w$	$A = \ell w$	$A = \ell w$	$A = \ell w$
$= 200 \cdot 150$	$= 50 \cdot 40$	$= 50 \cdot 60$	$= 100 \cdot 60$
$= 30{,}000\text{ ft}^2$	$= 2{,}000\text{ ft}^2$	$= 3{,}000\text{ ft}^2$	$= 6{,}000\text{ ft}^2$

STOP! End of slide—continued on the next slide

Example 2

The total area is 30,000 – 2000 – 3000 – 6000 or 19,000 square feet. There are 9 square feet in one square yard, so divide by 9 to convert from square feet to square yards.

$$19{,}000 \text{ ft}^2 \div \frac{9 \text{ ft}^2}{1 \text{ yd}^2} = 19{,}000 \text{ ft}^2 \times \frac{1 \text{ yd}^2}{9 \text{ ft}^2}$$

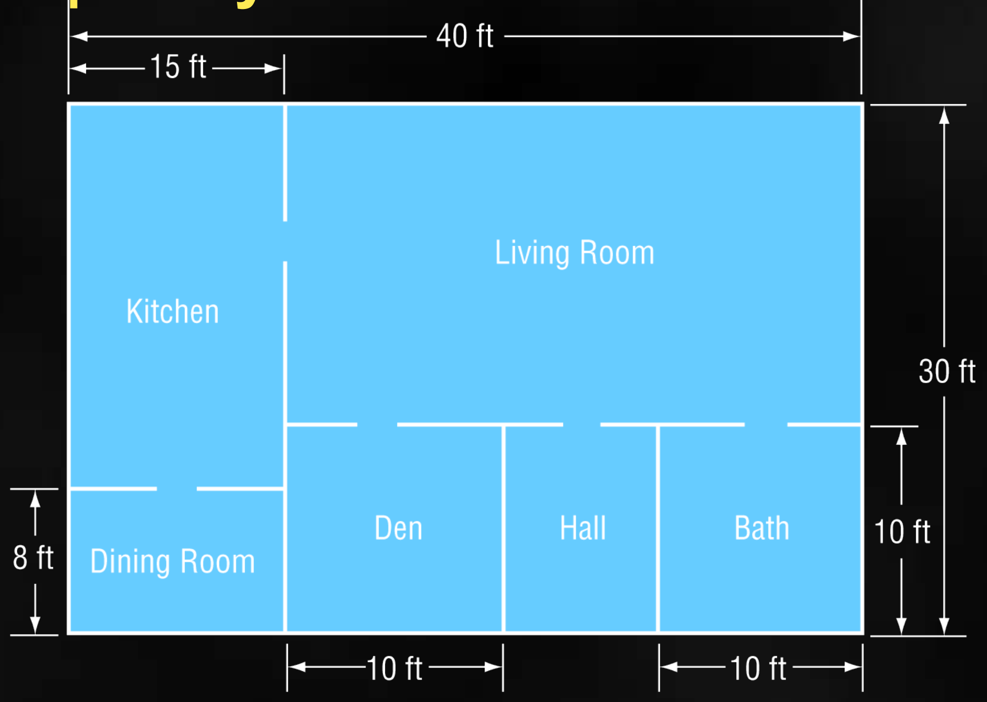
$$\approx 2111.1 \text{ yd}^2$$

Answer: They will need about 2111 square yards of sod.

End of slide

Your Turn

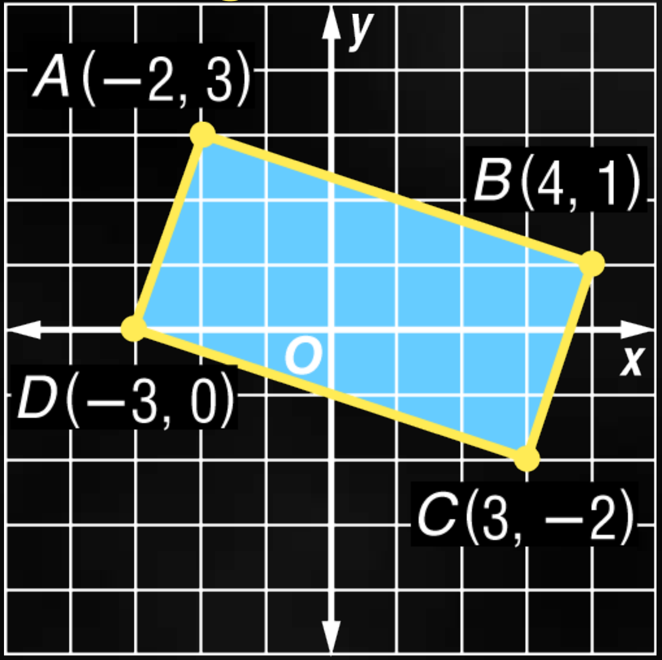
The Wagners are planning to put hardwood floors in their dining room, living room, and kitchen. Find the number of square yards of wood needed.



Answer: $106\ yd^2$

Example 3a

The vertices of a quadrilateral are $A(-2, 3)$, $B(4, 1)$, $C(3, -2)$, **and** $D(-3, 0)$. **Determine whether the quadrilateral is a *square*, a *rectangle*, or a *parallelogram*.**



First graph each point and draw the quadrilateral. Then determine the slope of each side.

$$\text{slope of } \overline{AB} = \frac{3-1}{-2-4}$$

$$= \frac{2}{-6} \text{ or } -\frac{1}{3}$$

End of slide—continued on the next slide

Example 3a

$$\text{slope of } \overline{CD} = \frac{-2-0}{3-(-3)}$$

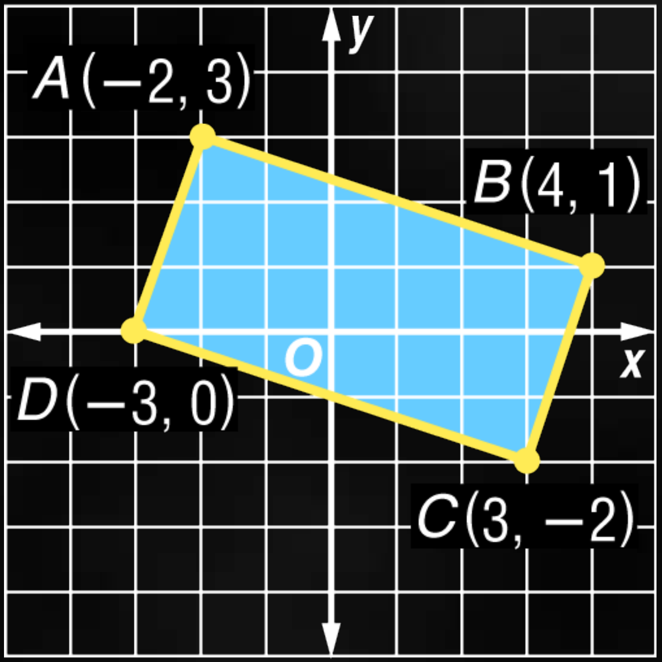
$$= \frac{-2}{6} \text{ or } -\frac{1}{3}$$

$$\text{slope of } \overline{BC} = \frac{1-(-2)}{4-3}$$

$$= \frac{3}{1} \text{ or } 3$$

$$\text{slope of } \overline{AD} = \frac{3-0}{-2-(-3)}$$

$$= \frac{3}{1} \text{ or } 3$$



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Example 3a

Opposite sides have the same slope, so they are parallel. *ABCD* is a parallelogram. The slopes of the consecutive sides are negative reciprocals of each other, so the sides are perpendicular. Thus, the parallelogram is a rectangle. In order for the rectangle to be a square, all sides must be equal. Use the Distance Formula to find the side lengths.

$$\overline{AB} = \sqrt{(x_2 - x_1) + (y_2 - y_1)^2}$$

$$= \sqrt{(1-3)^2 + [4-(-2)]^2}$$

$$= \sqrt{40}$$

$$\overline{BC} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(-2-1)^2 + [3-4]^2}$$

$$= \sqrt{10}$$

End of slide—continued on the next slide

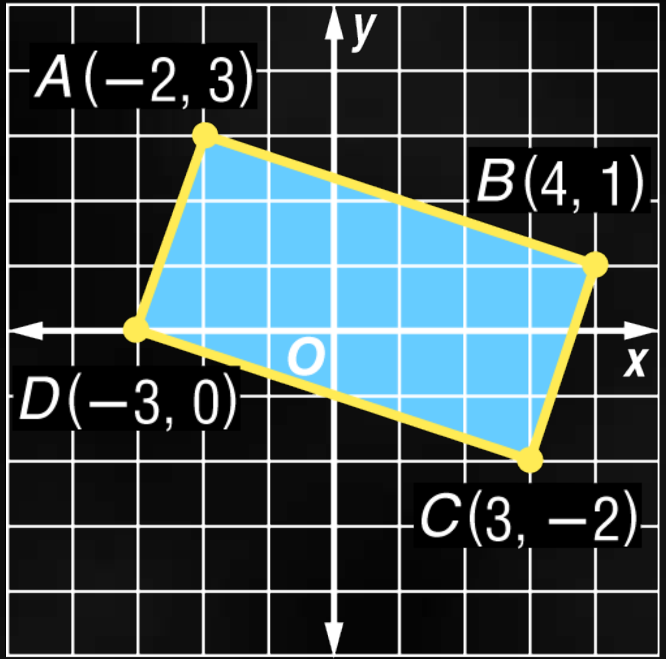
Example 3a

Since $\overline{AB} \neq \overline{BC}$, rectangle *ABCD* is not a square.

Answer: rectangle

Example 3b

The vertices of a quadrilateral are *A*(–2, 3), *B*(4, 1), *C*(3, –2), **and** *D*(–3, 0). **Find the area of quadrilateral** *ABCD*.



Base: The base is *AB*, which we found to be $\sqrt{40}$.

Height: The height is *BC*, which we found to be $\sqrt{10}$.

End of slide—continued on the next slide

Example 3b

$A = bh$ Area formula

$= \sqrt{40}\left(\sqrt{10}\right)$ $b = \sqrt{40},\ h = \sqrt{10}$

$= \sqrt{400}$ Multiply.

$= 20$ Simplify.

Answer: 20 square units

End of slide

Your Turn

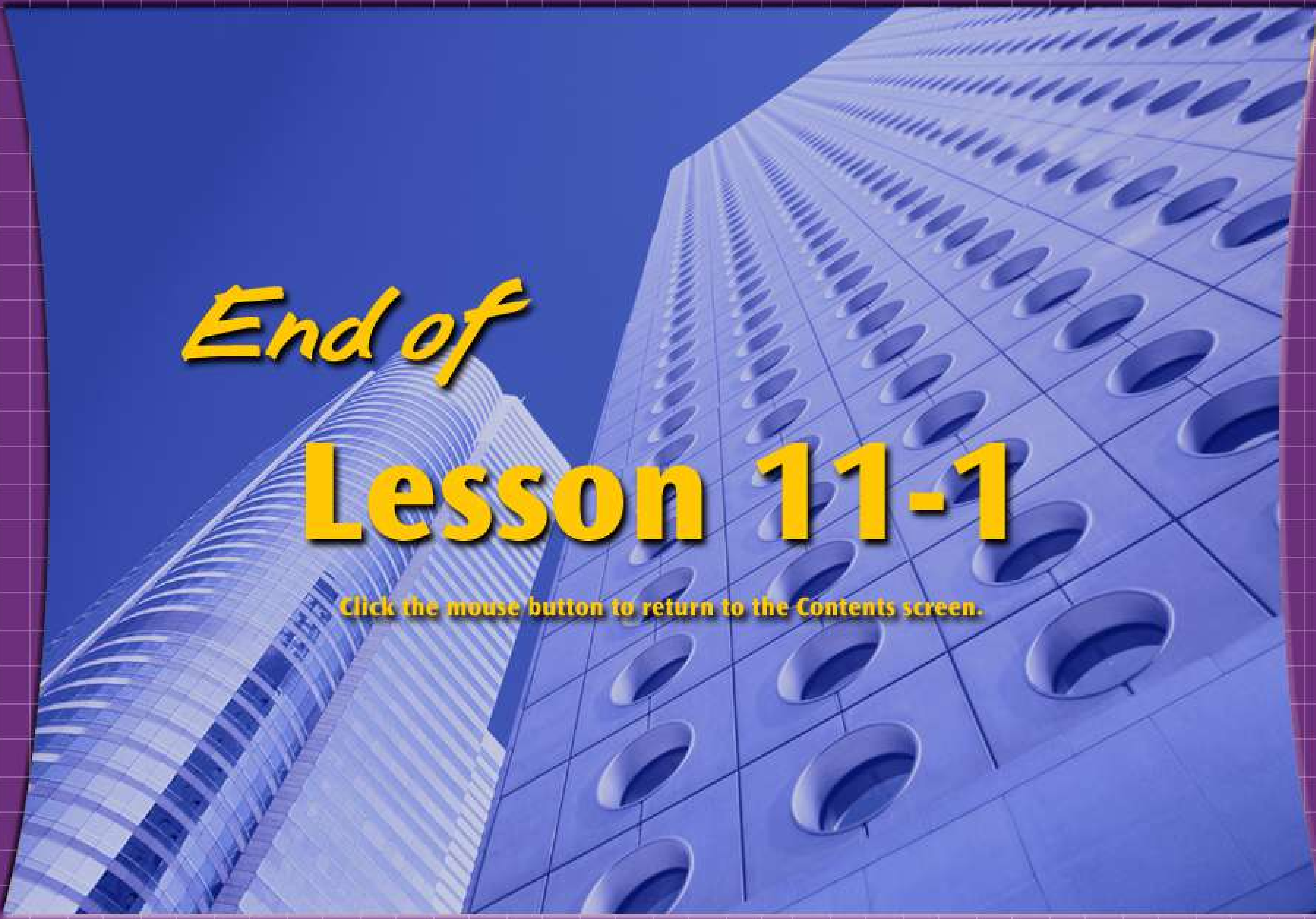
The vertices of a quadrilateral are *A*(–1, 1), *B*(1, 4), *C*(5, 4), **and** *D*(3, 1).

a. Determine whether the quadrilateral is a *square*, a *rectangle*, or a *parallelogram*.

Answer: parallelogram

b. Find the area of quadrilateral *ABCD*.

Answer: 12 units^2


End of
Lesson 11-1
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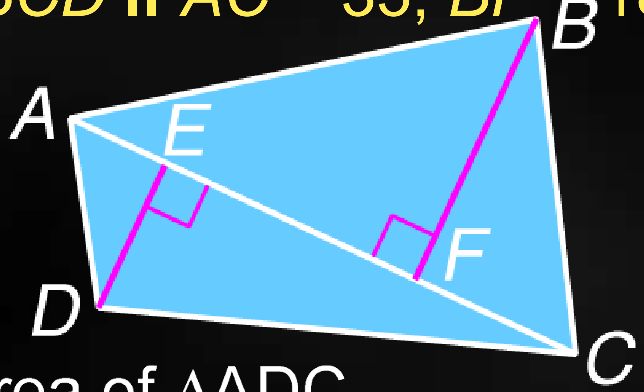
Lesson 11-2 Contents

Example 1

Find the area of quadrilateral *ABCD* if *AC* = 35, *BF* = 18, and *DE* = 10.



The area of the quadrilateral is equal to the sum of the areas of ΔABC and ΔADC.

$$\text{area of } ABCD = \text{area of } \Delta ABC + \text{area of } \Delta ADC$$

$$= \frac{1}{2}bh + \frac{1}{2}bh \quad \text{Area formula}$$

$$= \frac{1}{2}(35)(18) + \frac{1}{2}(35)(10) \quad \text{Substitution}$$

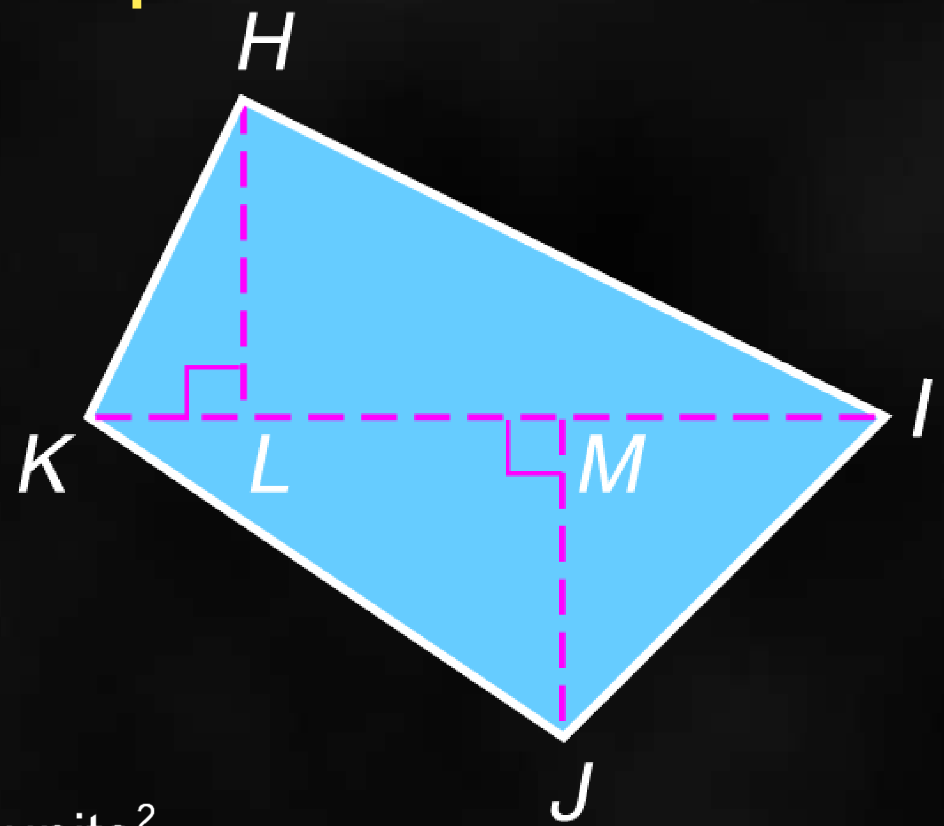
$$= 490 \quad \text{Simplify.}$$

Answer: The area of *ABCD* is 490 square units.

End of slide—continued on the next slide

Your Turn

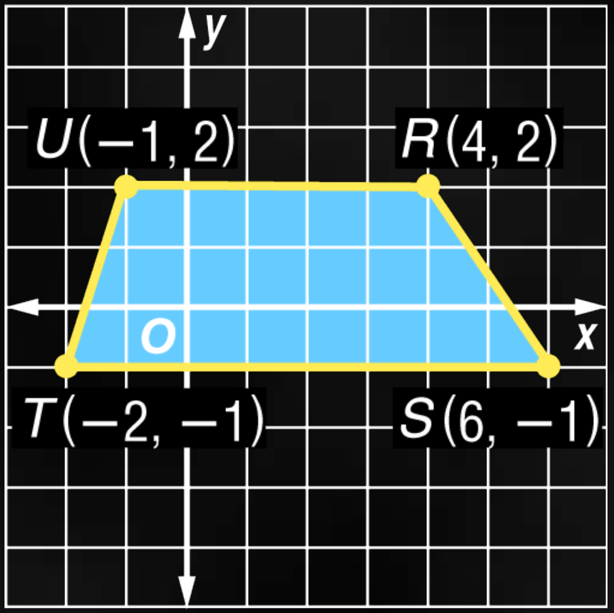
Find the area of quadrilateral $HIJK$ **if** $IK = 16$, $HL = 5$, **and** $JM = 9$.



Answer: 112 units^2

Example 2

Find the area of trapezoid *RSTU* with vertices *R*(4, 2), *S*(6, –1), *T*(–2, –1), and *U*(–1, 2).



Bases: Since $\overline{UR}$ and $\overline{TS}$ are horizontal, find their length by subtracting the *x*-coordinates of their endpoints.

$$\overline{UR} = |-1-4|$$

$$= |-5| \text{ or } 5$$

$$\overline{TS} = |-2-6|$$

$$= |-8| \text{ or } 8$$

End of slide—continued on the next slide

Example 2

Height: Because the bases are horizontal segments, the distance between them can be measured on a vertical line. That is, subtract the *y*-coordinates.

$$h = |2 - (-1)| \text{ or } 3$$

Area:

$$A = \frac{1}{2}h(b_1 + b_2) \quad \text{Area of a trapezoid}$$

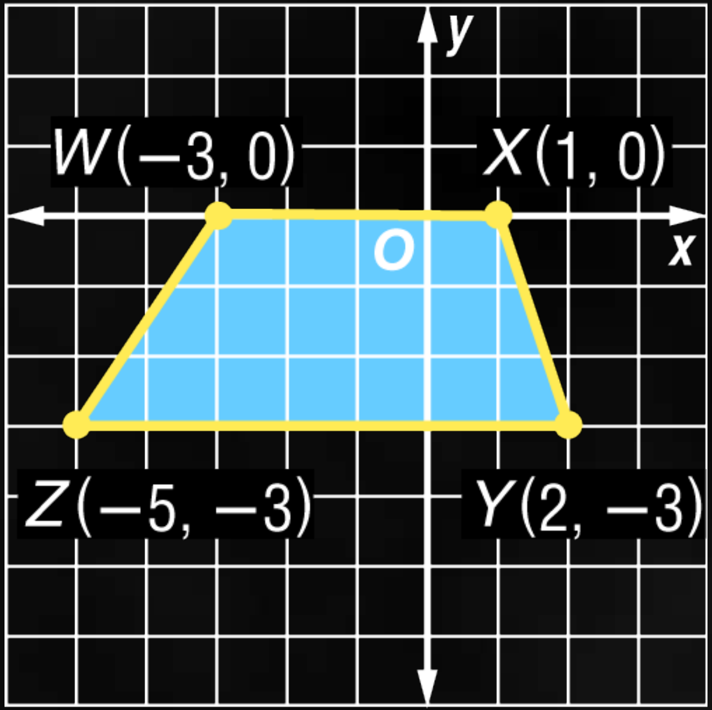
$$= \frac{1}{2}(3)(5 + 8) \quad h = 3,\ b_1 = 5,\ b_2 = 8$$

$$= 19.5 \quad \text{Simplify.}$$

Answer: The area of trapezoid *RSTU* is 19.5 square units.

Your Turn

Find the area of trapezoid *WXYZ* with vertices *W*(–3, 0), *X*(1, 0), *Y*(2, –3), and *Z*(–5, –3).



Answer: 16.5 units^2

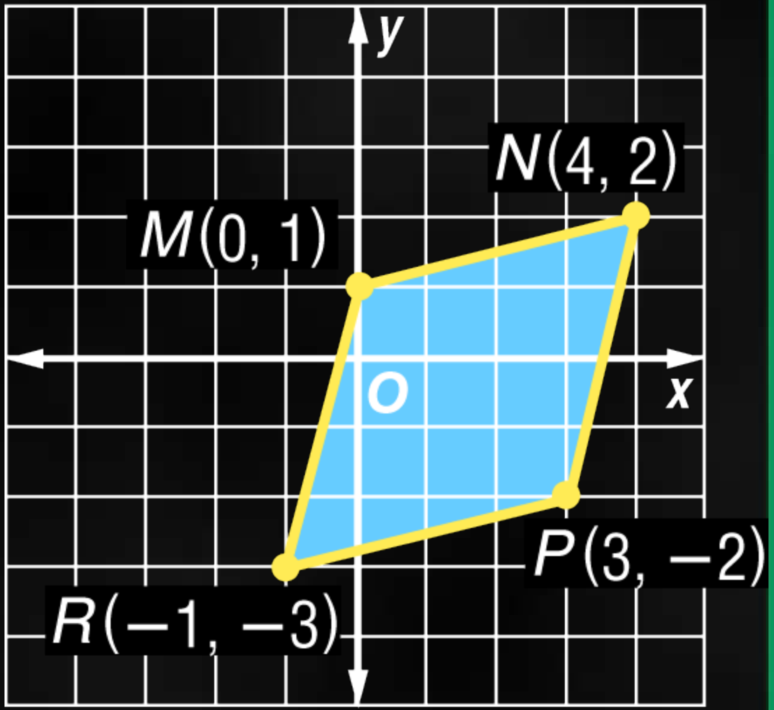
End of slide

Example 3

Find the area of rhombus *MNPR* with vertices at *M*(0, 1), *N*(4, 2), *P*(3, –2), and *R*(–1, –3).

Explore To find the area of the rhombus, we need to know the lengths of each diagonal.

Plan Use coordinate geometry to find the length of each diagonal. Use the formula to find the area of rhombus *MNPR*.



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Example 3

Solve

Let $\overline{MP}$ be d_1 and $\overline{NR}$ be d_2.

Use the Distance Formula to find $\overline{MP}$.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(0 - 3)^2 + [1 - (-2)]^2}$$

$$= \sqrt{18} \text{ or } 3\sqrt{2}$$

Use the Distance Formula to find $\overline{NR}$.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{[4 - (-1)]^2 + [2 - (-3)]^2}$$

$$= \sqrt{50} \text{ or } 5\sqrt{2}$$

End of slide—continued on the next slide

Example 3

$$A = \frac{1}{2}d_1d_2$$ Area of a rhombus

$$= \frac{1}{2}\left(3\sqrt{2}\right)\left(5\sqrt{2}\right) \text{ or } 15$$ $d_1 = 3\sqrt{2},\ d_2 = 5\sqrt{2}$

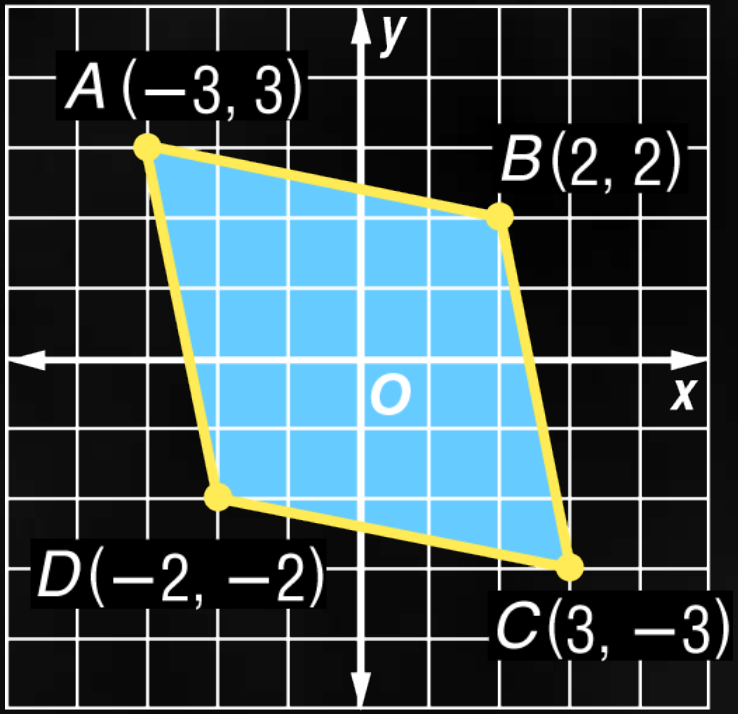
Examine The area of rhombus *MNPR* is 15 square units.

Answer: 15 square units

End of slide

Your Turn

Find the area of rhombus *ABCD* with vertices *A*(–3, 3), *B*(2, 2), *C*(3, –3), and *D*(–2, –2).

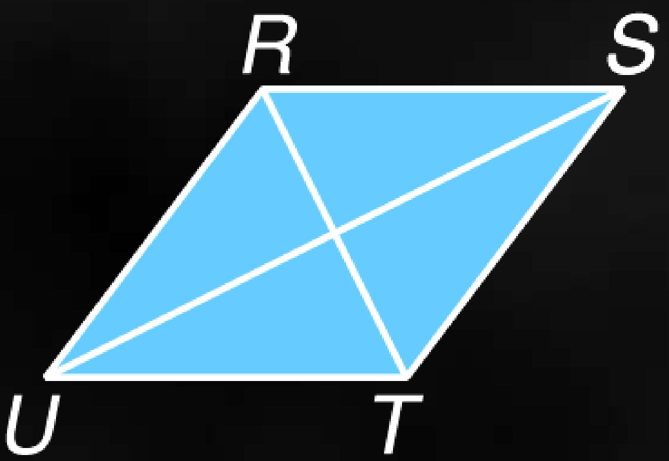


Answer: 24 $units^2$

End of slide

Example 4a

Rhombus *RSTU* has an area of 64 square inches. Find *US* if *RT*=8 inches.



Use the formula for the area of a rhombus and solve for d_2.

$$A = \frac{1}{2}d_1d_2$$

$$64 = \frac{1}{2}(8)(d_2)$$

$$64 = 4d_2$$

$$16 = d_2$$

Answer: *US* is 16 inches long.

End of slide

Example 4b

Trapezoid *DEFG* has an area of 120 square feet. Find the height of *DEFG*.

Use the formula for the area of a trapezoid and solve for *h*.

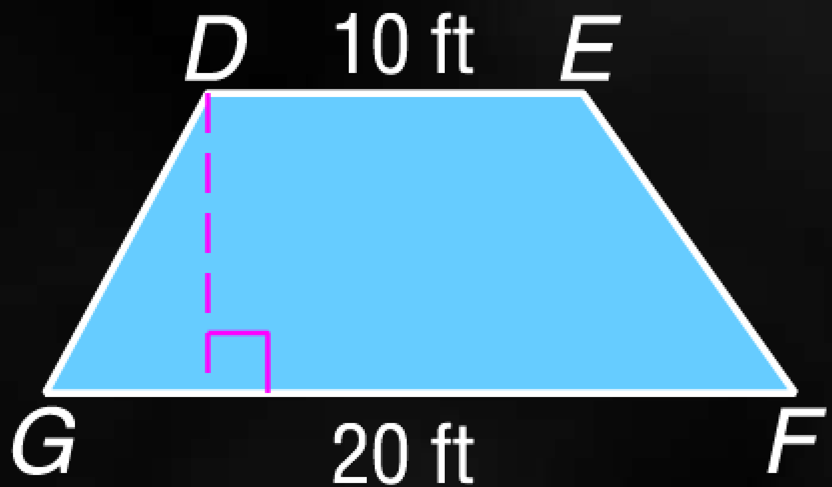
$$A = \frac{1}{2}h(b_1 + b_2)$$

$$120 = \frac{1}{2}h(10 + 20)$$

$$120 = \frac{1}{2}(30)h$$

$$120 = 15h$$

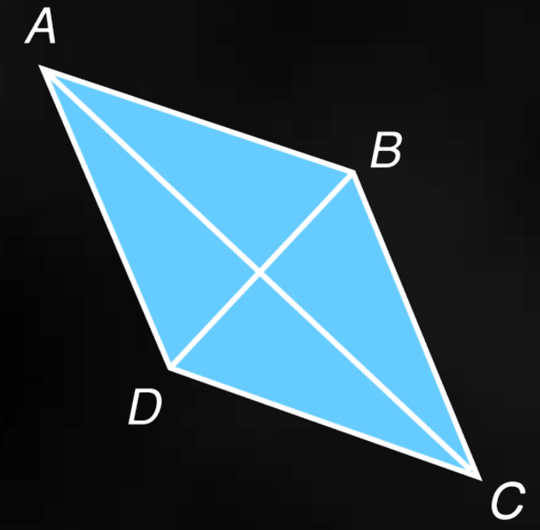
$$8 = h$$



Answer: The height of trapezoid *DEFG* is 8 feet.

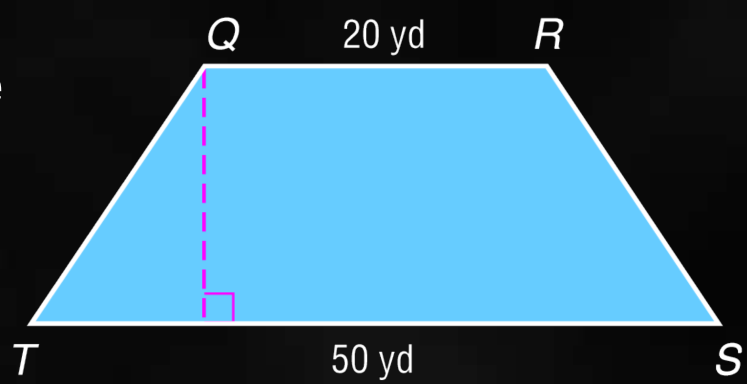
Your Turn

a. Rhombus *ABCD* has an area of 81 square centimeters. Find *BD* if *AC* = 6 centimeters.



Answer: 27 cm

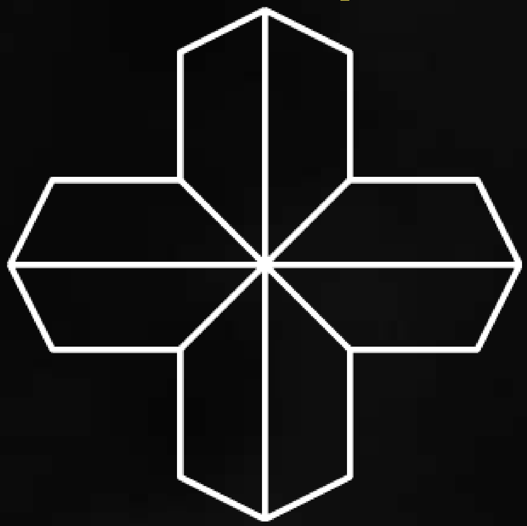
b. Trapezoid *QRST* has an area of 210 square yards. Find the height of *QRST*.



Answer: 6 yd

Example 5

STAINED GLASS **This stained glass window is composed of 8 congruent trapezoidal shapes. The total area of the design is 72 square feet. Each trapezoid has bases of 3 and 6 feet. Find the height of each trapezoid.**



First, find the area of one trapezoid. From Postulate 11.1, the area of each trapezoid is the same. So, the area of each trapezoid is $72 \div 8$ or 9 square feet.

Next, use the area formula to find the height of each trapezoid.

End of slide—continued on the next slide

Example 5

$$A = \frac{1}{2}h(b_1 + b_2)$$ Area of a trapezoid

$$9 = \frac{1}{2}h(3 + 6)$$ Substitution

$$9 = \frac{1}{2}(9)h$$ Add.

$$9 = 4.5h$$ Multiply.

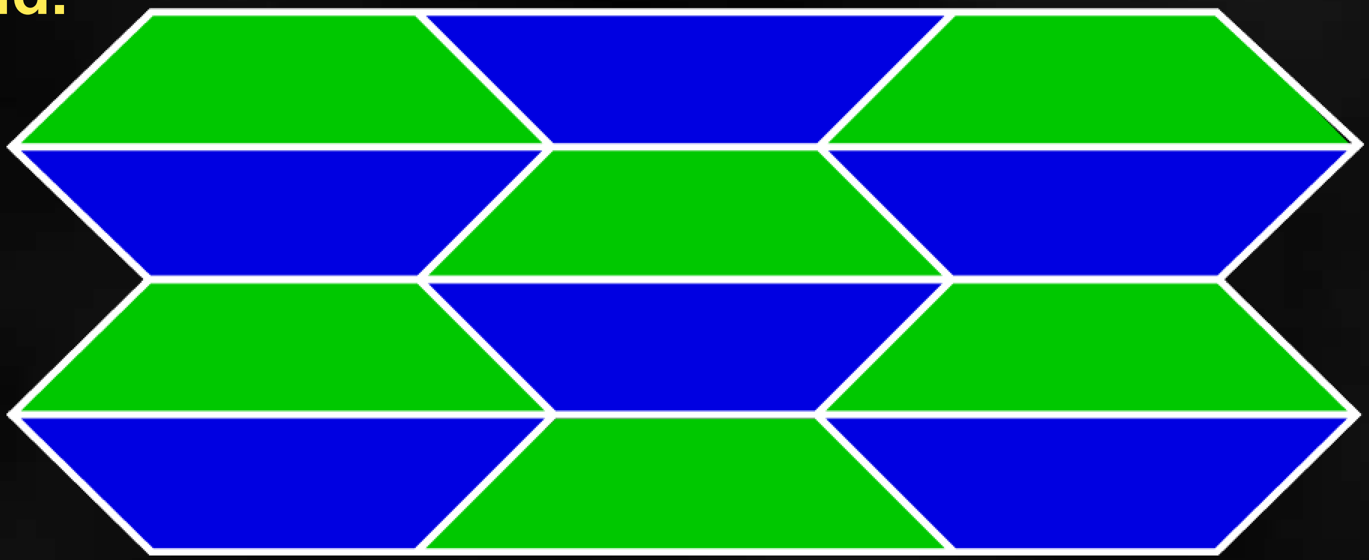
$$2 = h$$ Divide each side by 4.5.

Answer: Each trapezoid has a height of 2 feet.

End of slide

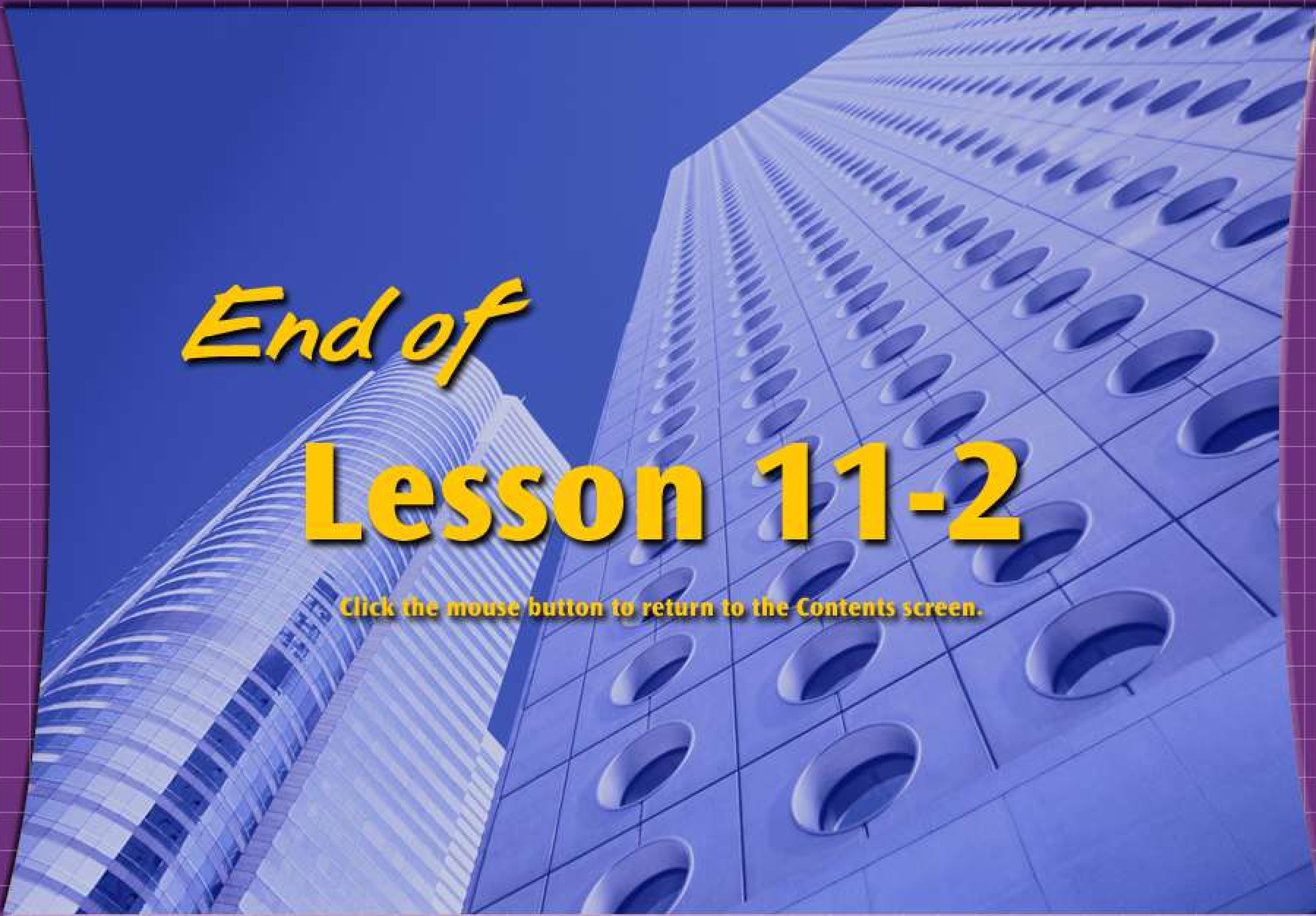
Your Turn

INTERIOR DESIGN This window hanging is composed of 12 congruent trapezoidal shapes. The total area of the design is 216 square inches. Each trapezoid has bases of 4 and 8 inches. Find the height of each trapezoid.



Answer: 3 in.

End of slide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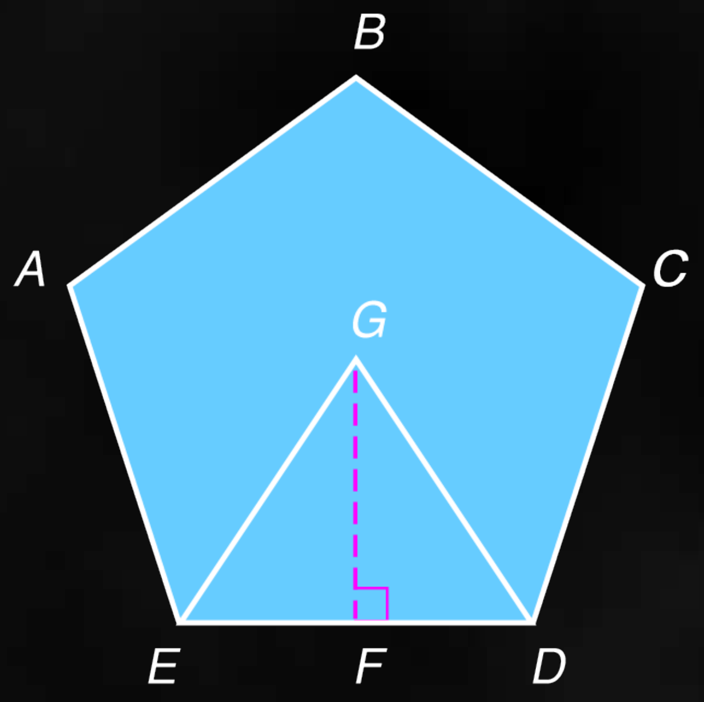
Lesson 11-2
Click the mouse button to return to the Contents screen.

Lesson 11-3 Contents

Example 1

Find the area of a regular pentagon with a perimeter of 90 meters.



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Example 1

Apothem: The central angles of a regular pentagon are all congruent. Therefore, the measure of each angle is $\frac{360}{5}$ or 72. $\overline{GE}$ is an apothem of pentagon *ABCDE*. It bisects $\angle EGD$ and is a perpendicular bisector of $\overline{ED}$. So, $m\angle DGF = \frac{1}{2}(72)$ or 36. Since the perimeter is 90 meters, each side is 18 meters and $\overline{FD}$ = 9 meters.

End of slide—continued on the next slide

Example 1

Write a trigonometric ratio to find the length of $\overline{GF}$.

$\tan \angle DGF = \dfrac{DF}{GF}$ $\qquad \tan\theta = \dfrac{\text{length of opposite side}}{\text{length of adjacent side}}$

$\tan 36° = \dfrac{9}{GF}$ $\qquad m\angle DGF = 36,\ DF = 9$

$(GF)\tan 36° = 9$ $\qquad$ Multiply each side by *GF*.

$GF = \dfrac{9}{\tan 36°}$ $\qquad$ Divide each side by $\tan 36°$.

$GF \approx 12.4$ $\qquad$ Use a calculator.

End of slide—continued on the next slide

Example 1

Area: $A = \frac{1}{2}Pa$ Area of a regular polygon

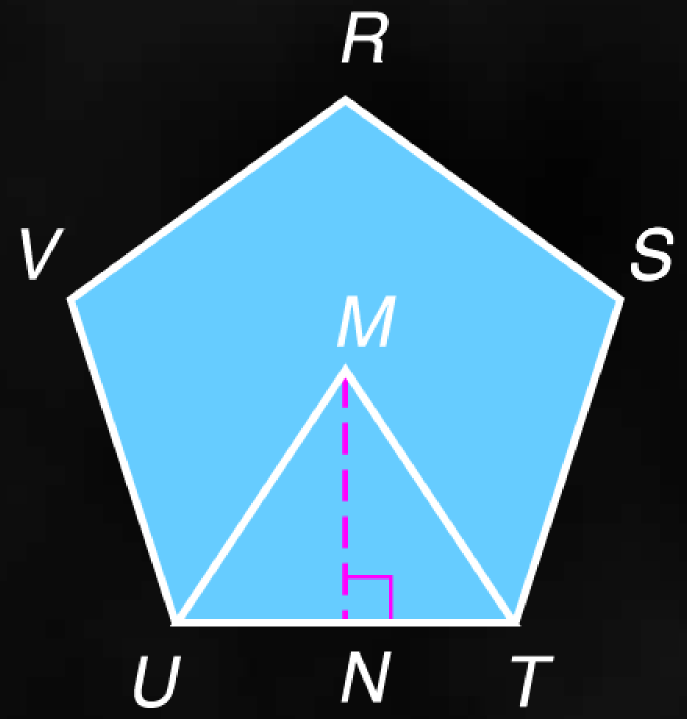
$\approx \frac{1}{2}(90)(12.4)$ $P = 90,\ a \approx 12.4$

≈ 558 Simplify.

Answer: The area of the pentagon is about 558 square meters.

Your Turn

Find the area of a regular pentagon with a perimeter of 120 inches.



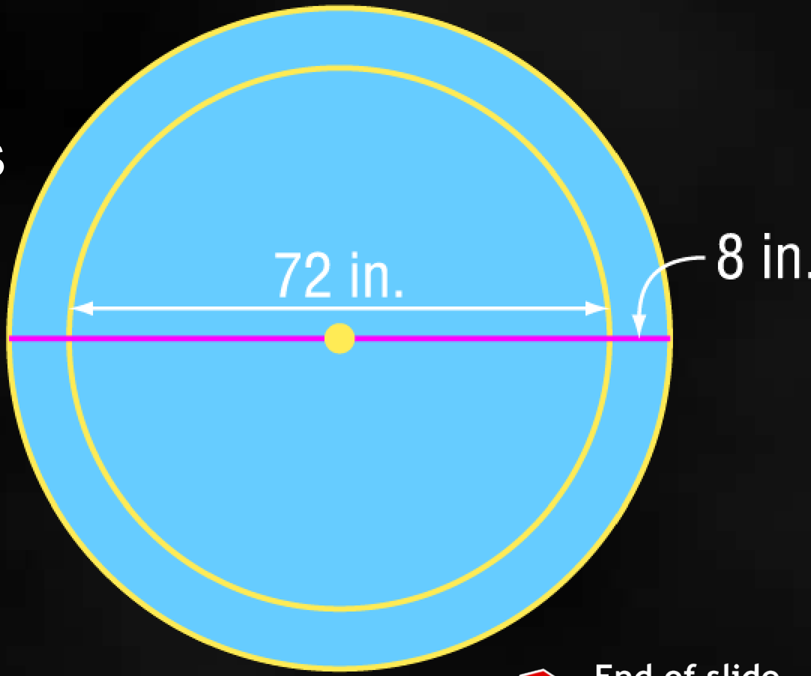
Answer: about 990 in^2

End of slide

Example 2

An outdoor accessories company manufactures circular covers for outdoor umbrellas. If the cover is 8 inches longer than the umbrella on each side, find the area of the cover in square yards.

The diameter of the umbrella is 72 inches, and the cover must extend 8 inches in each direction. So the diameter of the cover is 8 + 72 + 8 or 88 inches. Divide by 2 to find that the radius is 44 inches.



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Example 2

$A = \pi r^2$	Area of a circle
$= \pi(44)^2$	Substitution
≈ 6082.1	Use a calculator.

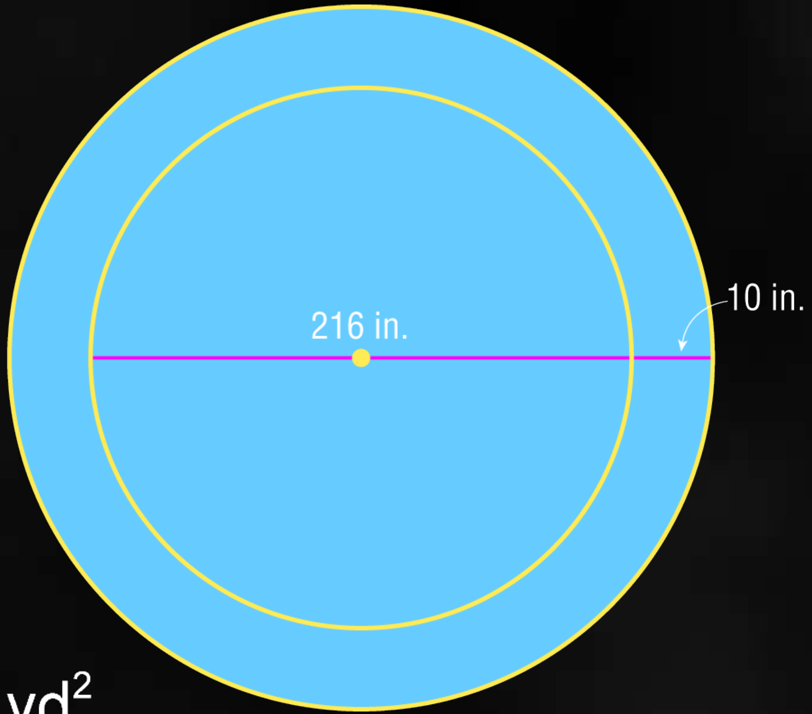
The area of the cover is 6082.1 square inches. To convert to square yards, divide by 1296.

Answer: The area of the cover is 4.7 square yards to the nearest tenth.

End of slide

Your Turn

A swimming pool company manufactures circular covers for above ground pools. If the cover is 10 inches longer than the pool on each side, find the area of the cover in square yards.



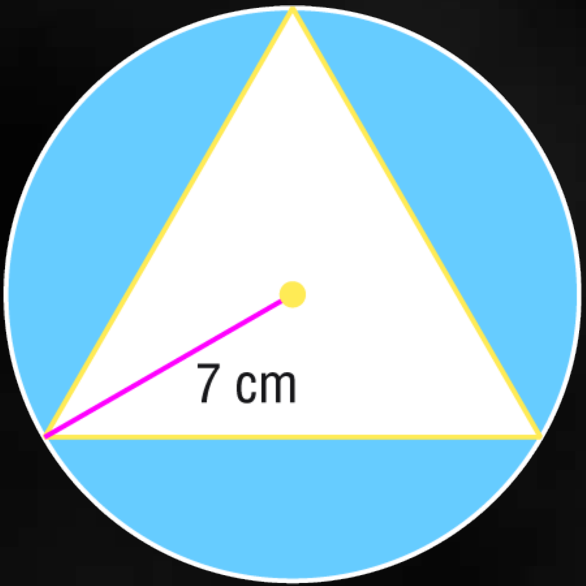
Answer: 33.8 yd^2

End of slide

Example 3

Find the area of the shaded region. Assume that the triangle is equilateral. Round to the nearest tenth.

The area of the shaded region is the difference between the area of the circle and the area of the triangle. First, find the area of the circle.

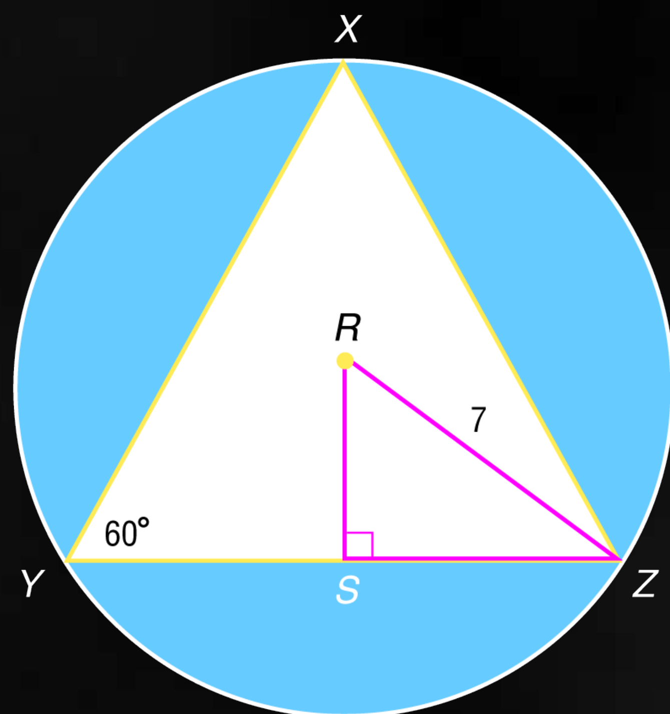


$A = \pi r^2$	Area of a circle
$= \pi(7)^2$	Substitution
≈ 153.9	Use a calculator.

End of slide—continued on the next slide

Example 3

To find the area of the triangle, use properties of 30°-60°-90° triangles. First, find the length of the base. The hypotenuse of ΔRSZ is 7, so RS is 3.5 and SZ is $3.5\sqrt{3}$. Since $YZ = 2(SZ)$, $YZ = 7\sqrt{3}$.



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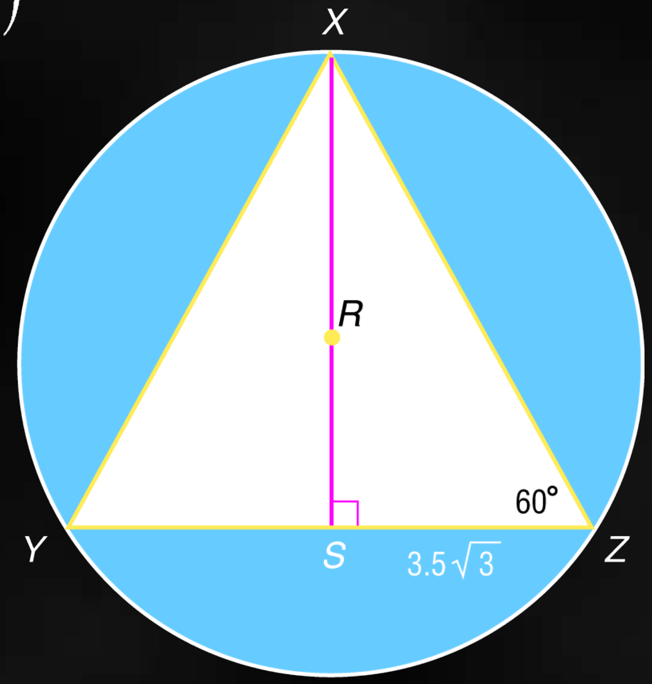
Example 3

Next, find the height of the triangle, *XS*.
Since $m\angle XZY$ is 60, $XS = 3.5\sqrt{3}\left(\sqrt{3}\right)$ or 10.5.

$$A = \frac{1}{2}bh$$ Area of a triangle

$$= \frac{1}{2}\left(7\sqrt{3}\right)(10.5)$$ $b = 7\sqrt{3}$, $h = 10.5$

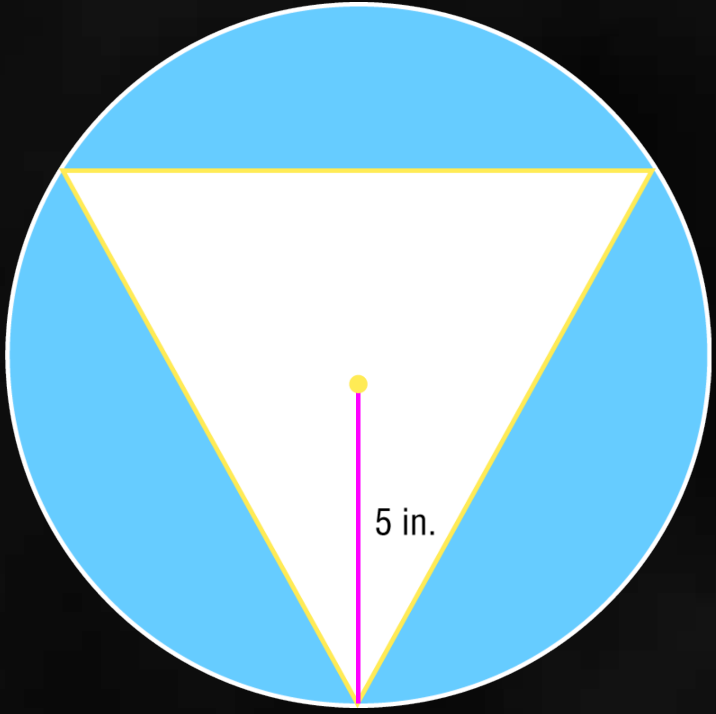
$$\approx 63.7$$ Use a calculator.



Answer: The area of the shaded region is 153.9 – 63.7 or 90.2 square centimeters to the nearest tenth.

Your Turn

Find the area of the shaded region. Assume that the triangle is equilateral. Round to the nearest tenth.



Answer: 46.0 in^2

End of slide

End of

Lesson 11-3

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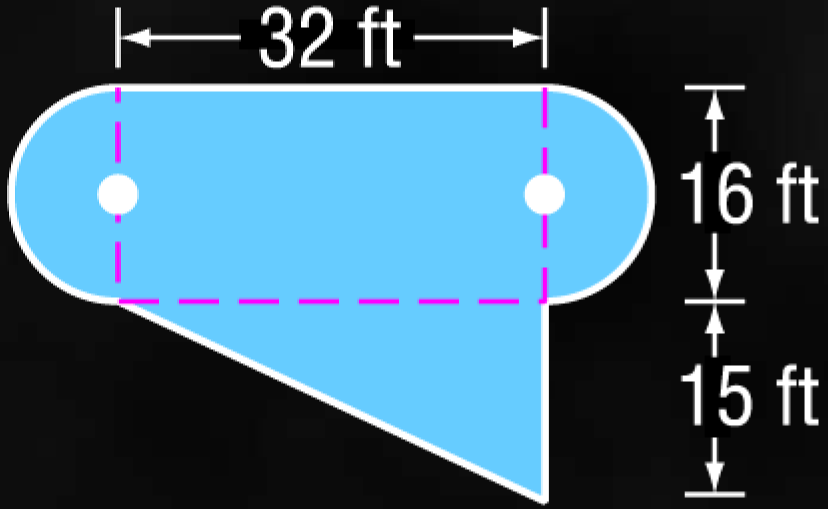
Lesson 11-4 Contents

Example 1

Find the area of the figure in square feet. Round to the nearest tenth if necessary.



The figure can be separated into a rectangle with dimensions 16 feet by 32 feet, a triangle with a base of 32 feet and a height of 15 feet, and two semicircles with radii of 8 feet.

End of slide—continued on the next slide

Example 1

area of irregular figure

= area of rectangle + area of triangle + area of 2 semicircles

$= \ell w + \frac{1}{2}bh + 2\left(\frac{1}{2}\pi r^2\right)$ Area formulas

$= 16 \cdot 23 + \frac{1}{2}(32)(15) + 2\left[\frac{1}{2}\pi(8)^2\right]$ Substitution

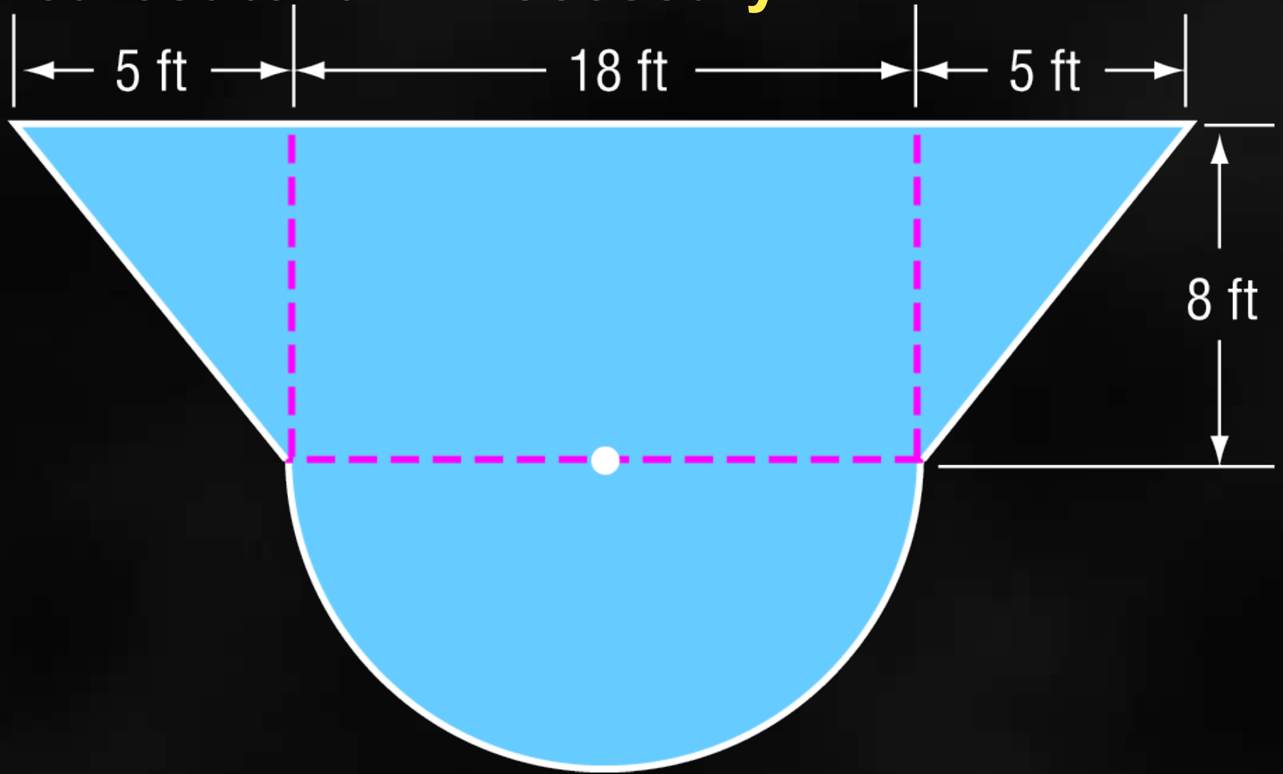
$= 512 + 240 + 64\pi$ Simplify.

≈ 953.1 Use a calculator.

Answer: The area of the irregular figure is 953.1 square feet to the nearest tenth.

Your Turn

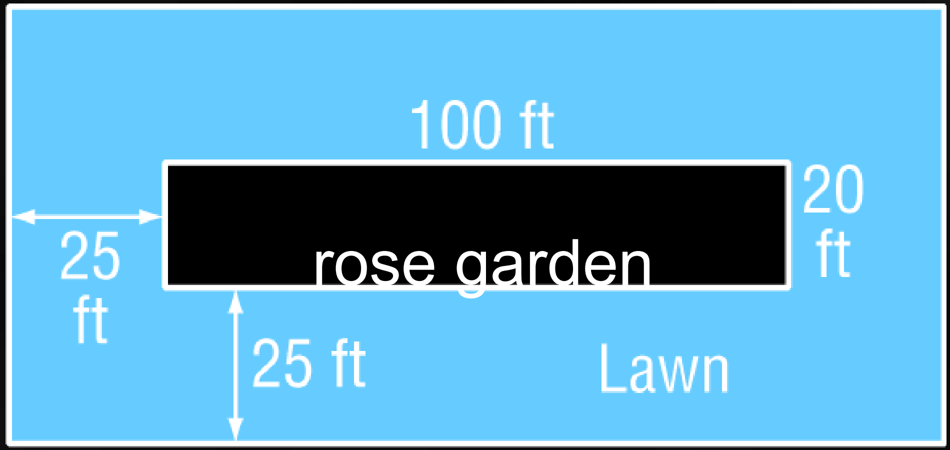
Find the area of the figure in square feet. Round to the nearest tenth if necessary.



Answer: 311.2 ft^2

Example 2

A rectangular rose garden is centered in a border of lawn. Find the area of the lawn around the garden in square feet.



The length of the entire lawn is 25 + 100 + 25 or 150 feet. The width of the entire lawn is 25 + 20 + 25 or 70 feet. The length of the rose garden is 100 feet and the width is 20 feet.

End of slide—continued on the next slide

Example 2

area of irregular figure

= area of entire lawn – area of rose garden

$= \ell w - \ell w$ Area formulas

$= 150(70) - 100(20)$ Substitution

$= 10{,}500 - 2000$ Simplify.

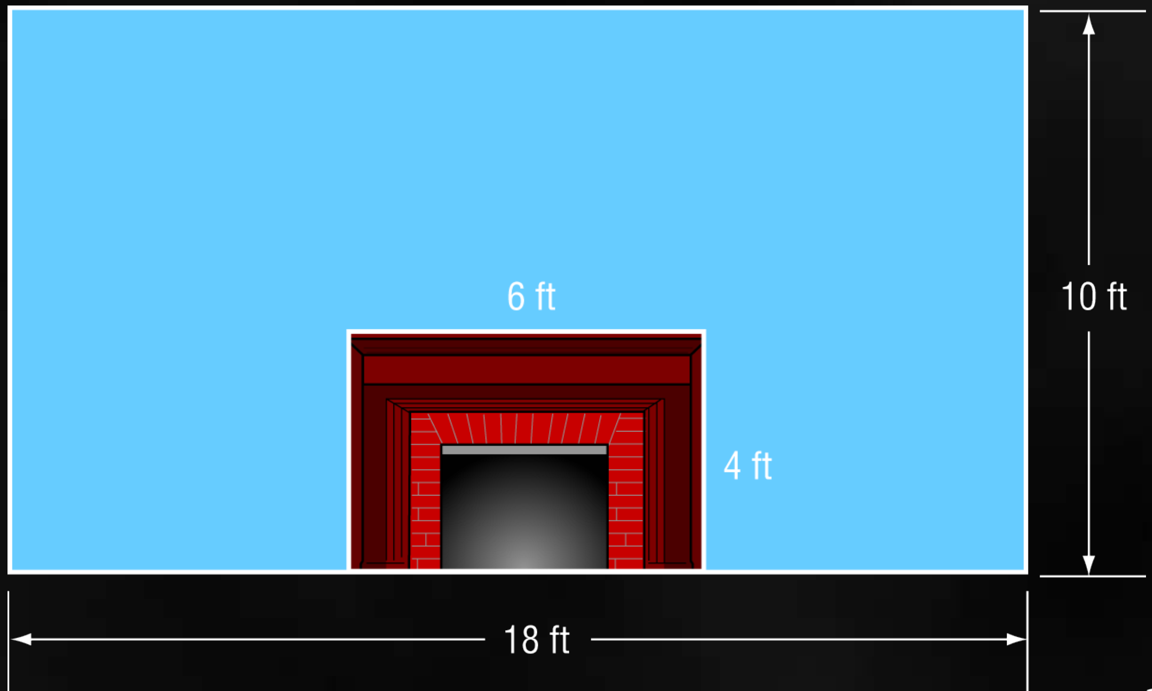
$= 8500$ Simplify.

Answer: The area of the lawn around the garden is 8500 square feet.

End of slide

Your Turn

INTERIOR DESIGN Cara wants to wallpaper one wall of her family room. She has a fireplace in the center of the wall. Find the area of the wall around the fireplace.



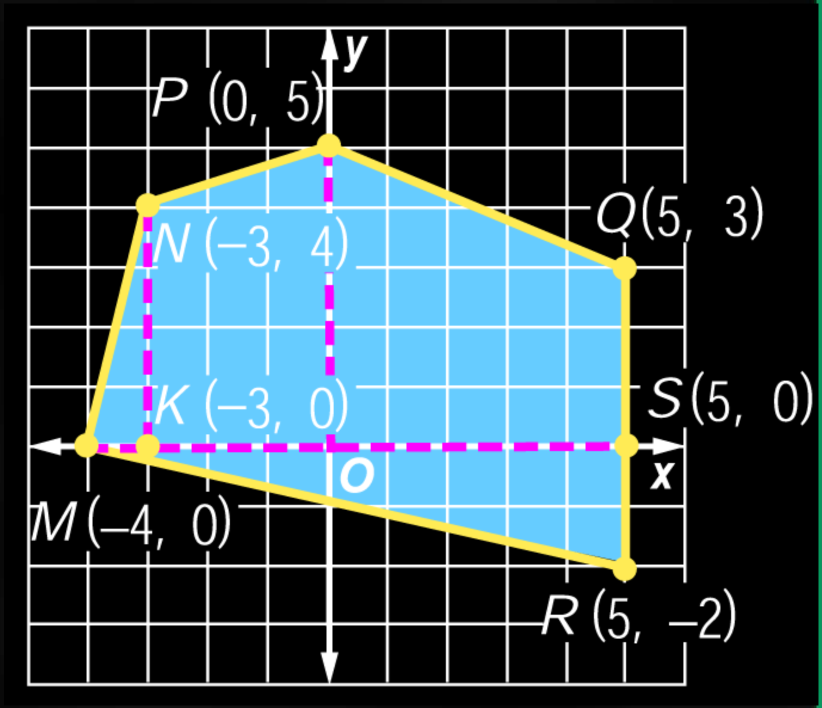
Answer: $156\ \text{ft}^2$

End of slide

Example 3

Find the area of polygon *MNPQR*.

First, separate the figure into regions. Draw an auxiliary line perpendicular to $\overline{QR}$ from *M* (we will call this point *S*) and an auxiliary line from *N* to the *x*-axis (we will call this point *K*).



This divides the figure into triangle *MRS*, triangle *NKM*, trapezoid *POKN* and trapezoid *PQSO*.

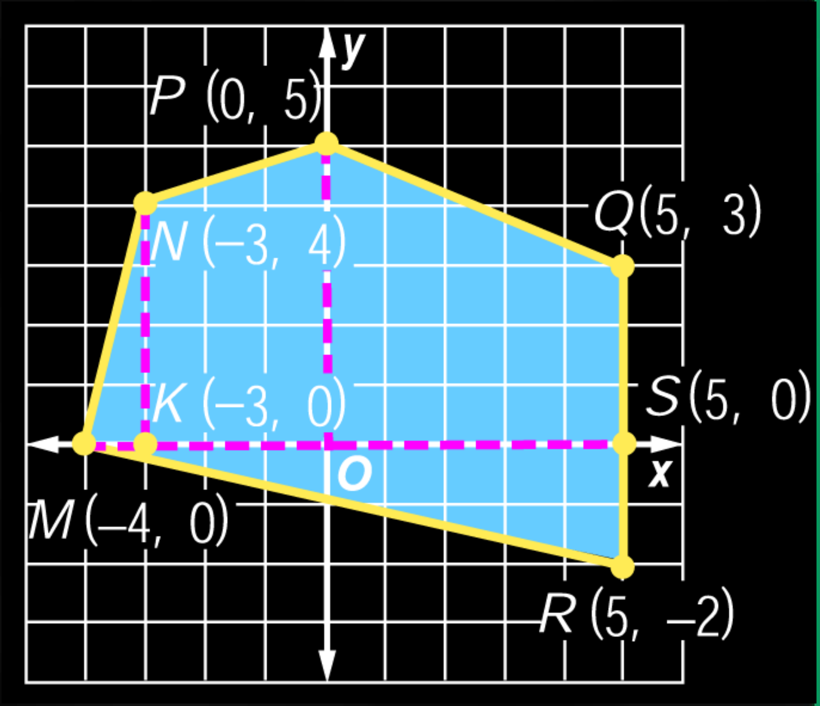
End of slide—continued on the next slide

Example 3

Now, find the area of each of the figures.

Find the difference between *x*-coordinates to find the lengths of the bases of the triangles and the lengths of the bases of the trapezoids.

Find the difference between *y*-coordinates to find the heights of the triangles and trapezoids.



End of slide—continued on the next slide

Example 3

area of $MNPQR$ = area of $\triangle MRS$ + area of $\triangle NKM$ + area of trapezoid $POKN$ + area of trapezoid $PQSO$

$$= \frac{1}{2}bh + \frac{1}{2}bh + \frac{1}{2}h(b_1 + b_2) + \frac{1}{2}h(b_1 + b_2)$$ Area formulas

$$= \frac{1}{2}(2)(9) + \frac{1}{2}(1)(4) + \frac{1}{2}(3)(5 + 4) + \frac{1}{2}(5)(5 + 3)$$ Substitution

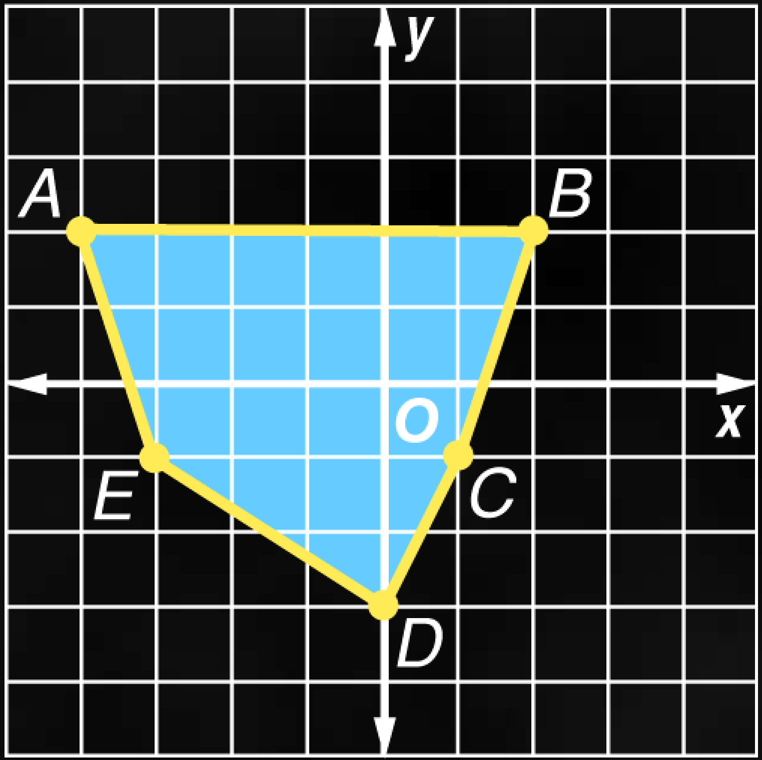
$= 44.5$ Simplify.

Answer: The area of polygon $MNPQR$ is 44.5 square units.

End of slide

Your Turn

Find the area of polygon *ABCDE*.



Answer: 19 units^2

End of

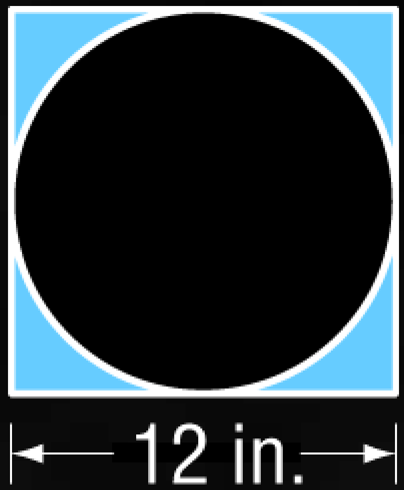
Lesson 11-4

Click the mouse button to return to the Contents screen.

Lesson 11-5 Contents

Example 1

Grid-In Test Item **A game board consists of a circle inscribed in a square. What is the chance that a dart thrown at the board will land in the shaded area?**



Read the Test Item

You want to find the probability of landing in the shaded area, not the circle.

End of slide—continued on the next slide

Example 1

Solve the Test Item

We need to divide the area of the shaded region by the total area of the game board.

The total area of the board is 12×12 or 144 square inches.

The area of the shaded region is the area of the total board minus the area of the circle. The area of the circle is $\pi(6)^2$ or 36π.

The probability of throwing a dart onto the shaded area is $\frac{144 - 36\pi}{144}$ or about 0.215.

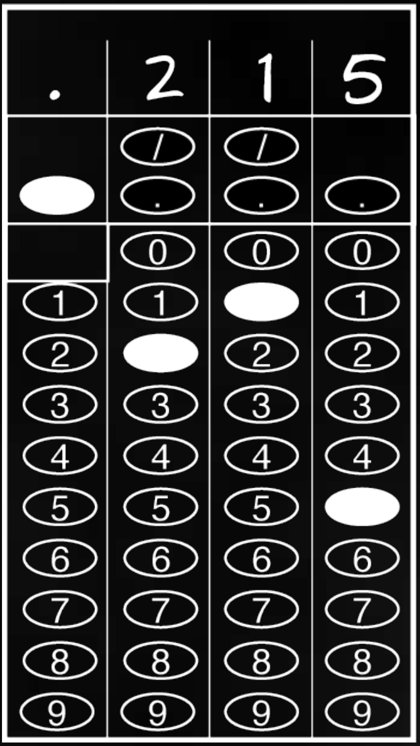
End of slide—continued on the next slide

Example 1

Fill in the Grid

Write 0.215 as .215 in the top row of the grid. Then shade in the appropriate bubble under each entry.

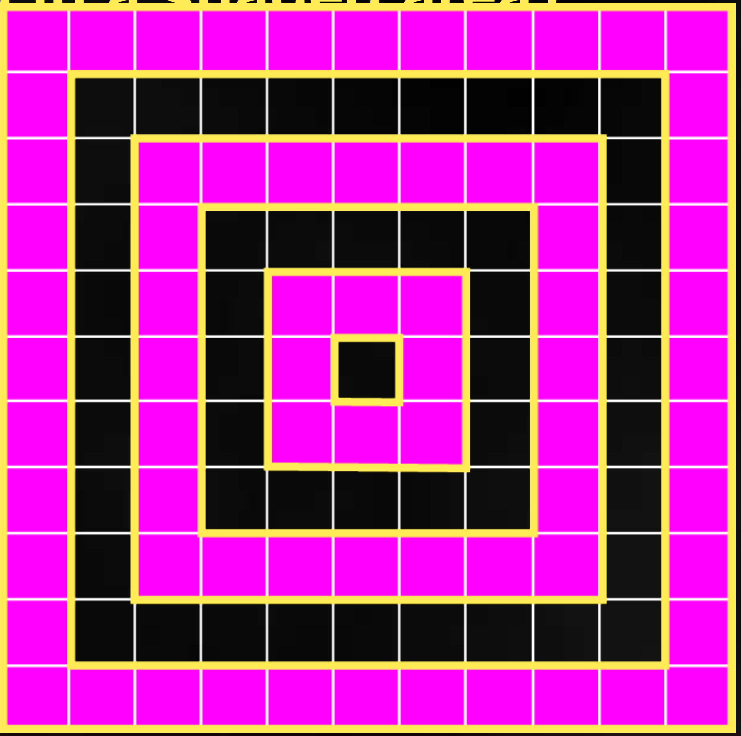
Answer:



End of slide

Your Turn

Grid In Test Item A square game board consists of shaded and non-shaded regions of equal width as shown. What is the chance that a dart thrown at the board will land in a shaded area?



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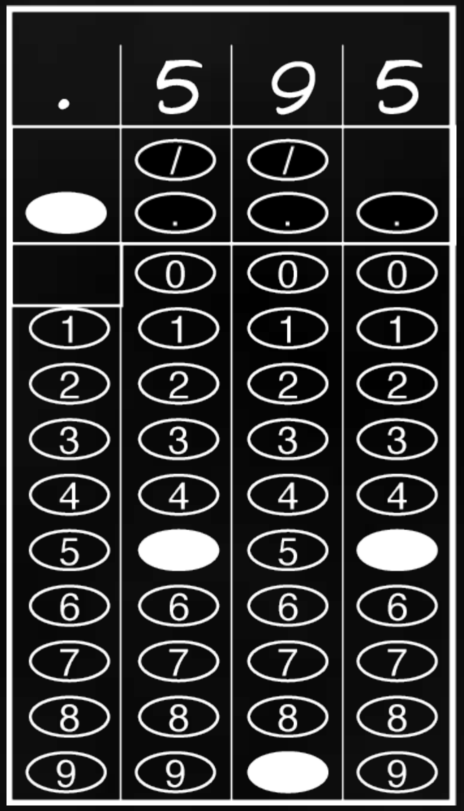
Your Turn

Answer:

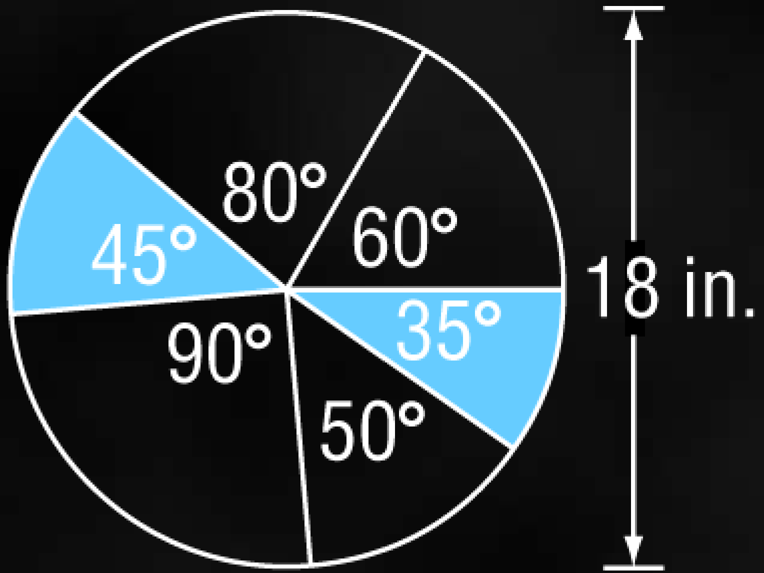


End of slide

Example 2a

Find the area of the shaded sectors.

The shaded sectors have degree measures of 45 and 35 or 80° total. Use the formula to find the total area of the shaded sectors.



$A = \frac{N}{360}\pi r^2$ Area of a sector

$= \frac{80}{360}\pi(9^2)$ $N = 80, r = 9$

$= 18\pi$ Simplify.

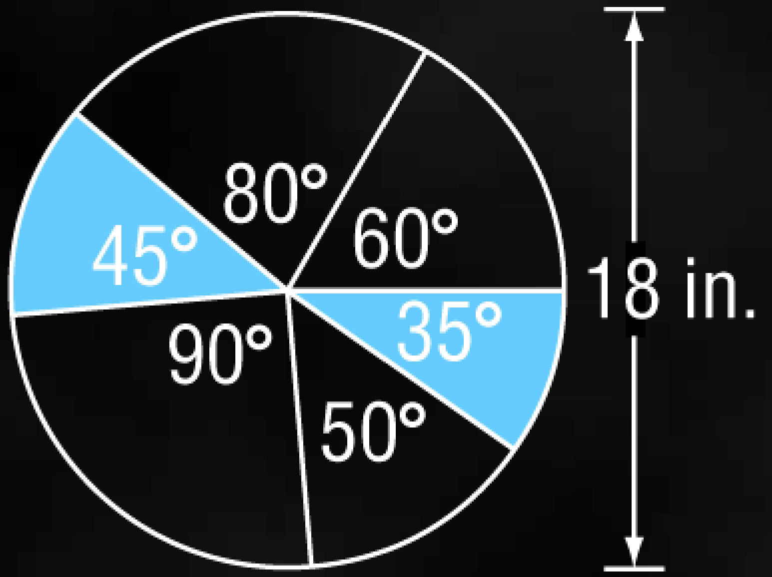
Answer: The area of the shaded sectors is 18π or about 56.5 square inches.

End of slide

Example 2b

Find the probability that a point chosen at random lies in the shaded region.

To find the probability, divide the area of the shaded sectors by the area of the circle. The area of the circle is πr^2 with a radius of 9.



End of slide—continued on the next slide

Example 2b

$$P(\text{shaded}) = \frac{\text{area of sectors}}{\text{area of circle}}$$ Geometric probability formula

$$= \frac{18\pi}{\pi \cdot 9^2}$$ area of sectors $= 18\pi$, area of circle $= \pi \cdot 9^2$

$$= \frac{2}{9}$$ Simplify.

$$\approx 0.22$$ Use a calculator.

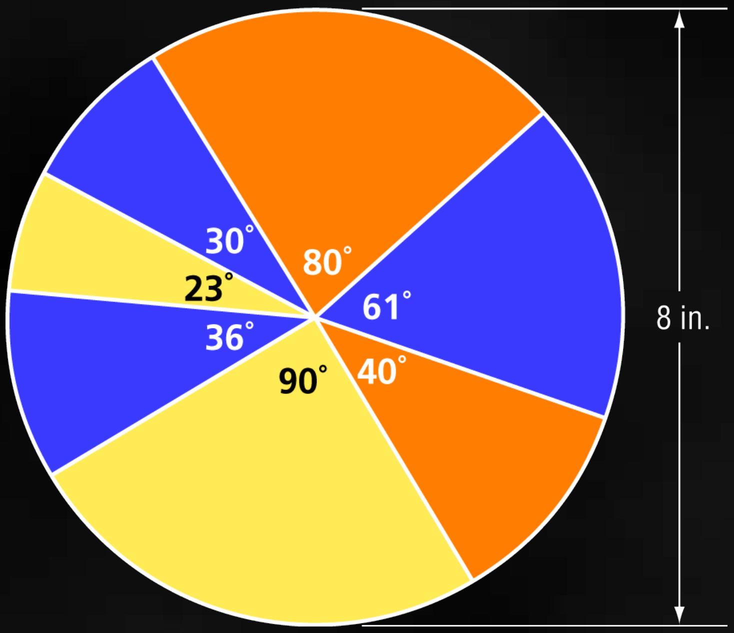
Answer: The probability that a random point is in the shaded sectors is $\frac{2}{9}$ or about 0.22.

End of slide

Your Turn

a. Find the area of the orange sectors.

Answer: $\frac{16}{3}\pi$ or about 16.8 in^2



b. Find the probability that a point chosen at random lies in the orange region.

Answer: $\frac{1}{3}$ or about 0.33

Example 3a

A regular hexagon is inscribed in a circle with a diameter of 12. Find the area of the shaded regions.

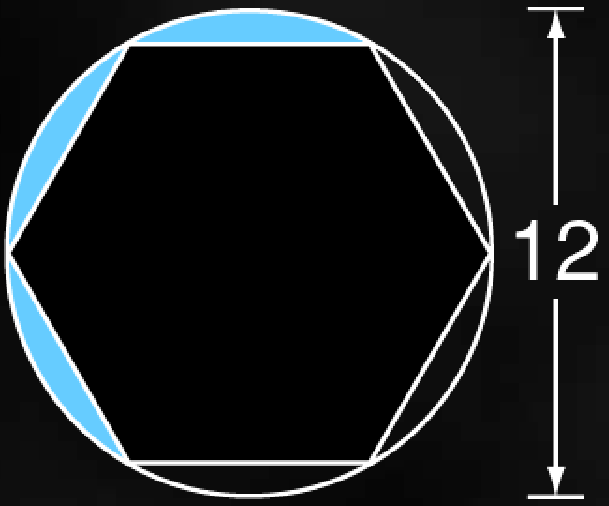
Area of a sector:

$A = \frac{N}{360}\pi r^2$ Area of a sector

$= \frac{60}{360}\pi(6^2)$ $N = 60, r = 6$

$= 6\pi$ Simplify.

≈ 18.85 Use a calculator.



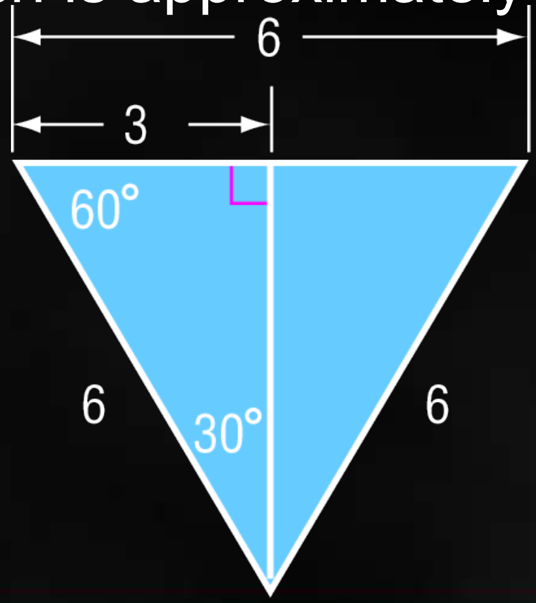
Use the center of the circle and two consecutive vertices of the hexagon to draw a triangle and find the area of one shaded segment.

End of slide—continued on the next slide

Example 3a

Area of a triangle:

Since the hexagon was inscribed in the circle, the triangle is equilateral, with each side 6 units long. Use properties of 30°-60°-90° triangles to find the apothem. The value of *x* is 3 and the apothem is $x\sqrt{3}$ or $3\sqrt{3}$, which is approximately 5.20.



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Example 3a

Next, use the formula for the area of a triangle.

$A = \frac{1}{2}bh$ Area of a triangle

$\approx \frac{1}{2}(6)(5.20)$ $b = 6,\ h \approx 5.20$

≈ 15.60 Simplify.

Area of segment:

area of one segment = area of sector — area of triangle

$\approx 18.85 - 15.60$ Substitution

≈ 3.25 Simplify.

End of slide—continued on the next slide

Example 3a

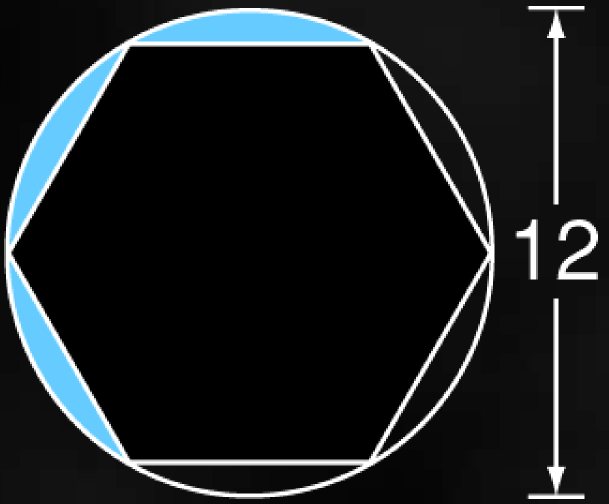
Since three segments are shaded, we will multiply this by 3.
3(3.25) = 9.75

Answer: The area of the shaded regions is about 9.75 square units.

Example 3b

A regular hexagon is inscribed in a circle with a diameter of 12. Find the probability that a point chosen at random lies in the shaded regions.

Divide the area of the shaded regions by the area of the circle to find the probability. First, find the area of the circle. The radius is 6, so the area is $\pi(6^2)$ or about 113.10 square units.



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Example 3b

$$P(\text{shaded}) = \frac{\text{area of shaded region}}{\text{area of circle}}$$

$$\approx \frac{9.75}{113.10}$$

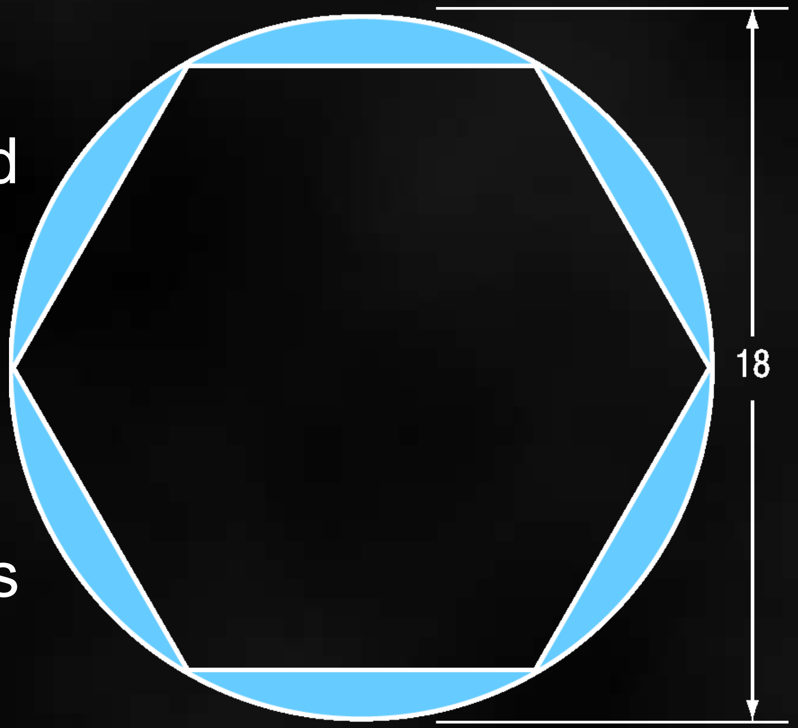
$$\approx 0.086$$

Answer: The probability that a random point is on the shaded region is about 0.086 or 8.6%.

End of slide

Your Turn

A regular hexagon is inscribed in a circle with a diameter of 18.

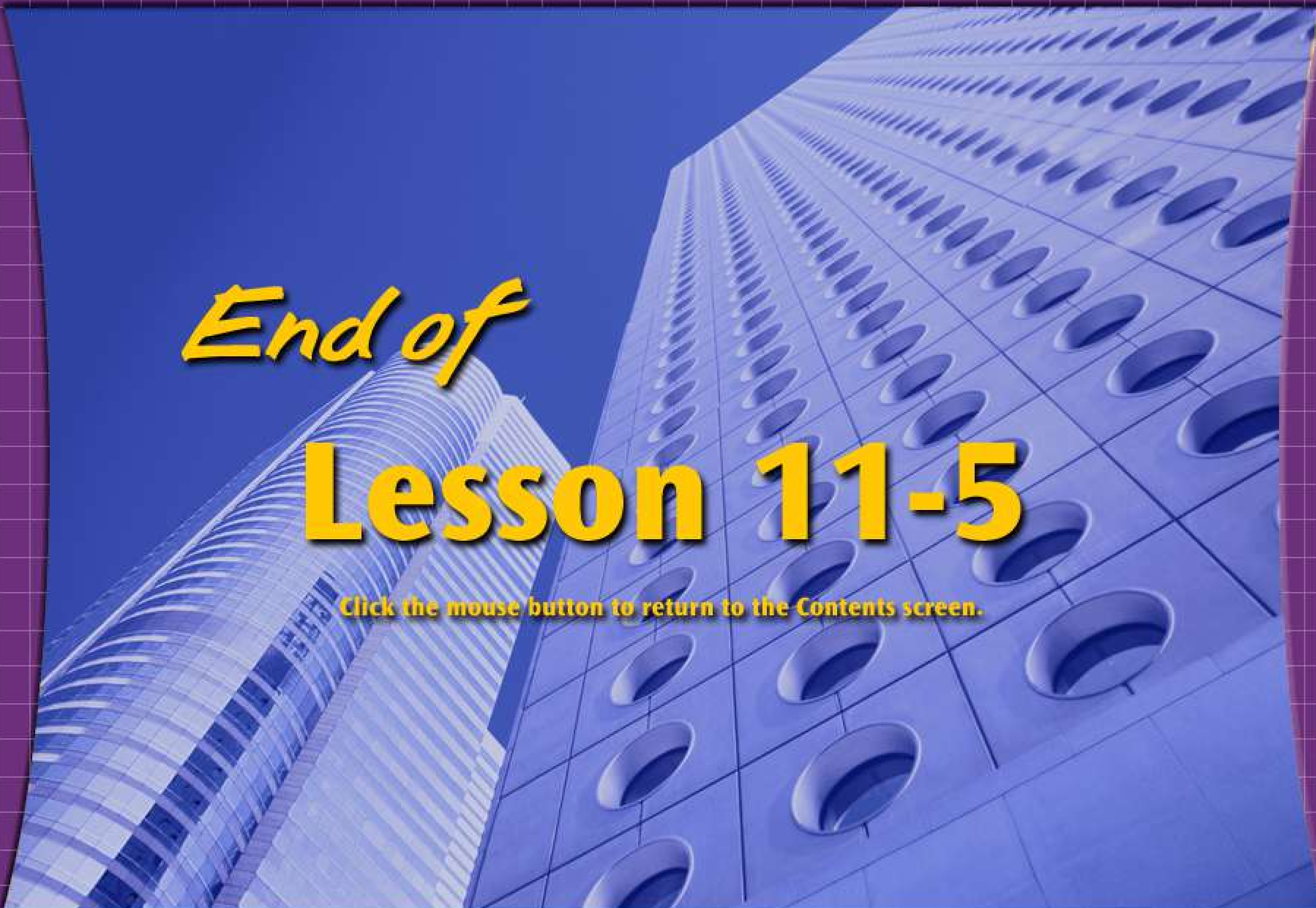


a. Find the area of the shaded regions.

Answer: about 44.1 units^2

b. Find the probability that a point chosen at random lies in the shaded regions.

Answer: about 0.173 or 17.3%

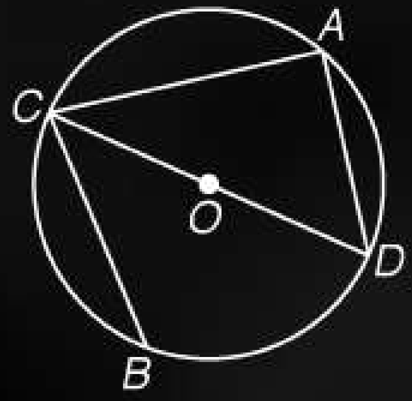

End of
Lesson 11-5
Click the mouse button to return to the Contents screen.

Extra Examples

Explore online information about the information introduced in this chapter.

Click on the **Connect** button to launch your browser and go to the *Glencoe Geometry* Web site. At this site, you will find extra examples for each lesson in the Student Edition of your textbook. When you finish exploring, exit the browser program to return to this presentation. If you experience difficulty connecting to the Web site, manually launch your Web browser and go to **www.geometryonline.com/extra_examples**.

Refer to the figure.



1. Name a radius.

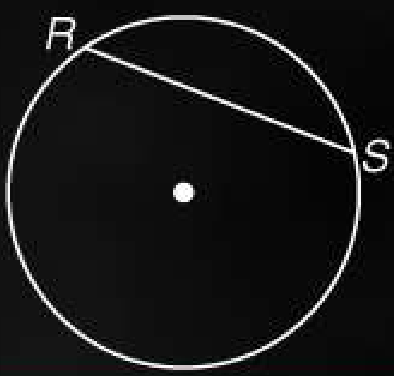
2. Name a chord.

3. Name a diameter.

4. Find $m\widehat{AB}$ if $m\angle ACB = 80$.

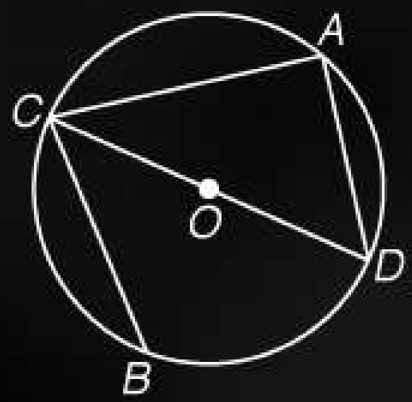
5. Write an equation of the circle with center at (–3, 2) and a diameter of 6.

6. **Standardized Test Practice** Which word best describes $\overline{RS}$?



A chord
B arc
C diameter
D radius

Refer to the figure.



1. Name a radius. $\overline{OC}$ or $\overline{OD}$

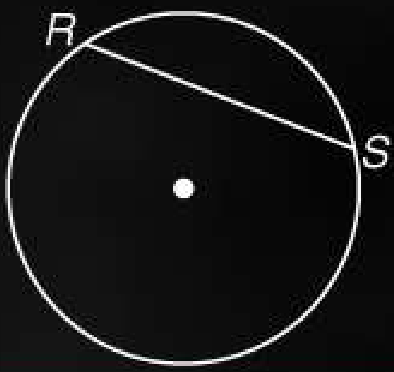
2. Name a chord. $\overline{AC}$, $\overline{AD}$, $\overline{BC}$, $\overline{CD}$

3. Name a diameter. $\overline{CD}$

4. Find $m\widehat{AB}$ if $m\angle ACB = 80$. 160

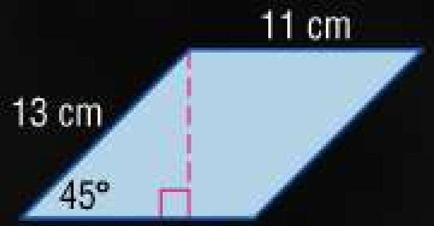
5. Write an equation of the circle with center at (–3, 2) and a diameter of 6. $(x + 3)^2 + (y - 2)^2 = 9$

6. **Standardized Test Practice** Which word best describes $\overline{RS}$?



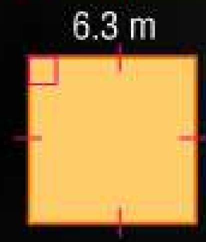
- A chord
- B arc
- C diameter
- D radius

Find the perimeter and area of each parallelogram. Round to the nearest tenth if necessary.

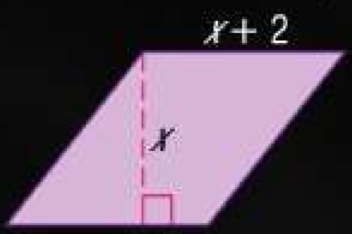
1.


2.


3.


4.


5. Find the height and base of the parallelogram if the area is 168 square units.



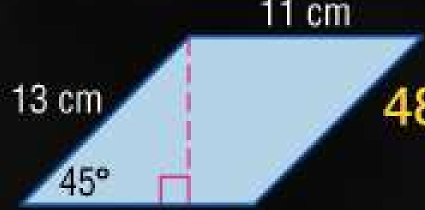
6. **Standardized Test Practice** Find the area of a parallelogram if the height is 8 centimeters and the base length is 10.2 centimeters.

A. $28.4\ cm^2$
B. $29.2\ cm^2$
C. $81.6\ cm^2$
D. $104.04\ cm^2$

5-Minute Check *(over Lesson 11-1)* Transparency 11-2

Find the perimeter and area of each parallelogram. Round to the nearest tenth if necessary.

1.



48 cm, 101.1 cm^2

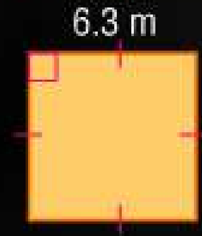
2.

58 ft, 204 ft^2

3.

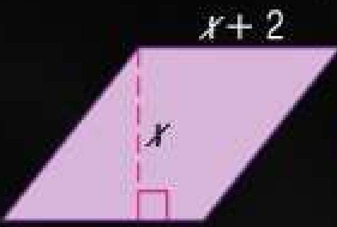
58 in., 171.5 in^2

4.



25.2 m, 39.7 m^2

5. Find the height and base of the parallelogram if the area is 168 square units.



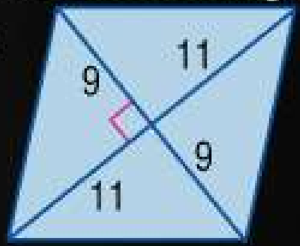
12 units, 14 units

6. **Standardized Test Practice** Find the area of a parallelogram if the height is 8 centimeters and the base length is 10.2 centimeters.

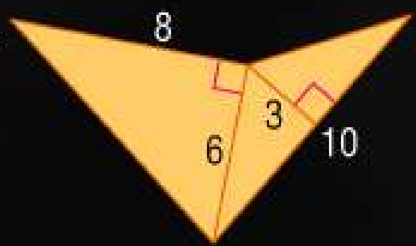
(A) 28.4 cm^2 (B) 29.2 cm^2

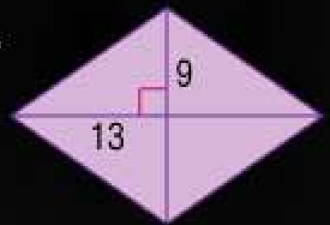
(C) 81.6 cm^2 (D) 104.04 cm^2

Find the area of each figure. Round to the nearest tenth if necessary.

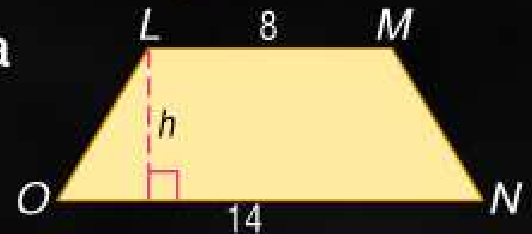
1. 

2. 

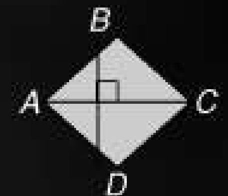
3. 

4. 

5. Trapezoid *LMNO* has an area of 55 square units. Find the height.



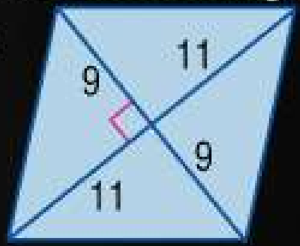
6. **Standardized Test Practice** Rhombus *ABCD* has an area of 144 square inches. Find *AC* if *BD* = 16 inches.



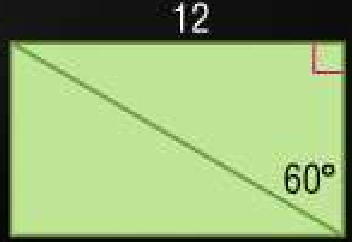
(A) 8 in. (B) 9 in.

(C) 16 in. (D) 18 in.

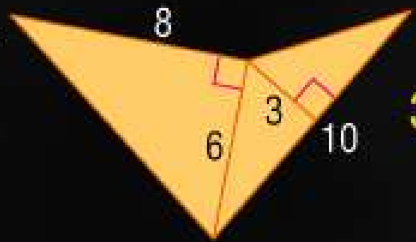
Find the area of each figure. Round to the nearest tenth if necessary.

1. 

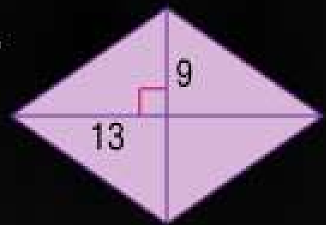
198 units^2

2. 

83.1 units^2

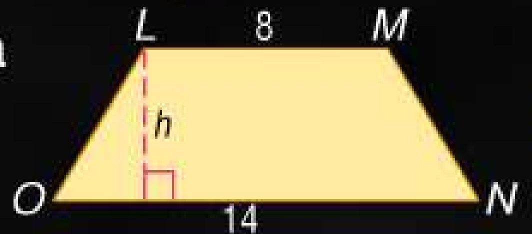
3. 

39 units^2

4. 

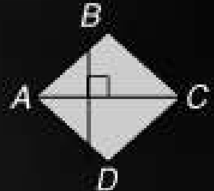
234 units^2

5. Trapezoid *LMNO* has an area of 55 square units. Find the height.



5 units

6. **Standardized Test Practice** Rhombus *ABCD* has an area of 144 square inches. Find *AC* if *BD* = 16 inches.



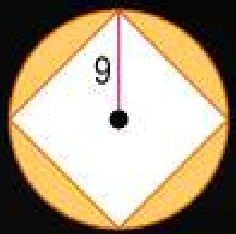
A. 8 in.
B. 9 in.
C. 16 in.
D. 18 in.

Find the area of each regular polygon. Round to the nearest tenth if necessary.

1. a hexagon with side length of 8 centimeters
2. a square with an apothem length of 14 inches
3. a triangle with side length of 18.6 meters

Find the area of each shaded region. Assume that all polygons are regular. Round to the nearest tenth.

4. 

5. 

6. **Standardized Test Practice** Find the area of a circle with a diameter of 8 inches.

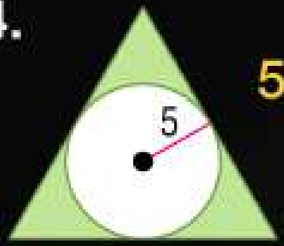
A 4π B 8π C 16π D 64π

Find the area of each regular polygon. Round to the nearest tenth if necessary.

1. a hexagon with side length of 8 centimeters 166.3 cm^2
2. a square with an apothem length of 14 inches 784 in^2
3. a triangle with side length of 18.6 meters 149.8 m^2

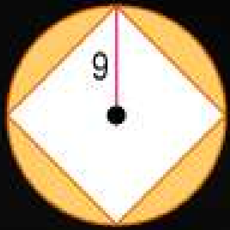
Find the area of each shaded region. Assume that all polygons are regular. Round to the nearest tenth.

4.



51.4 $units^2$

5.



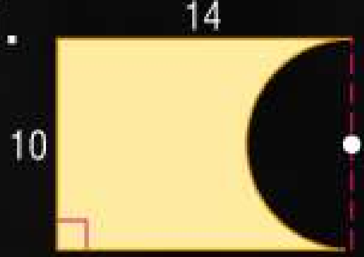
92.5 $units^2$

6. **Standardized Test Practice** Find the area of a circle with a diameter of 8 inches.

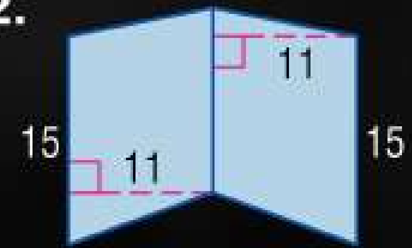
A 4π B 8π C 16π D 64π

Find the area of each figure. Round to the nearest tenth if necessary.

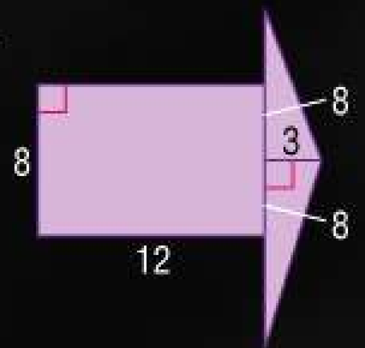
1.



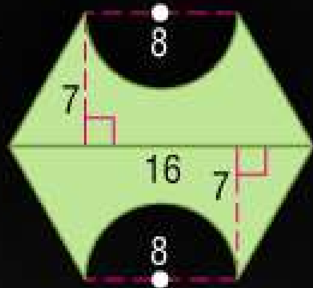
2.



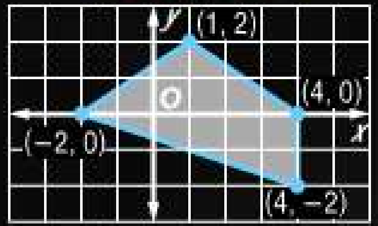
3.



4.



5. Find the area of the figure.



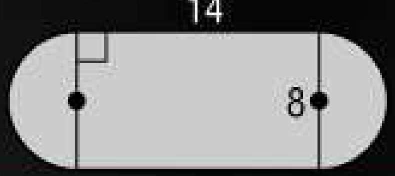
6. **Standardized Test Practice** Find the area of the figure.

A 112 units^2

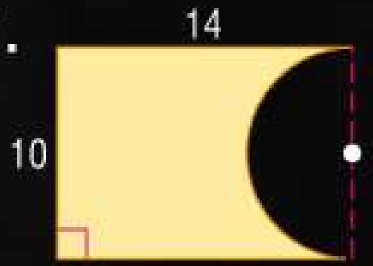
B 136.8 units^2

C 162.3 units^2

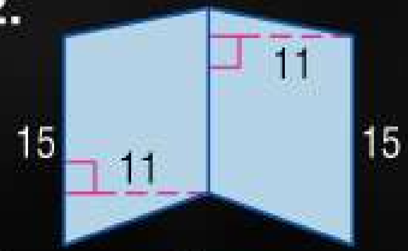
D 212.5 units^2



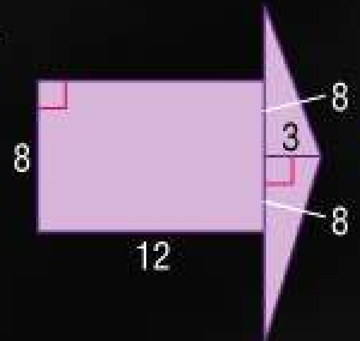
Find the area of each figure. Round to the nearest tenth if necessary.

1. 

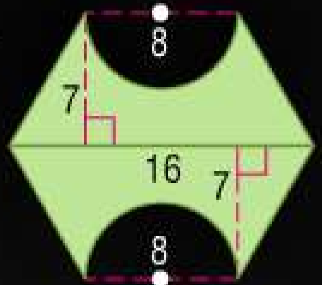
100.7 units^2

2. 

330 units^2

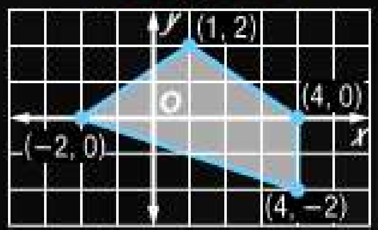
3. 

120 units^2

4. 

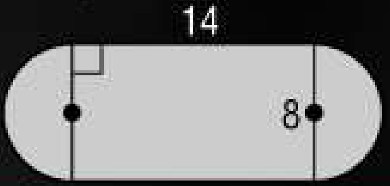
117.7 units^2

5. Find the area of the figure.



12 units^2

6. **Standardized Test Practice** Find the area of the figure.

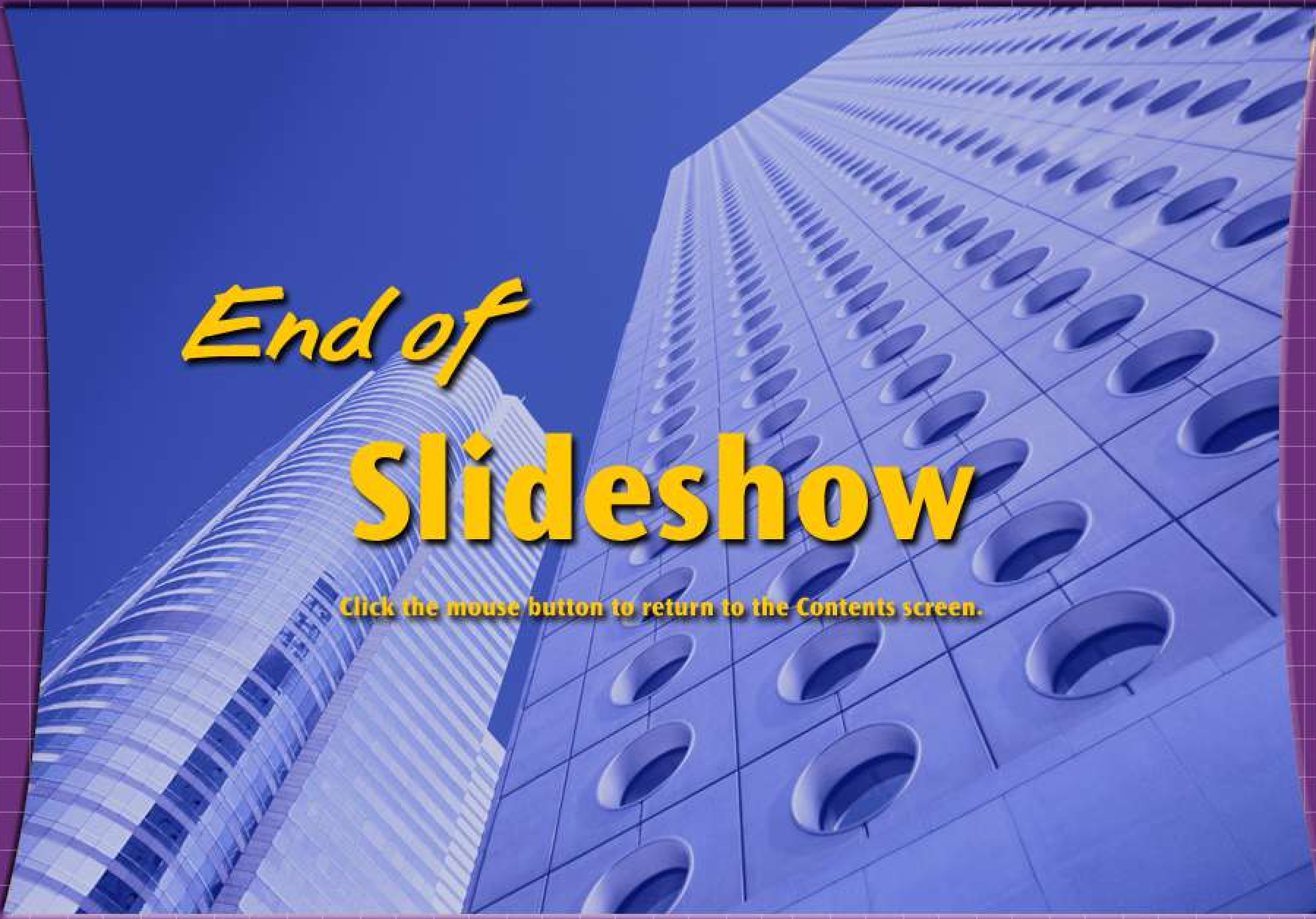


A 112 units^2

B 136.8 units^2

C 162.3 units^2

D 212.5 units^2


End of
Slideshow
Click the mouse button to return to the Contents screen.