Key

Unit 11 Table of Contents
Formulas

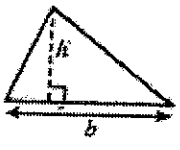
Date	Topic	SOL	Completed/Rated
	Formula Sheet		
	Perimeter of Triangles and Rectangles (2 pages)	6.7c	
	Homework		
	Area of Triangles and Rectangles (2 pages)	6.7c	
	Homework		
	Derive Pi (2 pages)	6.7a	
	Homework		
	Circumference of a Circle (2 pages)	6.7b	
	Homework		
	Area of a Circle (2 pages)	6.7b	
	Homework		
	Solving Practical Problems Using Formulas (2 pages)	6.7b,c	
	Bellringer (2 pages)		

Unit 11 Self Reflection

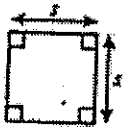
1. Overall, how did I do with the unit? _____
2. Which topic was my best? Why? _____
3. Worst? Why? _____
4. Did I complete all sections? _____
5. Did I complete all homework? _____
6. Did I try my best? _____
7. What is my goal for the test? _____
8. How will I prepare for the test and meet my goal? _____
9. What can I do to excel in the next unit? _____
10. Additional comment: _____

Homework _____ Folder _____

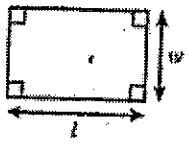
Geometric Formulas



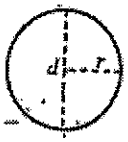
$A = \frac{1}{2}bh$



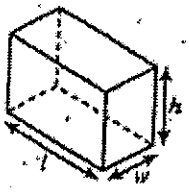
$p = 4s$
$A = s^2$



$p = 2l + 2w$
$A = lw$



$C = 2\pi r$
$C = \pi d$
$A = \pi r^2$



$V = lwh$
$S.A. = 2lw + 2lh + 2wh$

Pi

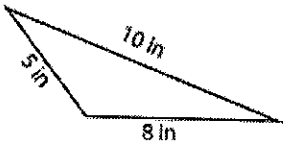
$\pi \approx 3.14$

$\pi \approx \frac{22}{7}$

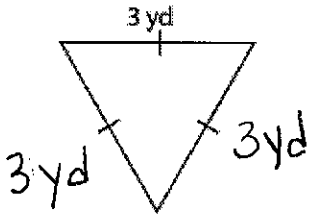
Perimeter of Triangles and Rectangles

Perimeter- the path or distance around any plane figure
Perimeter of a Triangle- the sum of the side lengths
Formula: P= a + b + c

Example 1
P= a + b + c
P= 5 + 8 + 10
P= 23 in.

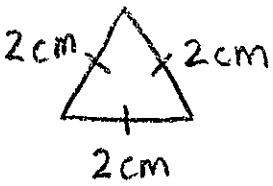


Example 2
P= a + b + c
P= 3 + 3 + 3
P= 9 yd.



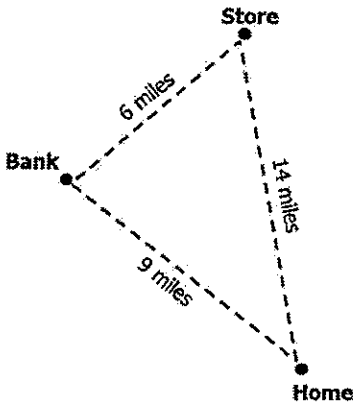
Practical Problems:

1. Katie's necklace contains a stone in the shape of an equilateral triangle. If the side measure of the stone is 2 cm what is the perimeter of the stone?



P = a + b + c
P = 2 + 2 + 2
p = 6 cm

2. Henry is going to try and jog from his home to the store, and then to the bank, before returning back home.

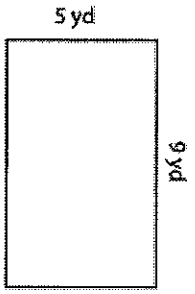


How many total miles will he run on this route?

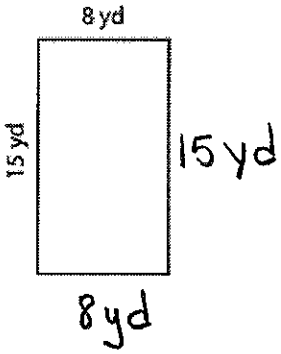
P = a + b + c
p = 14 + 6 + 9
P = 29 miles

Perimeter of a Rectangle- the sum of the lengths and widths
Formula: P= 2l + 2w or P= l + l + w + w

Example 1
P= 2l + 2w
P= 2•9 + 2 •5
P= 18 + 10
P= 28



Example 2
P= l + l + w + w
P= 15+ 15 + 8 + 8
P= 46 yd



Practical Problems: Draw a Picture!

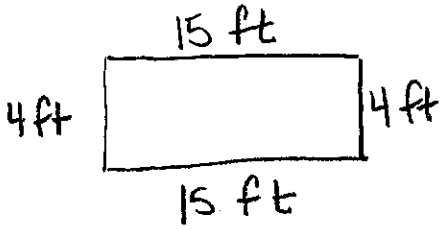
1. The perimeter of Rob's new rectangular shed is 96 feet. If the shed's width is 16 feet, what is the length? 32 ft

? / 16 ft | P = 96 ft | 16 ft / ?

P = l + l + w + w
96 = l + l + 16 + 16
96 = L + L + 32
✓ 96 = 32 + 32 + 32

96 total P
− 32 total w
64 total L
÷ 2 sides
32 one L

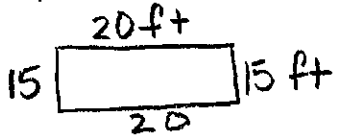
2. A rectangular display board has the dimensions of 15 feet by 4 feet. A border is added around the outside of the entire display board. What is the length of the border?



P = L + L + w + w
P = 15 + 15 + 4 + 4
P = 38 ft

Perimeter of Triangles and Rectangles Homework

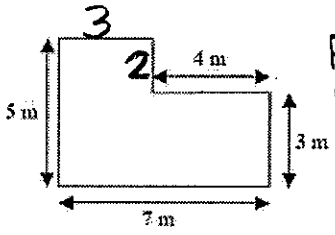
1. Karen is going to put a new baseboard in her living room that measures 20 feet by 15 feet. What is the minimum amount of baseboard she will need to buy?



$P = 20 + 20 + 15 + 15$

$P = 70$ ft

2. Ms. Smith wants to fence in her yard. How much fencing will she need to buy?

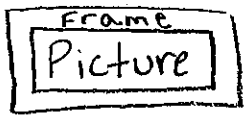


Fill in missing sides first!

$P = 5 + 7 + 3 + 4 + 2 + 3$

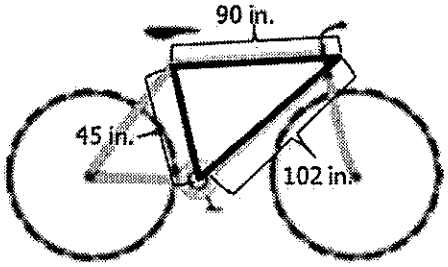
$P = 24$ m

3. Susan wanted to make a frame for a picture she drew for her mother. What formula would she need to use to make a frame for the picture?



Perimeter

4. Aaron needs to replace the triangular frame of an old bicycle.



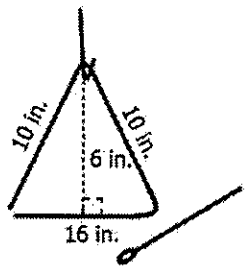
What is the least amount of material he will need to reconstruct this triangular frame?

$P = a + b + c$

$P = 90 + 102 + 45$

$P = 237$ in

5. Jill is going to make some musical triangles for class out of metal tubing.



Given the example to the left, how much tubing will she need for each triangle?

$P = a + b + c$

$P = 10 + 10 + 16$

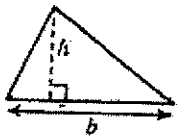
$P = 36$ in

Area of Triangles and Rectangles

Area of Triangles

1. Find the shape
2. Copy the correct formula
3. Substitute
4. Solve
5. Label

Formula:



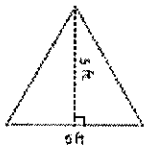
$$A = \frac{1}{2}bh$$

Example 1:

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

$A = .5 \cdot 5 \cdot 6$

$A = 15$ ft.

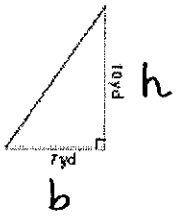


Example 2:

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

$A = .5\ (7)\ (10)$

$A = 35\ yd^2$



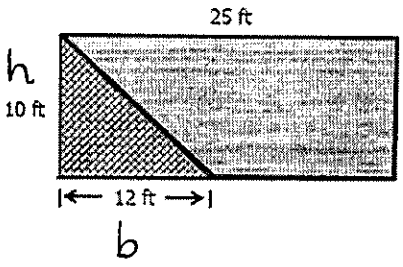
Practical Problems:

1. Ben is laying a triangular brick patio beside his wood deck. What is the area of the brick patio?

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

$A = .5(12)(10)$

$A = 60\ ft^2$



2. Sara predicts that pizza slice A has a larger area than pizza slice B. What could the minimum length of pizza A be in order for her prediction to be true?

Slice A

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

$A = .5(9)(5)$

$A = 22.5\ in^2$

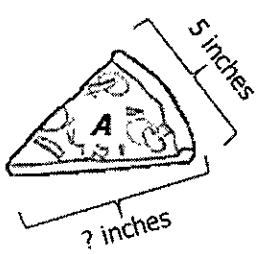
slice B

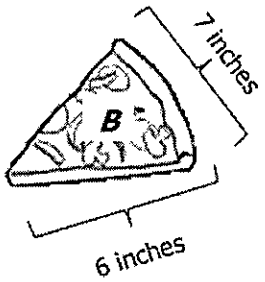
$A = \frac{1}{2}bh$

$A = .5(6)(7)$

$A = 21\ in^2$

$22.5 > 21$





$5 \times ? > 42$

$5 \times ? = 40$

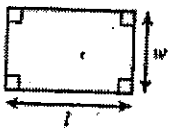
$5 \times (9) = 45$

$7 \times 6 = 42$

Area of Rectangles

1. Find the shape
2. Copy the correct formula
3. Substitute
4. Solve
5. Label

Formula:



$p = 2l + 2w$

$A = lw$

Example 1

$A = lw$

$A = 15 \cdot 2$

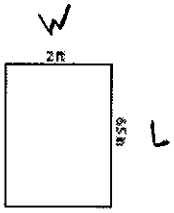
$A = 30 ft^2$

Example 2

$A = L \cdot W$

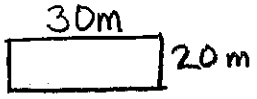
$A = 6.5\ (2)$

$A = 13\ ft^2$



Practical Problems:

1. Janice wants to make a cover for her rectangular swimming pool. The pool measures 20 meters by 30 meters. How many square meters of material will she need to purchase to make a cover?

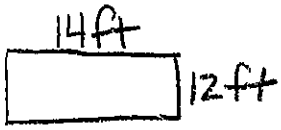


$A = L \cdot W$

$A = 30 \cdot 20$

$A = 600\ m^2$

2. Paul is going to buy a rug for his den that measure 12 feet by 14 feet. How many square feet will he have to buy?



$A = L \cdot W$

$A = 14 \cdot 12$

$A = 168\ ft^2$

3. Bert wants to pain the side of his house that measures 20 feet by 10 feet. The side contains a door with the dimensions shown. If Bert does not paint the door, what is the total shaded area he will paint?

house

$A = L \cdot W$

$A = 20 \cdot 10$

$A = 200\ ft^2$

door

$A = L \cdot W$

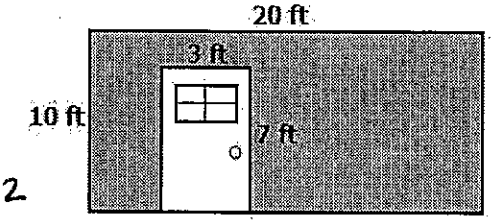
$A = 7 \cdot 3$

$A = 21\ ft^2$

painted part

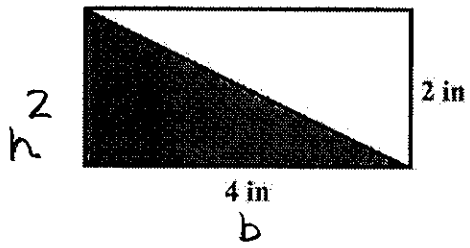
$200 - 21$

$179\ ft^2$



Area of Triangles and Rectangles Homework

1. What is the area of the shaded triangle?



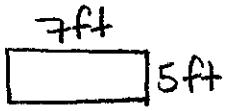
h = 2

$A = \frac{1}{2} b h$

$A = .5(4)(2)$

$A = 4\ in^2$

2. Sally needs a tablecloth for her picnic table. Her table is 5 feet by 7 feet. What is the area of the table?

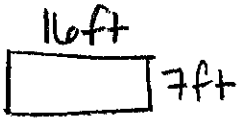


$A = L \cdot W$

$A = 7 \cdot 5$

$A = 35\ ft^2$

3. Susan is laying carpet in her new den. The dimensions are 7 feet by 16 feet. What is the area of the living room?

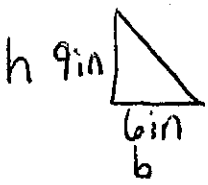


$A = L \cdot W$

$A = 16 \cdot 7$

$A = 112\ ft^2$

4. Mark wants to cover a triangle that has a base of 6 inches and a height of 9 inches. How much does he need to cover the triangle?

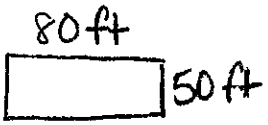


$A = \frac{1}{2} b h$

$A = .5(6)(9)$

$A = 27\ in^2$

5. A local town is building a new ice skating rink. The rink is to be 50 feet by 80 feet. How many square feet will the rink be?



$A = L \cdot W$

$A = 80 \cdot 50$

$A = 4000\ ft^2$

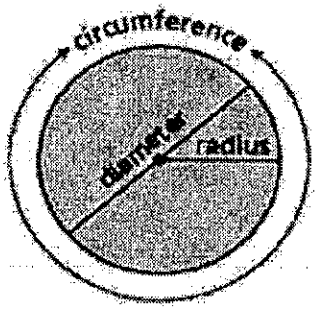
What's Pi (π)?

- The value of pi (π) is the ratio of the circumference of a circle to its diameter. $\pi = \frac{C}{d}$
- The average ratio of circumference to diameter is 22 to 7 or $\frac{22}{7}$. $3\frac{1}{7}$
  - What is the approximate value of pi? 3.14

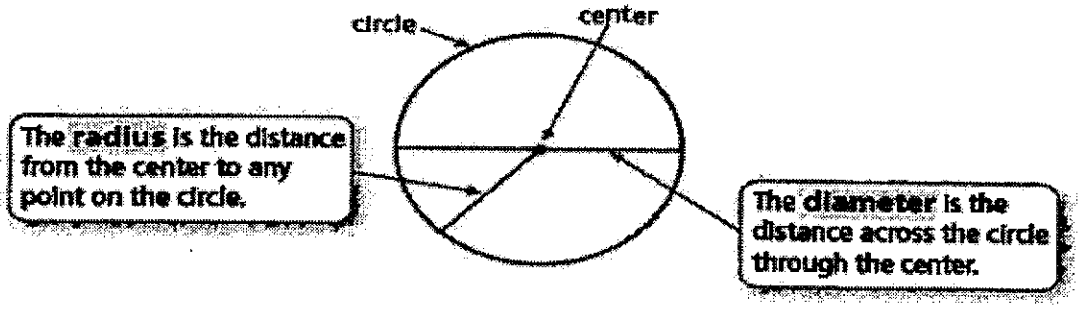
$$\pi = \frac{\text{Circumference}}{\text{Diameter}}$$

$$\pi = \frac{C}{d}$$

$$\pi = C \div d$$



Finding Radius and Diameter of a Circle

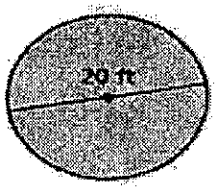


- The diameter d of a circle is twice the radius r. The radius r of a circle is one-half the diameter d.

Diameter: $d = 2r$ **Radius:** $r = \frac{d}{2}$

Examples:

The diameter of a circle is 20 feet. Find the radius.



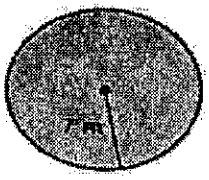
$r = \frac{d}{2}$ Radius of a circle

$= \frac{20}{2}$ Substitute 20 for d.

$= 10$ Divide.

∴ The radius is 10 feet.

The radius of a circle is 7 meters. Find the diameter.



$d = 2r$ Diameter of a circle

$= 2(7)$ Substitute 7 for r.

$= 14$ Multiply.

∴ The diameter is 14 meters.

On your own:

1. The diameter of a circle is 16 centimeters. Find the radius.

$16 \div 2 = 8$ $\boxed{r = 8 \text{ cm}}$ $r = \frac{d}{2}$ $r = \frac{16}{2}$ $r = 8$

2. The radius of a circle is 9 yards. Find the diameter.

$9 \times 2 = 18$ $\boxed{d = 18 \text{ yds}}$ $d = 2 \cdot r$ $d = 2 \cdot 9$ $d = 18$

3. Claire's pool has a diameter (d) of 25 feet and a circumference (c) of 78.5 feet. What expression represents an approximation of the value of pi?

$\pi = \frac{C}{d}$ $\pi = \frac{78.5 \text{ ft}}{25 \text{ ft}}$ $\boxed{78.5 \div 25}$

4. Which of the following ratios could be used to estimate the value of pi (π)?

$\frac{15.7}{5}$	$\frac{25.12}{2}$	$\frac{18.84}{3}$	$\frac{21.98}{7}$	$\frac{37.68}{6}$	$\frac{12.56}{4}$
3.14	12.56	6.28	3.14	6.28	3.14
✓	X	X	✓	X	✓

Homework

1. Write the formula for finding pi.

$\pi = \frac{C}{d}$

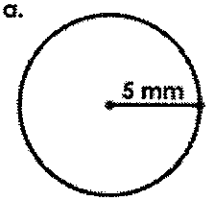
2. Write the formula for finding diameter.

$d = 2r$

3. Write the formula for finding radius. $r = \frac{d}{2}$

What is the radius and diameter of each circle?

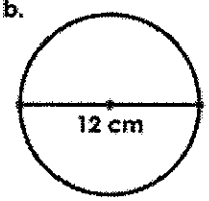
a.



radius = 5

diameter = 10

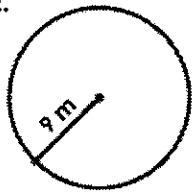
b.



radius = 6

diameter = 12

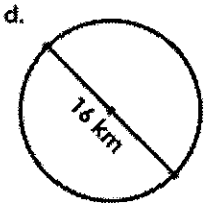
c.



radius = 9

diameter = 18

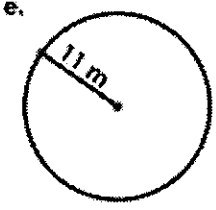
d.



radius = 8

diameter = 16

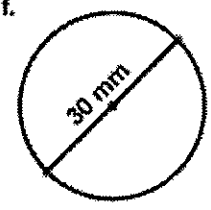
e.



radius = 11

diameter = 22

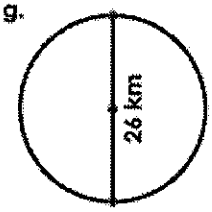
f.



radius = 15

diameter = 30

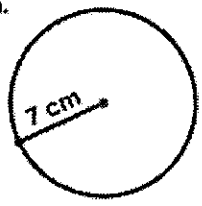
g.



radius = 13

diameter = 26

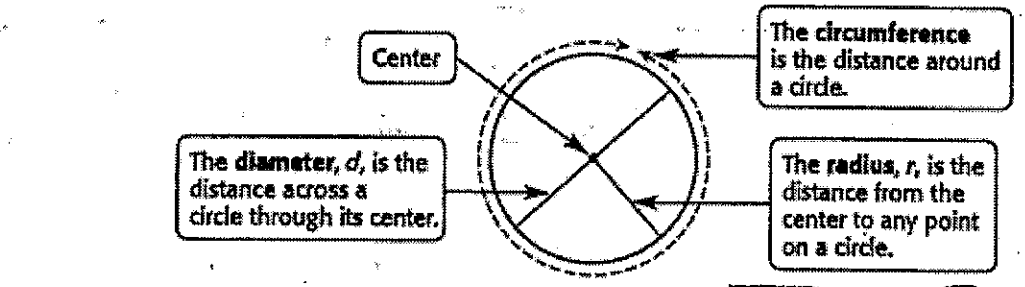
h.



radius = 7

diameter = 14

Circumference of a Circle



The circumference of a circle is equal to π times its diameter or π times twice its radius.

$C = \pi d$ or $C = 2\pi r$

Example 1: Find the circumference of a circle whose **diameter** is 4.2 meters. Round to the nearest tenth.

Steps:

1. Write the formula	$C = \pi d$
2. Replace π with 3.14 and d with 4.2.	$= 3.14 \times 4.2$
3. Multiply	$= 13.188$
4. Round to the nearest tenth and label	≈ 13.2 meters

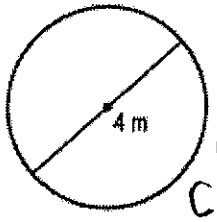
Example 2: Find the circumference of a circle whose **radius** is 13 inches. Round to the nearest tenth.

Steps:

1. Write the formula	$C = 2\pi r$
2. Replace π with 3.14 and r with 13.	$= (2)(3.14)(13)$
3. Multiply	$= 81.64$
4. Round to the nearest tenth and label	≈ 81.6 in

Practice

Find the circumference of each circle shown. Round to the nearest tenth.

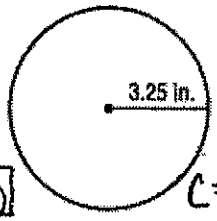
1. 

$C = \pi d$

$C = 3.14(4)$

$C = 12.56$

$C = 12.6 m$

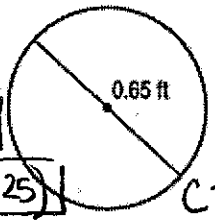
2. 

$C = 2\pi r$

$C = 2(3.14)(3.25)$

$C = 20.41$

$C = 20.4 in$

3. 

$C = \pi d$

$C = 3.14(.65)$

$C = 2.041$

$C = 2.0 ft$

4. The radius of a circle measures 16 miles. What is the measure of its circumference to the nearest tenth?

$C = 2\pi r$

$C = 2(3.14)(16)$

$C = 100.48$

$C = 100.5 mi$

5. Find the circumference of a circle whose diameter is 12.5 yards to the nearest tenth.

$C = \pi d$

$C = 3.14(12.5)$

$C = 39.25$

$C = 39.3 yds$

6. What is the circumference of a circle with a radius of 2.05 inches to the nearest tenth?

$C = 2\pi r$

$C = 2(3.14)(2.05)$

$C = 12.874$

$C = 12.9 in$

7. A circular sinkhole has a radius of 12 meters. A week later, it has a diameter of 48 meters. How much greater is the circumference of the sinkhole compared to the previous week?

12m circle

$C = 2\pi r$

$C = 2(3.14)(12)$

$C = 75.36$

48m circle

$C = \pi d$

$C = 3.14(48)$

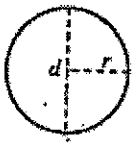
$C = 150.72$

Difference

$150.72 - 75.36 = 75.36$

The circumference has doubled in size.

Circumference Homework



$C = 2\pi r$
$C = \pi d$
$A = \pi r^2$

Directions: Find the circumference of each circle shown or described. Round to the nearest tenth.

1. Given a circle with a radius of 4cm, find the circumference.

$C = 2\pi r$
$C = 2(3.14)(4)$
$C = 25.12$

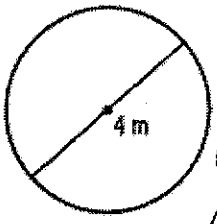
$C = 25.1$ cm

2. Given a circle with a diameter of 5in, find the circumference.

$C = \pi d$
$C = 3.14(5)$

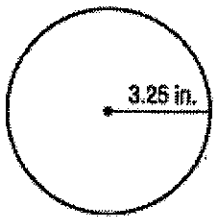
$C = 15.7$ in

3.



$C = \pi d$
$C = 3.14(4)$
$C = 12.56$
$C = 12.6$m

4.



$C = 2\pi r$
$C = 2(3.14)(3.25$
$C = 20.41$
$C = 20.4$ in

5. **Challenge** Given a circle with a circumference of 18.84in, find the diameter and the radius.

$C = \pi d$
$\frac{18.84}{3.14} = \frac{3.14d}{3.14}$
$6 = d$

$d = 6$ in
$r = 3$ in

Area of a Circle

Words: The area of a circle is computed using the formula $A = \pi r^2$, where r is the radius of the circle.

Formula: $A = \pi r^2$ $\quad$ $A = \pi \cdot r \cdot r$

Example 1: Find the area of a circle with diameter 18 inches. Use 3.14 for π.

Steps:

1. Write the formula	$A = \pi r^2$
2. Find the radius if the diameter is 18.	$r = 18 \div 2 = 9$
2. Replace π with 3.14 and r with 9.	$= 3.14 \times 9^2$
3. Multiply	$= 254.34$
4. Round to the nearest tenth and label	$\approx 254.3\ in^2$

Example 2: Find the area of a circle with a radius of 6 feet.

Steps:

1. Write the formula	$A = \pi \cdot r \cdot r$
2. Replace π with 3.14 and r with 6.	$= 3.14(6)(6)$
3. Multiply	$= 113.04$
4. Round to the nearest tenth and label	$\approx 113.0\ ft^2$

Example 3: Find the area of a circle with a circumference of 15.7m.

$C = \pi d$

$\frac{15.7}{3.14} = \frac{3.14\,d}{3.14}$

$5 = d$

$d = 5$

$r = 2.5$

$A = \pi \cdot r \cdot r$

$A = 3.14(2.5)(2.5)$

$A = 19.625$

$r = 2.5m$

$d = 5m$

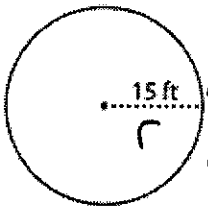
$C = 15.7m$

$A = 19.6m^2$

Practice:

Find the exact area of each circle.

1)

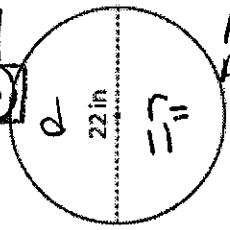


$A = \pi \cdot r \cdot r$

$A = 3.14(15)(15)$

$A = 706.5$

2)

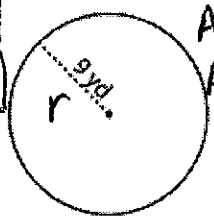


$A = \pi \cdot r \cdot r$

$A = 3.14(11)(11)$

$A = 379.94$

3)



$A = \pi \cdot r \cdot r$

$A = 3.14(9)(9$

$A = 254.34$

Area = $706.5\ ft^2$

Area = $379.94\ in^2$

Area = $254.34\ yd^2$

4. If the radius is 10 ft, what will be the area of the circle?

$A = \pi \cdot r \cdot r$

$A = 3.14\ (10)(10)$

$A = 314\ ft^2$

5. What is the area of a circle with a diameter of 16 in?

$r = 8$

$A = \pi \cdot r \cdot r$

$A = 3.14\ (8)(8)$

$A = 200.96\ in^2$

6. A cow is tethered with a rope 20 ft long. What is the maximum area the cow can graze?

$A = \pi \cdot r \cdot r$

$A = 3.14\ (20)(20)$

$A = 1254\ ft^2$

Area Homework
Round to the nearest tenth

1 a.

Calculate the area of the circle.

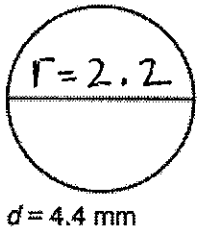
$A = \pi \cdot r \cdot r$

$A = 3.14(4.85)(4.85)$

$A = 73.86$

$A = 73.9\ mm^2$

1 b.



Calculate the area of the circle.

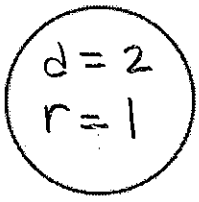
$A = \pi \cdot r \cdot r$

$A = 3.14(2.2)(2.2)$

$A = 15.19$

$A = 15.2\ mm^2$

2 a.



$C = \pi d$

$\frac{6.3}{3.14} = \frac{3.14\ d}{3.14}$

$2.00 = d$

Calculate the area of the circle.

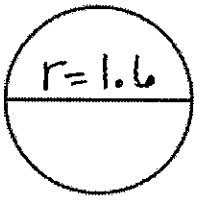
$A = \pi \cdot r \cdot r$

$A = 3.14(1)(1)$

$A = 3.14$

$A = 3.1\ m^2$

2 b.



Calculate the area of the circle.

$A = \pi \cdot r \cdot r$

$A = 3.14(1.6)(1.6)$

$A = 8.03$

$A = 8.0\ m^2$

3. What is the area of a circle if r = 6.6 mm?

$A = \pi \cdot r \cdot r$

$A = 3.14(6.6)(6.6)$

$A = 136.77$

$A = 136.8\ mm^2$

4. What is the area of a circle if d = 7.4 m?

$r = 3.7$

$A = \pi \cdot r \cdot r$

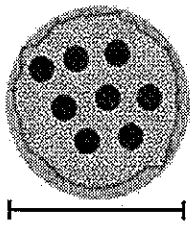
$A = 3.14(3.7)(3.7)$

$A = 42.98$

$A = 43.0\ m^2$

Practical Problems

1. A pizza company is advertising an 18 inch pizza that costs $13.99. Which is closest to the area of the pizza?



$d = 18$ inches

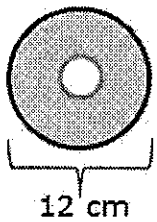
$r = 9$ in

$A = \pi \cdot r \cdot r$

$A = 3.14 (9)(9)$

$A = 254.34 \text{ in}^2$

2. The diameter of a CD is 12cm. What the is the circumference of the outer edge of the CD?



$C = \pi d$

$C = 3.14 (12)$

$C = 37.68 \text{ cm}$

3. A hollow tree trunk was used as a home for the main character of a book. The trunk had a diameter of 12 feet. What is the tree's radius?

$d = 12$

$r = 6 \text{ ft}$

4. Mary is making a tablecloth for her circular dining room table. The diameter of the table is 6 feet. How much material will she need to purchase to make a cloth that covers the top of the table?

$d = 6$

$r = 3$

$A = \pi \cdot r \cdot r$

$A = 3.14 (3)(3)$

$A = 28.26 \text{ ft}^2$

5. **Look at the table.**

Pizza Sizes	Diameter
Large	24 in.
Medium	12 in.
Small $r = 4$	8 in.
Personal	4 in.

$A = \pi \cdot r \cdot r$

$A = 3.14(4)(4)$

$A = 50.24 \text{ in}^2$

Which is closest to the area of a small pizza?

6. The following chart shows the size of five circles used to make a bullseye. About how much larger is the circumference of the black circle than the circumference of the blue circle?

Key

Color	Radius
Yellow	2 in.
Red	6 in.
Blue	10 in.
Black	14 in.
White	18 in.

Black

$C = 2\pi r$

$C = 2(3.14)(14)$

$C = 87.92 \text{ in}$

Blue

$C = 2\pi r$

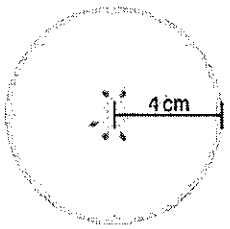
$C = 2(3.14)(10)$

$C = 62.8 \text{ in}$

Difference

$87.92 - 62.8 = 25.12 \text{ in}$

7. Catherine sliced an orange into circular pieces to put into a bowl of punch. One piece had a radius of 4 centimeters. What is the approximate circumference of this piece of orange?



$C = 2\pi r$

$C = 2(3.14)(4)$

$C = 25.12 \text{ cm}$

8. Mrs.Foster has a circular pond in her backyard. Its circumference is 21.98 feet. Name the radius, diameter, and area of the circular pond.

$C = \pi d$

$\frac{21.98}{3.14} = \frac{3.14d}{3.14}$

$7 = d$

$d = 7$

$r = 3.5$

$A = \pi \cdot r \cdot r$

$A = 3.14(3.5)(3.5)$

$A = 38.465$

$r = 3.5 \text{ ft}$

$d = 7 \text{ ft}$

$C = 21.98 \text{ ft}$

$A = 38.465 \text{ ft}$

NAME_____ BELLRINGER SHEET

#	Date	Problem/Work	Let's Make It Better ☺
1			
2			
3			
4			
5			
6			

#	Date	Problem/Work	Let's Make It Better ☺
7			
8			
9			
10			
11			
12			