Lesson 2.3 Two Dimensional Figures

Saturday, October 19, 2024 9:27 PM

Click link below for interactive Pear Deck PowerPoint Lesson:
https://app.peardeck.com/student/teastdeju

Lesson 2.3 TwoDime...

Lesson 2.3: Two-Dimensional Figures

MA.912.GR.3.4

Use coordinate geometry to solve mathematical and real-world problems on the coordinate plane involving perimeter or area of polygons.

MA.912.GR.4.4

Solve mathematical and real-world problems involving the area of two-dimensional figures.

Content Objective

Students model and find measures of two-dimensional objects.

Learn

Perimeter, Circumference, and Area

A **polygon** is a closed plane figure with at least three straight sides.

The **perimeter** of a polygon is the sum of the lengths of the sides of the polygon. Some shapes have special formulas for perimeter, but all are derived from the basic definition of perimeter. Outside

The **circumference** of a circle is the distance around the circle. ← perimeter

Area is the number of square units needed to cover a surface. inside

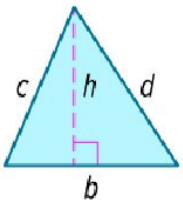
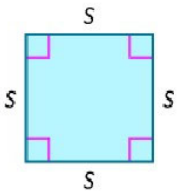
Inside

Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Learn

Perimeter, Circumference, and Area

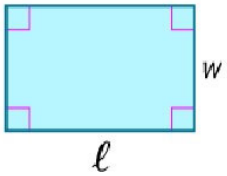
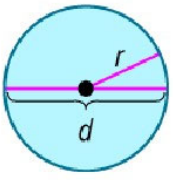
Perimeter, Circumference, and Area	
Triangle	**Square**
	
Perimeter $P = b + c + d$ Area $A = \frac{1}{2}bh$	Perimeter $P = s + s + s + s = 4s$ Area $A = s^2$

Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Learn

Perimeter, Circumference, and Area

Perimeter, Circumference, and Area	
Rectangle	**Circle**
	
Perimeter $P = \ell + w + \ell + w = 2\ell + 2w$ Area $A = \ell w$	Circumference $C = 2\pi r$ or $C = \pi d$ Area $A = \pi r^2$

Area	Area
$A = \ell w$	$A = \pi r^2$

Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Learn
Perimeter, Circumference, and Area

You can use the Distance Formula to find the perimeter and area of a polygon graphed on a coordinate plane. You can also use the Distance Formula to calculate the radius of a circle and then use the appropriate equations for circumference and area.

60° 180° 60° 5 5 5 60° 60°

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

Rectangle

An **equilateral polygon** has all sides congruent. An **equiangular polygon** has all angles congruent. A **regular polygon** is a convex polygon that is both equilateral and equiangular.

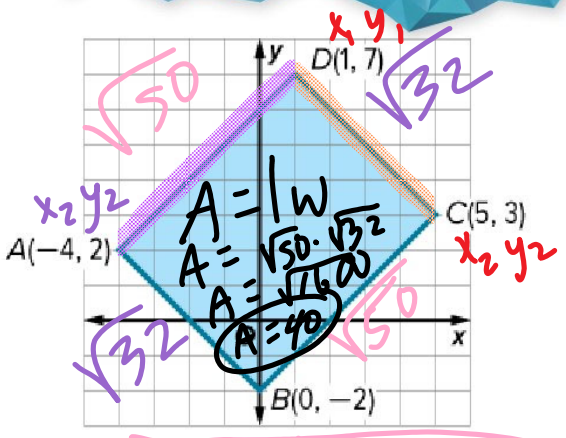
SQUARE

Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Example 1
Find Perimeter, Circumference, and Area

Find the perimeter and area of Rectangle *ABCD*.



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

$(5 - 1)^2 + (3 - 7)^2$

$4^2 + -4^2$

$16 + 16 = \sqrt{32}$

$P = 2\sqrt{50} + 2\sqrt{32}$

$\sqrt{(-4 - 1)^2 + (2 - 7)^2}$

$-5^2 + -5^2$

$25 + 25 = \sqrt{50}$

Students, draw anywhere on this slide!

Pear Deck Interactive Slide

Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Example 1
Find Perimeter, Circumference, and Area

Find the circumference and area of Circle *C*.

$C = 2\pi r$

$C = 2\pi(\sqrt{29})$

33.8

$A = \pi r^2$

$A = \pi(\sqrt{29})^2$

$29\pi = 91.1$

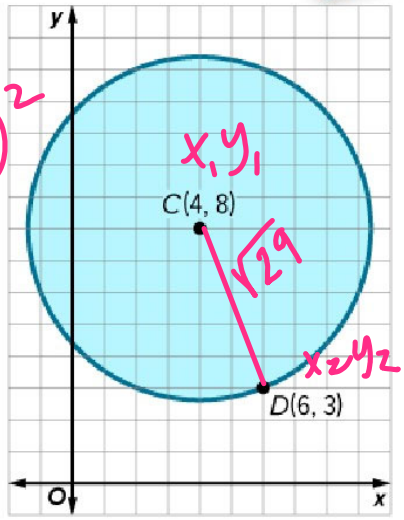
$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$(6-4)^2+(3-8)^2$

$(2)^2+(-5)^2$

$4 + 25$

$\sqrt{29}$



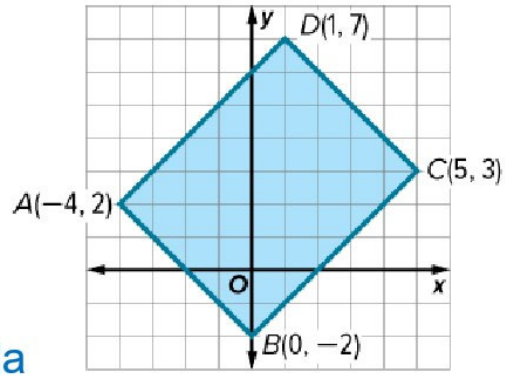
Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Example 1
Find Perimeter, Circumference, and Area

a. Rectangle *ABCD*

First, find the length ℓ of the rectangle by using the Distance Formula. Let the length be equal to *AD*.



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

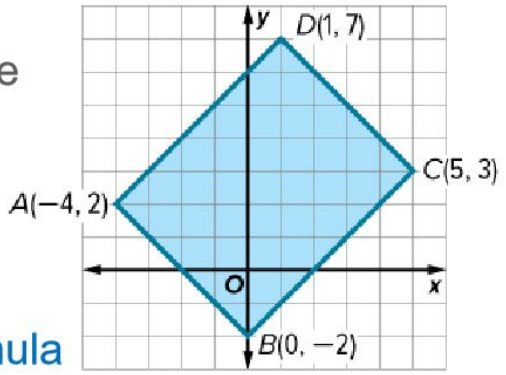
$= \sqrt{[1 - (-4)]^2 + (7 - 2)^2}$ Let $(x_1, y_1) = A(-4, 2)$ and $(x_2, y_2) = D(1, 7)$.

$= \sqrt{5^2 + 5^2}$ Subtract.

$= \sqrt{50}$ Simplify.

Example 1
Find Perimeter, Circumference, and Area

Next, find the width *w* of the rectangle by using the Distance Formula. Let the width be equal to *AB*.



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

$= \sqrt{[0 - (-4)]^2 + [(-2) - 2]^2}$ Let $(x_1, y_1) = A(-4, 2)$ and $(x_2, y_2) = B(0, -2)$.

$= \sqrt{4^2 + (-4)^2}$ Subtract.

$= \sqrt{32}$ Simplify.

Example 1
Find Perimeter, Circumference, and Area

Use the length and width that you calculated to find the perimeter and area of the rectangle.

$P = 2\ell + 2w$ Perimeter of a rectangle

$= 2\sqrt{50} + 2\sqrt{32}$ $\ell = \sqrt{50}$ and $w = \sqrt{32}$

≈ 25.5 Simplify.

14.14 + 11.31

The perimeter is about 25.5 units.

Example 1

Example 1
Find Perimeter, Circumference, and Area

$A = \ell w$ Area of a rectangle

$= \sqrt{50} \times \sqrt{32} = \sqrt{1600}$ $\ell = \sqrt{50}$ and $w = \sqrt{32}$

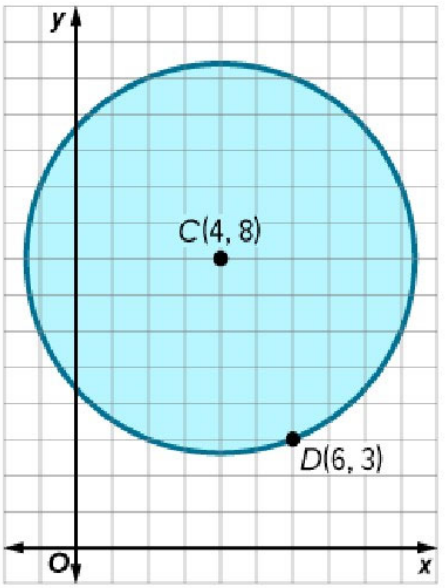
$= 40$ Simplify.

The area is 40 square units.

Example 1
Find Perimeter, Circumference, and Area

b. Circle *C*

Use the Distance Formula to calculate the length of the radius of the circle.



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

$= \sqrt{(6 - 4)^2 + (3 - 8)^2}$ $C(4, 8)$ and $D(6, 3)$

$= \sqrt{2^2 + (-5)^2}$ Subtract.

$= \sqrt{29}$ Simplify.

Example 1
Find Perimeter, Circumference, and Area

Example 1
Find Perimeter, Circumference, and Area

Use the value of r to find the circumference and area of the circle.

$C = 2\pi r$ Circumference

$= 2\pi\sqrt{29}$ or about 33.8 $r = \sqrt{29}$

The circumference of the circle is about 33.8 units.

$A = \pi r^2$ Area of a circle

$= \pi(\sqrt{29})^2$ $r = \sqrt{29}$

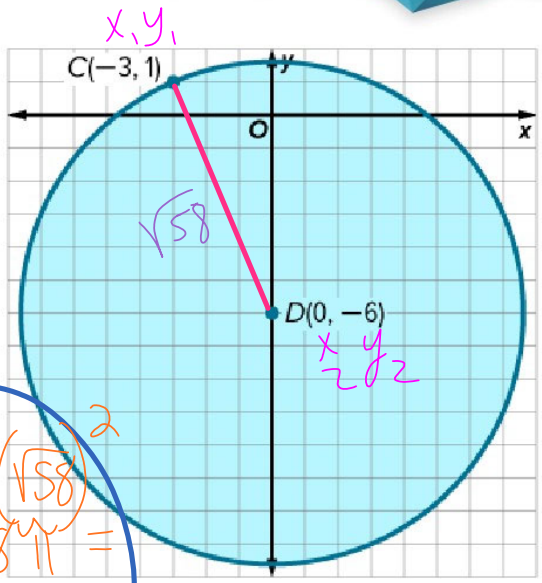
$= 29\pi$ or about 91.1 Simplify.

The area of the circle is about 91.1 square units.

Example 1
Find Perimeter, Circumference, and Area

Check

Find the circumference and area of the circle. Round to the nearest tenth, if necessary.



$C = 2\pi r$

$C = 2\pi(\sqrt{58})$

$C = 47.9$

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

$(0 - -3)^2 + (-6 - 1)^2$

$(3)^2 + (-7)^2$

$9 + 49$

$\sqrt{58}$

$A = \pi(\sqrt{58})^2$

$A = 58\pi =$

$A = 182.2$

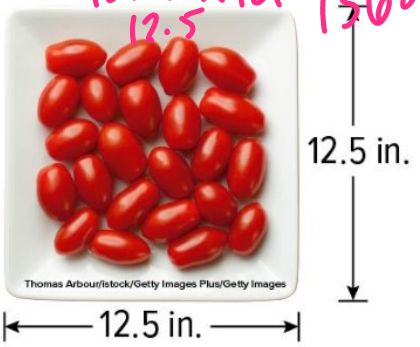
Students, draw anywhere on this slide!

Example 2
Modeling with Two-Dimensional Figures

$A = l w$

TABLEWARE Use an appropriate two-dimensional model and the dimensions provided in the image to calculate the perimeter and area of the serving platter.

$A = lw$
$12.5 \times 12.5 = 156.25$
12.5
12.5
$P = 12.5 \times 4 = 50$



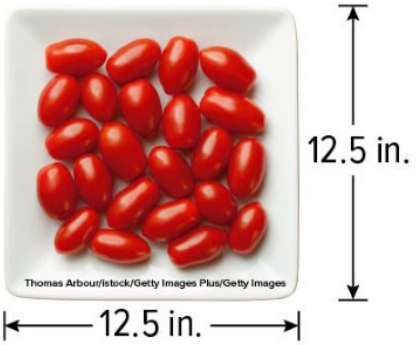
Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Example 2
Modeling with Two-Dimensional Figures

What two-dimensional figure can be used to model the serving platter?
square

What are the perimeter and area of the serving platter? Round to the nearest tenth, if necessary.



Perimeter = $4s = 4(12.5) = 50$ in.

Area = $s^2 = (12.5)^2 \approx 156.3$ in^2

Example 2
Modeling with Two-Dimensional Figures

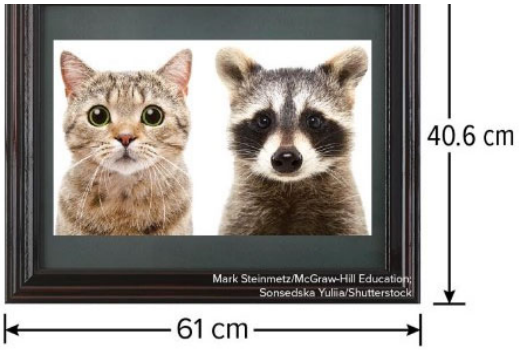
Check

FRAMES Use an appropriate two-

Check

FRAMES Use an appropriate two-dimensional model and the dimensions provided in the image to calculate the perimeter and area of the framed art.

What two-dimensional figure can be used to model the art?



$P = 61 + 61 + 40.6 + 40.6$

$P = 203.2$

$A = LW$

$61(40.6) = 2476.6$

Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Example 2

Modeling with Two-Dimensional Figures

Check

FRAMES Use an appropriate two-dimensional model and the dimensions provided in the image to calculate the perimeter and area of the framed art.

What two-dimensional figure can be used to model the art? rectangle

$P = 203.2$ cm; $A = 2476.6$ cm^2