Need Calculator, Graph Paper

1.7 Find Perimeter, Circumference, and Area

perimeter - distance around a figure

circumference - distance around a circle

area - the amount of surface (how many square units fit inside)

KEY CONCEPT *For Your Notebook*

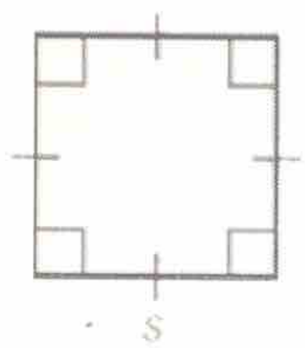
Formulas for Perimeter *P*, Area *A*, and Circumference *C*

Square

side length s

$P = 4s$

$A = s^2$

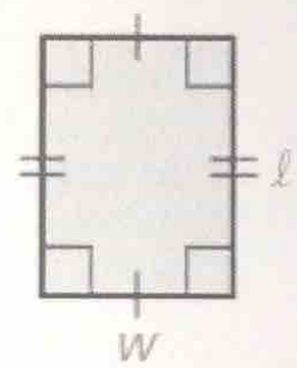


Rectangle

length ℓ and width w

$P = 2\ell + 2w$

$A = \ell w$

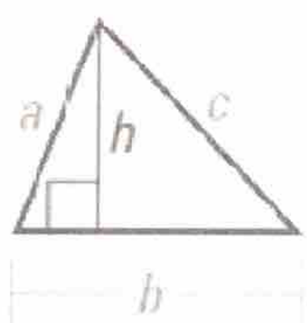


Triangle

side lengths a, b, and c, base b, and height h

$P = a + b + c$

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

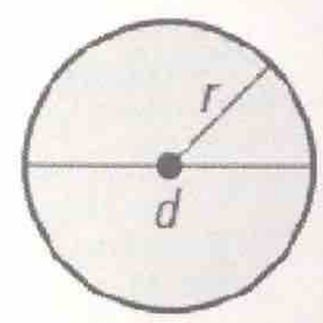


Circle

diameter d and radius r

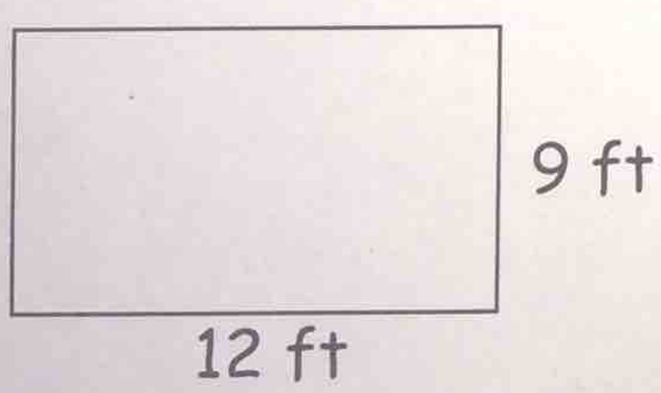
$C = \pi d = 2\pi r$

$A = \pi r^2$



Pi (π) is the ratio of a circle's circumference to its diameter.

Ex 1: Find the perimeter and area of the dining room shown.



$P = 2l + 2w$

$= 2(12) + 2(9)$

$= 24 + 18$

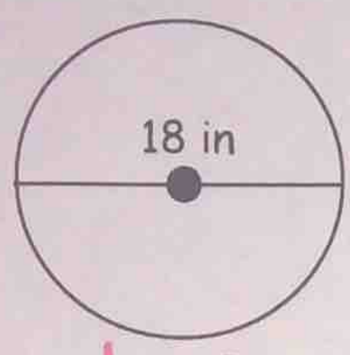
$\boxed{P = 42 \text{ ft}}$

$A = bh$

$= (12)(9)$

$\boxed{A = 108 \text{ ft}^2}$

Ex 2: Find the approximate circumference and area of the circular window shown. Round to the nearest tenth.



$d = 18$

$r = 9$

$C = 2\pi r$

$= 2\pi(9)$

$= 18\pi$

$\boxed{C \approx 56.5 \text{ in}}$

$A = \pi r^2$

$= \pi(9)^2$

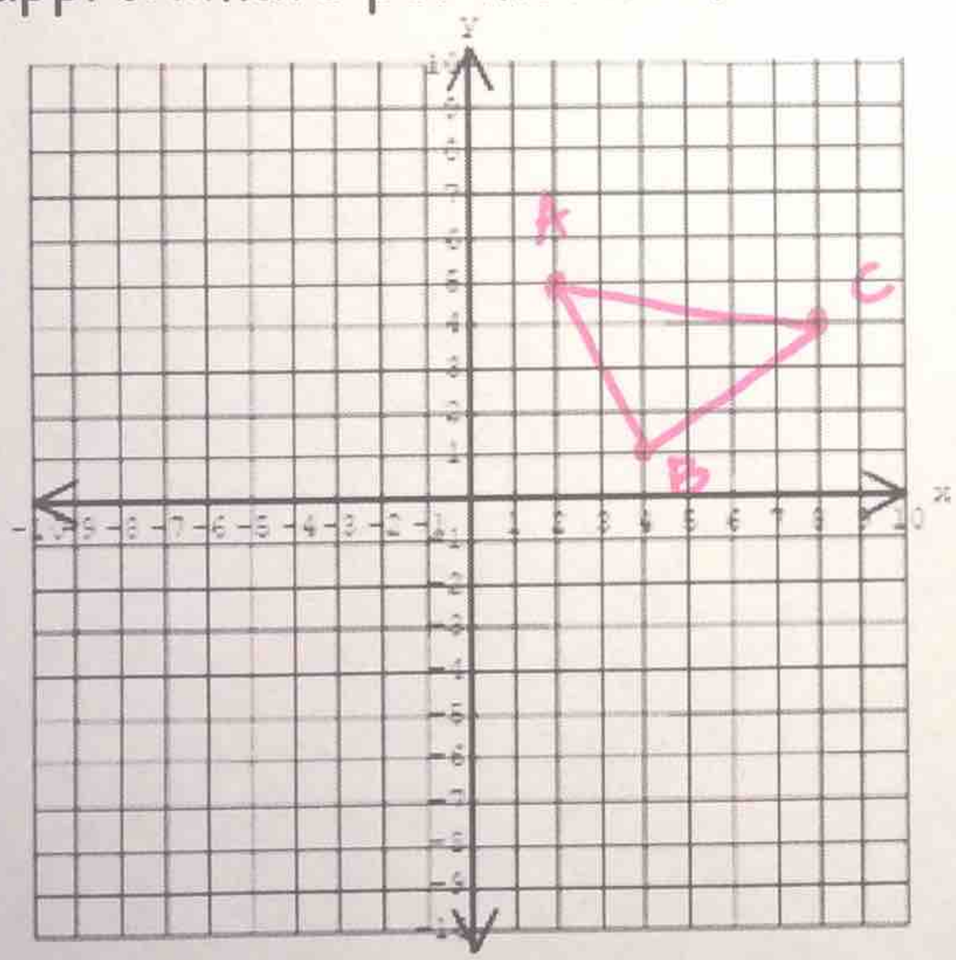
$= 81\pi$

$\boxed{A \approx 254.5 \text{ in}^2}$

$A \approx 254.3 \text{ in}^2$

(using 3.14)

Ex 3: Triangle ABC has vertices A(2, 5), B(4, 1), and C(8, 3). What is the approximate perimeter of ΔABC?



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

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

$= \sqrt{4+16}$

$= \sqrt{20}$

$d_{BC} = \sqrt{(8-4)^2 + (3-1)^2}$

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

$= \sqrt{16+4}$

$= \sqrt{20}$

$d_{AC} = \sqrt{(8-2)^2 + (3-5)^2}$

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

$= \sqrt{36+4}$

$= \sqrt{40}$

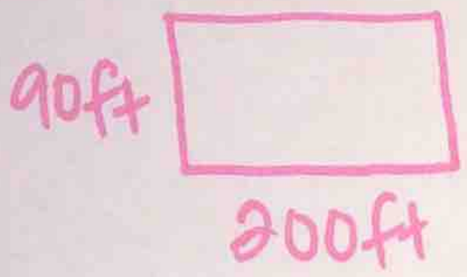
$P = \sqrt{20} + \sqrt{20} + \sqrt{40}$

$P \approx 4.5 + 4.5 + 6.3$

$\boxed{P \approx 15.3 \text{ units}}$

Ex 4: An ice-resurfacing machine is used to smooth the surface of the ice at a skating rink. The machine can resurface about 270 square yards of ice in one minute. About how many minutes does it take the machine to resurface a rectangular skating rink that is 200 feet long and 90 feet wide?

$\frac{270 \text{ yds}^2}{1 \text{ min}}$



$A = bh$
$= (200)(90)$
$= 18\,000 \text{ ft}^2$

Convert to yards: $\frac{18{,}000 \text{ ft}^2}{1} \times \frac{1 \text{ yd}^2}{9 \text{ ft}^2} = 2000 \text{ yd}^2$

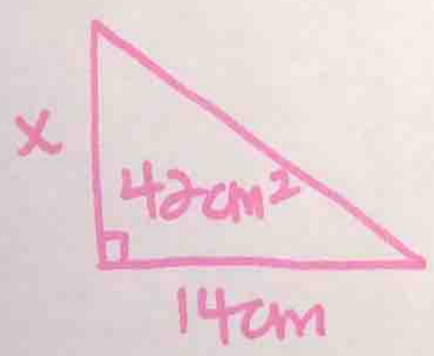
$\frac{270 \text{ yds}^2}{1 \text{ min}} = \frac{2000 \text{ yd}^2}{x \text{ min}}$

$2000 = 270x$

$x \approx 7.4$

It takes the machine about 7 min 24 sec to resurface the rink.

Ex 5: The base of a triangle is 14 cm. Its area is 42 cm². Find the height of the triangle.



$A_\Delta = \frac{1}{2}bh$

$42 = \frac{1}{2}(14)(x)$

$42 = 7x$

$x = 6$

The height is 6 cm.