

Name: _____

Algebra 1B-2

Lesson 1-E: Perimeter, Area, and Volume

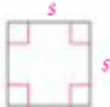
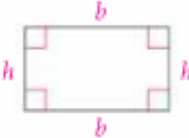
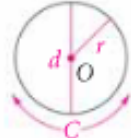
Background: All students will eventually live in a home or an apartment where they will need to calculate the square footage of an area rug or wall to wall carpet or the amount of the wall paper or paint needed to cover a certain room's wall surfaces. Considering interior design, the students will be able to lay out the future footprint of their furniture for the entire house and see if the traffic pattern will be pleasing or awkward.

- Material:**
- Formulas for perimeter, area, and volume of different shapes:
 - Blocks of wood of various lengths, widths, depths and actual floor plans

- Objective:**
- To be able to calculate:
 - perimeter of a figure—distance around the figure
 - area of a figure—number of square units in a figure
 - volume of a figure—number of cubic units contained in the figure

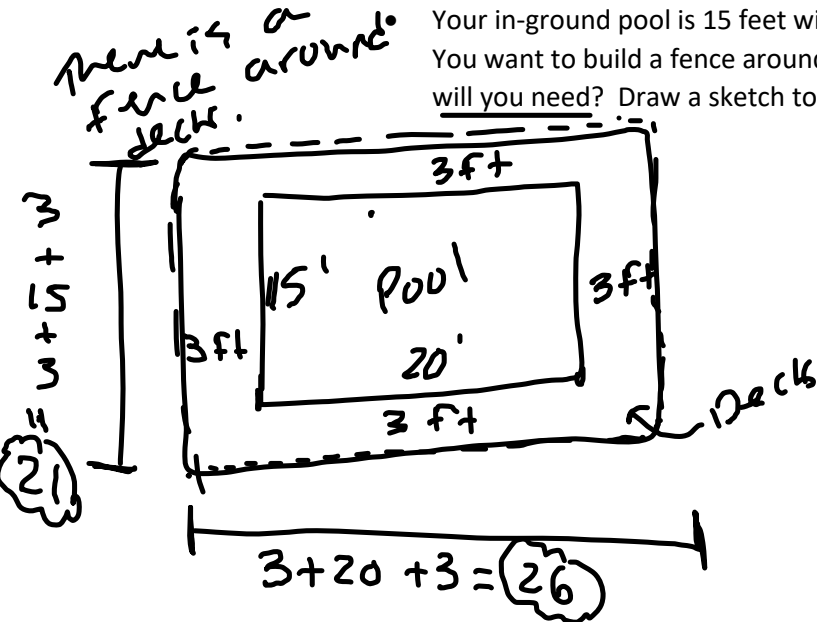
Instructions:

- Perimeter and Area

Summary	Perimeter and Area	
		
Square with side length s	Rectangle with base b and height h	Circle with radius r and diameter d
Perimeter $P = 4s$ Area $A = s^2$	Perimeter $P = 2b + 2h$ Area $A = bh$	Circumference $C = \pi d$, or $C = 2\pi r$ Area $= \pi r^2$

Perimeter

Your in-ground pool is 15 feet wide and 20 feet long with a 3 foot wide deck surrounding it. You want to build a fence around the deck to keep the riff-raff out. How much fencing will you need? Draw a sketch to visualize the situation:

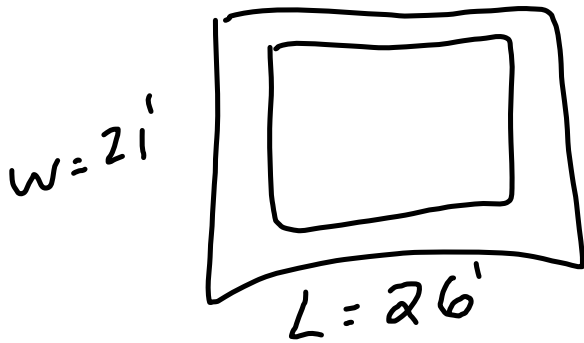


Perimeter = 21 + 26 + 21 + 26

$P = 94'$

We will need 94' of fencing.

- Continued...Now, what is the area of your pool area, including the 3-foot wide deck?



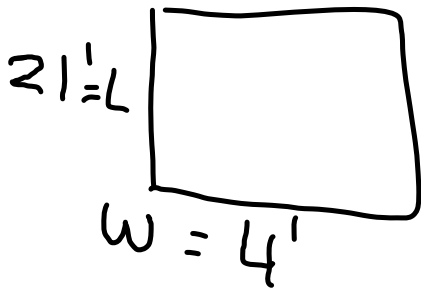
$$\text{Area} = L \cdot W$$

$$\text{Area} = 26(21)$$

$$\text{Area} = 546 \text{ ft}^2$$

$$\text{Area} = 546 \text{ sq. ft}$$

- You are designing a rectangular banner for the next hockey game. The banner is to be 4 feet wide and 7 yards high. How much material will you need?

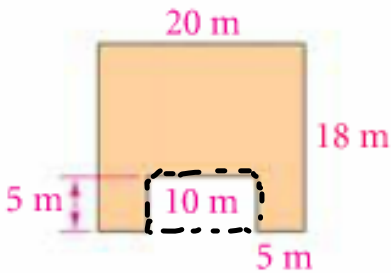


① Convert 7 yds to feet: $\frac{7 \text{ yds}}{1} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 21 \text{ ft}$

② $\text{Area} = 21(4) = 84 \text{ ft}^2$

We will need 84 ft^2 of material.

- Find the area of the shaded region.



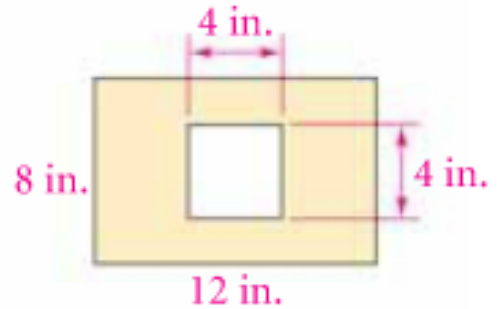
Area of Shaded Region:

Area of whole rectangle - Area of part that was taken out

$$20(18) - 5(10)$$

$$360 - 50$$

$$310 \text{ m}^2$$



Whole Rectangle Area: $8(12) = 96$

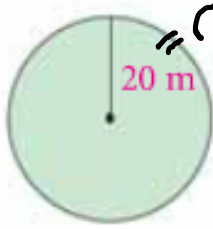
Area of piece taken out: $4(4) = 16$

$$96 - 16 = 80 \text{ in}^2$$

$$A = \pi r^2$$

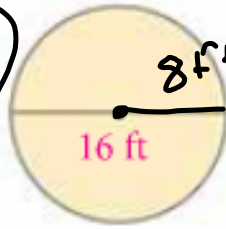
- Find the Area of each circle. Round your answer to the nearest hundredth.

two decimals



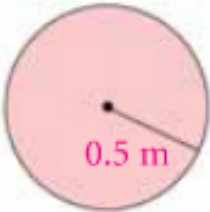
$$A = \pi (20)^2$$

$$A = 1256.63 \text{ m}^2$$



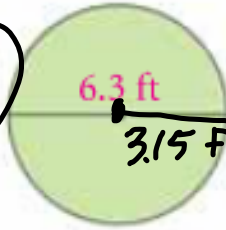
$$A = \pi (8)^2$$

$$A = 201.06 \text{ ft}^2$$



$$A = \pi (0.5)^2$$

$$A = 0.79 \text{ m}^2$$



$$6.3 \div 2 = 3.15$$

$$A = \pi (3.15)^2$$

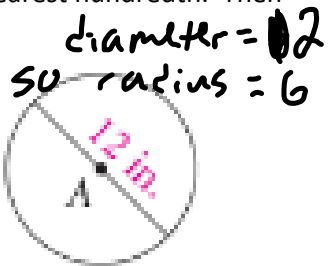
$$A = 31.17 \text{ ft}^2$$

- Find the circumference of circle A below. Round your answer to the nearest hundredth. Then find the circumference to the nearest tenth.

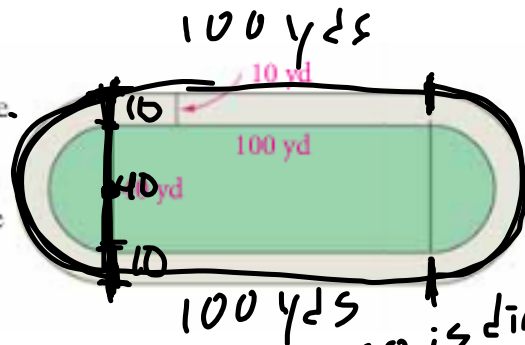
Perimeter

$$C = 2\pi r$$

$$C = 2\pi(6)$$



Track An athletic field is a rectangle, 100 yards by 40 yards, with a semicircle at each of the short sides. A running track 10 yards wide surrounds the field. Find the perimeter of the outside of the running track to the nearest tenth of a yard.



Semicircle = half a circle
 2 Semicircles = 1 whole circle
 circumference of our 2 semicircles:

$$C = 2\pi(30)$$

$$C = 188.50$$

$$\text{Whole Perimeter} = 100 + 100 + 188.50$$

$$= 388.50 \text{ yds}$$

40 + 10 + 10 = 60 is diameter
 so, $\frac{60}{2} = 30$ is the radius

Distance Formula:

Formula	The Distance Formula
The distance d between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ is	
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	

- Find the distance between $A(5, 2)$ and $B(-4, -1)$. Round to the nearest hundredth.

$$d = \sqrt{(5 - (-4))^2 + (2 - (-1))^2}$$

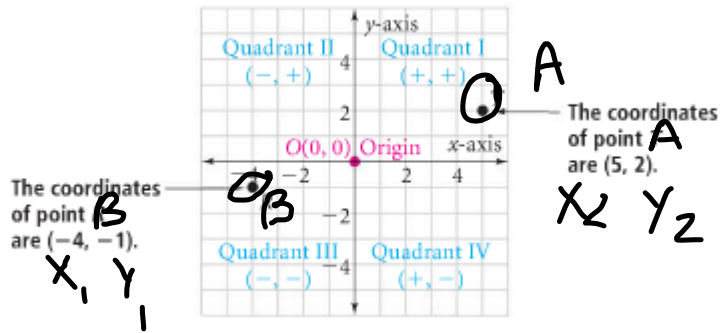
$$d = \sqrt{(5+4)^2 + (2+1)^2}$$

$$d = \sqrt{(9)^2 + (3)^2}$$

$$d = \sqrt{81 + 9}$$

$$d = \sqrt{90}$$

$d = 9.49$ units



Each morning you take the "Blue Line" metro from Oak Station to Jackson Station. As the map shows, Oak Station is 1 mile west

Find distance from Oak to Jackson.

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

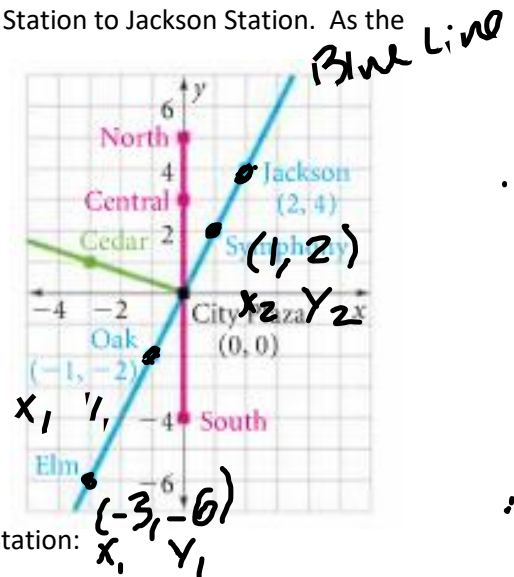
$$d = \sqrt{(3)^2 + (6)^2}$$

$$d = \sqrt{9 + 36}$$

$$d = \sqrt{45}$$

$$d = 6.70 \text{ mi}$$

They are 6.70 miles apart.



- Find the distance between Elm Station and Symphony Station:

$$d = \sqrt{(1 - (-3))^2 + (2 - (-6))^2}$$

$$d = \sqrt{4^2 + 8^2}$$

$$d = \sqrt{16 + 64}$$

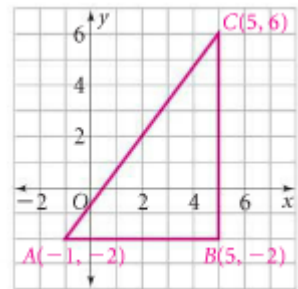
$$d = \sqrt{80}$$

$d = 8.94$ mi

- ~~Continued...Maple Station is located 6 miles east and 2 miles north of City Plaza. Find the distance between Cedar Station and Maple Station:~~

Find distance from Cedar to North

- Find the perimeter of $\triangle ABC$:



- **Midpoint Formula:**

Formula

The Midpoint Formula

The coordinates of the midpoint M of \overline{AB} with endpoints $A(x_1, y_1)$ and $B(x_2, y_2)$ are the following:

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

