Math-2A Lesson 10-3: Area of: -Triangles -rectangles -circles -trapezoids and Surface Area of: -Rectangular Prisms Describe the idea of <u>area.</u> <u>Area</u> attempts to answer the question "<u>how big is it</u>?"



When we ask for an area, we really mean, "how many 1 inch x 1 inch squares will fit in the area."



The area of this circle is?

"how many 1inch squares will fit in the circle."

area = less than 4 inch²

Will all those extra corners make up 1 sq. inch?

No. They make up slightly less than 1 sq. inch.

area = slightly more than $3 \operatorname{inch}^2$

area = 3.1428 inch²





The <u>area</u> of this circle is....? area = π r²

What is the area of the circle given by the equation?

$$16 = x^2 + (y+2)^2$$

area = 16π



- area = $\pi \left(\frac{2.7}{2}\right)^2 = 5.73 \,\mathrm{in}^2$
- If decimal dimensions are given in the problem, it is OK to have a decimal answer.
 - If the problem says to use 3.14 for "pi", DO NOT use the pi button on your calculator; use 3.14.



Base (of a triangle): any side of the triangle.

height (of a triangle): the perpendicular distance (altitude) from any vertex of the triangle to its opposite side.

height (of a triangle) is the same at its altitude.



 $Area_{\Delta ABC} = 0.5 * 25 * (12.7)$

 $Area_{\Delta ABC} = 159.1 \ units^2$

The width of a rectangle is 2 feet. The length is twice the width. What is the <u>perimeter</u> of the rectangle?



$$w = 2$$

 $L = 2w$ substitution $\rightarrow L = 2(2) = 4$

 $P_{\text{rectangle}} = 2L + 2w$ substitution \rightarrow

 $P_{rect.} = 2(4) + 2(2)$ $P_{rect.} = 12 ft$

The width of a rectangle is 3 feet. The length is four times the width. What is the <u>area</u> of the rectangle?



$$w = 3$$

 $L = 4w$ substitution $\rightarrow L = 4(3) = 12$

 $Area_{rectangle} = l * w$ substitution \rightarrow

$$A_{rect.} = (12 ft)(3 ft)$$
$$A_{rect.} = 36 ft^2$$

If the width of a rectangle is twice the length, and the perimeter is 90 feet, what is the area?

W

L

W

w = 2L $P_{rect.} = 90 ft$ substitution \rightarrow

- $P_{\text{rectangle}} = 2L + 2w$
 - 90 = 2L + 2(2L) solve for $L' \rightarrow$

90 = 6L

- L = 15 substitution $\rightarrow w = 2L$
- w = 30 substitution $\rightarrow A = L * w$

 $A_{rect.} = (15 ft)(30 ft) \quad A_{rect.} = 450 ft^2$

The area of a trapezoid is the <u>average</u> of the two bases times the height. 1 (1 b_1

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

One base has a length of 6 feet. The other base is three times as long. If the area of the trapezoid is 75 square feet, what is the height?

$$b_1$$

 h
 b_2

 $b_1 = 6 ft$ $substitution \rightarrow b_2 = 3(6 ft) = 18 ft$ $b_2 = 3b_1$

 $A = 75 ft^2$ substitution $\rightarrow A = 0.5(b_1 + b_2)h$

75 = 0.5(6 + 18)h solve for $h' \rightarrow$

75 = 12h h = 6.25 ft

What does "surface area" mean? <u>Surface area</u>: The area of the surface of the shape.

Why would this information be important?

Helps you to know how much material you need to <u>build</u>, <u>paint</u>, or cover the item.

A <u>"Solid"</u>: a three-dimensional shape.

Prism: a "solid" that has two parallel polygonal bases and planer ("flat") sides.

Prisms are named based upon the shape of their bases.



If the sides intersect the base at a right angle, we include that in the name:

"Right Rectangular Prism"

Lateral Area: the total area of the sides.



