Area and Volume

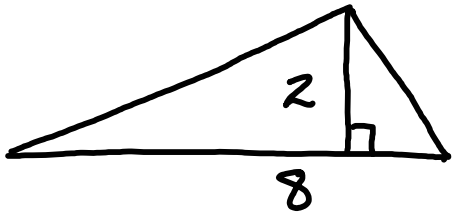
Chapter Review

Area of Basic Figures

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

$b = 8 \quad h = 2 \quad A = \frac{1}{2}(8)(2)$

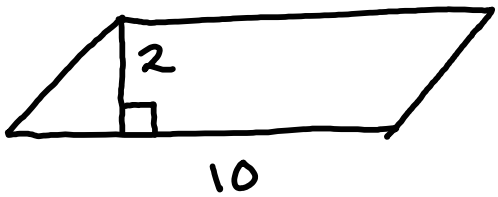
$A = 8$ units squared



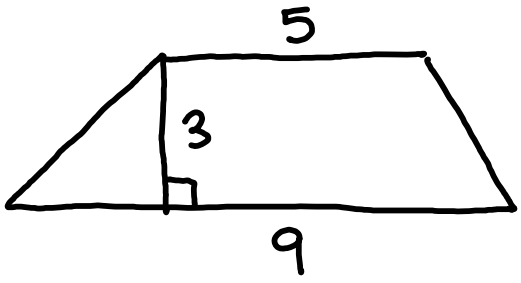
Parallelogram - $A = bh$

$b = 10 \quad h = 2 \quad A = (10)(2)$

$A = 20$ units squared



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



$h = 3$

$b_1 = 5$

$b_2 = 9$

$A = \frac{1}{2}(3)(5+9)$

$= \frac{1}{2}(3)(14)$

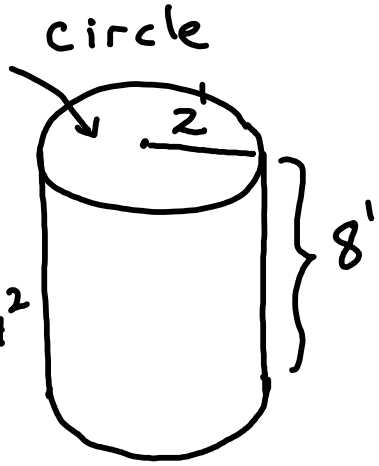
$= (3)(7)$

$A = 21$ units squared

Surface Area of Basic Figures

Cylinder - $SA = 2\pi rh + 2B$

Example $r = 2$ $h = 8$ B = area of circle



$SA = 2\pi(2)(8) + 2\pi(2)^2$

$= 32\pi + 8\pi$

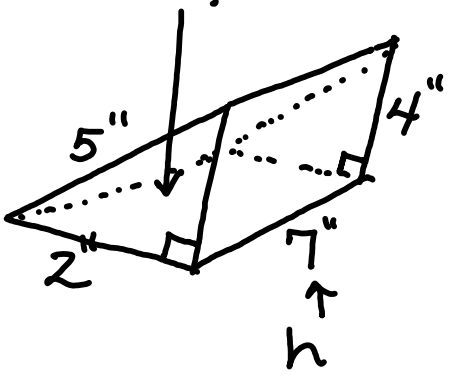
$= 40\pi$ or $40(3.14) \approx 125.6$ ft^2

Prism - $SA = ph + 2B$ B = area of base

Example p = perimiter of base

$p = 2 + 5 + 4 = 11$"

$B = \frac{1}{2}(2)(4) = 4$ in^2



$SA = (11)(7) + 2(4)$

$SA = 77 + 8 = 85$ in^2

Pyramid - $SA = n\left(\frac{1}{2}bl\right) + B$

Example

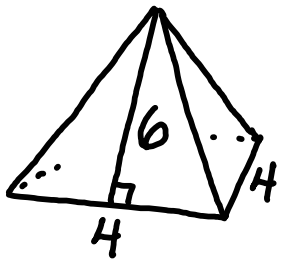
n = # sides = 4

l = length of side = 6

b = length of base = 4

B = area of base

$B = (4)(4) = 16$



$SA = 4\left(\frac{1}{2} \cdot 4 \ \ 6\right) + 16$

$SA = 48 + 16 = 64$ units squared

Cone - $SA = \pi r l + B$

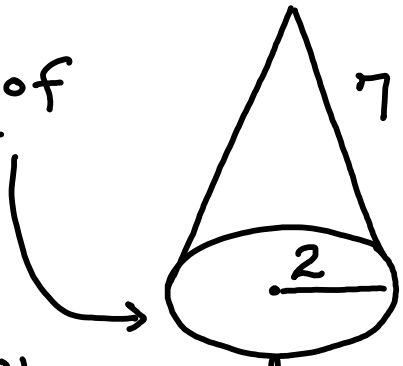
B → area of circle

Example

$r = 2$

$l = 7$

$B = \pi(2)^2 = 4\pi$

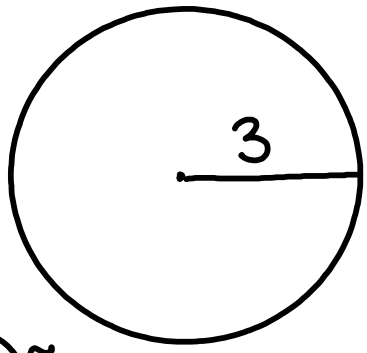


$SA = \pi(2)(7) + 4\pi$

$SA = 14\pi + 4\pi = 18\pi$ units squared

Sphere - $SA = 4\pi r^2$

Example $r = 3$



$SA = 4\pi(3)^2$

$= 4\pi \cdot 9$

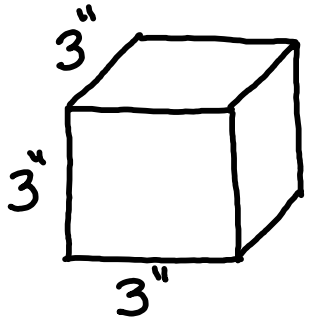
$= 36\pi$ or $36(3.14) \approx$

113.04 units squared

Volume of Basic Figures

Cube - $V = s^3$ $s = 3''$

Example $V = (3)^3 = 27 in^3$



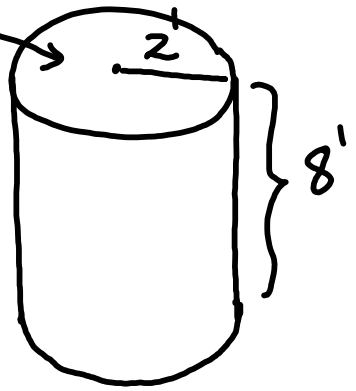
Cylinder- $V = Bh$ B = area of circle

Example

$B = \pi(2)^2 = 4\pi$

$h = 8$

$V = (4\pi)(8) = 32\pi \approx 100.48 \text{ ft}^3$



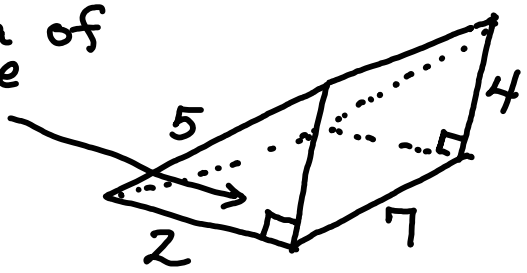
Prism - $V = Bh$ B = area of base

Example

$B = \frac{1}{2}(2)(4)$

$h = 7$

$V = (4)(7) = 28$ units cubed



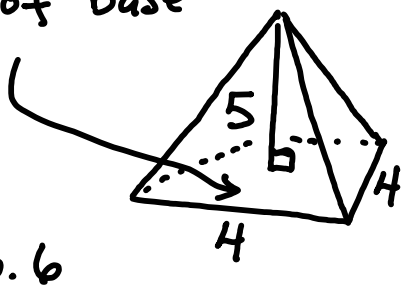
Pyramid - $V = \frac{1}{3}Bh$ B = area of base

Example

$B = (4)(4) = 16$

$h = 5$

$V = \frac{1}{3}(16)(5) = \frac{80}{3} = 26.6$ units cubed

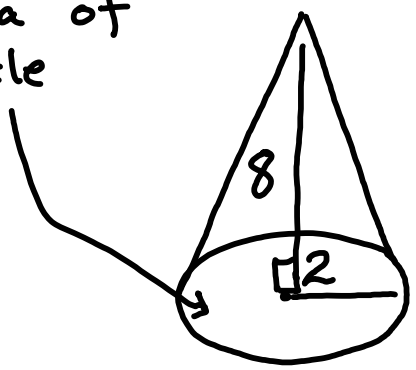


Cone - $V = \frac{1}{3}Bh$ B = area of circle

Example

$B = \pi(2)^2 = 4\pi$

$h = 8$

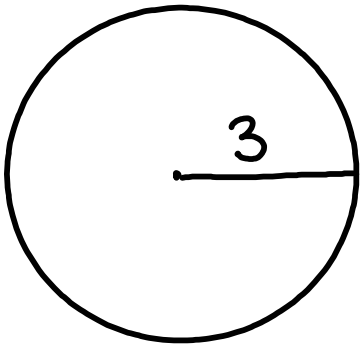


$V = \frac{1}{3}(4\pi)(8)$

$V = \frac{32\pi}{3} \approx 33.49$ units cubed

Sphere - $V = \frac{4}{3}\pi r^3$

Example $r = 3$



$V = \frac{4}{3}\pi(3)^3$

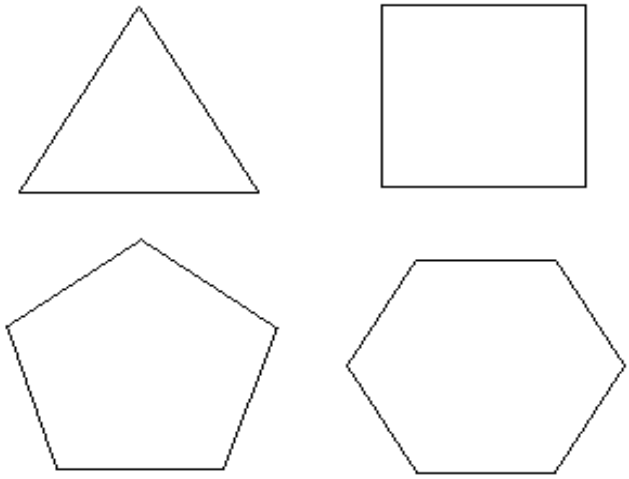
$= \frac{4}{3}\pi(27)$

$= 4\pi(9) = 36\pi \approx 113.04$ units cubed

Area of Regular Polygons

regular polygons

equal angles, equal sides



Parts of a regular polygon

side

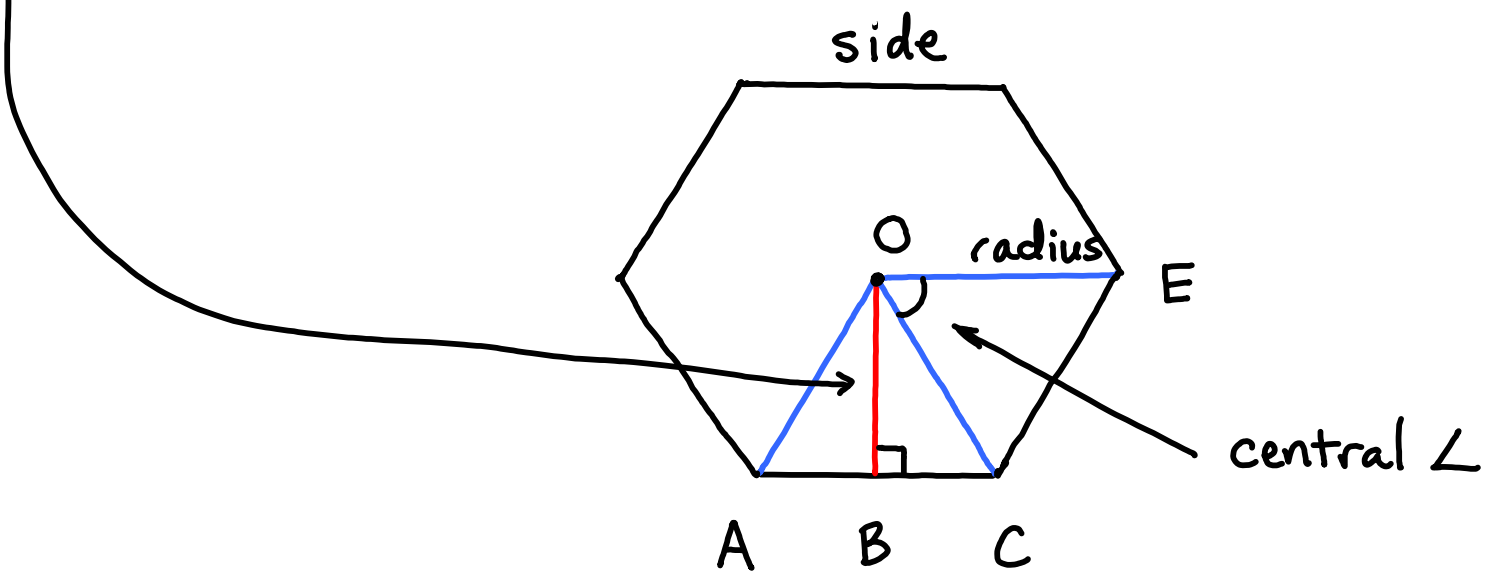
perimeter

center

radius - center to vertex

central angle - angle formed by two radii

apothem -is perpendicular distance from center to side

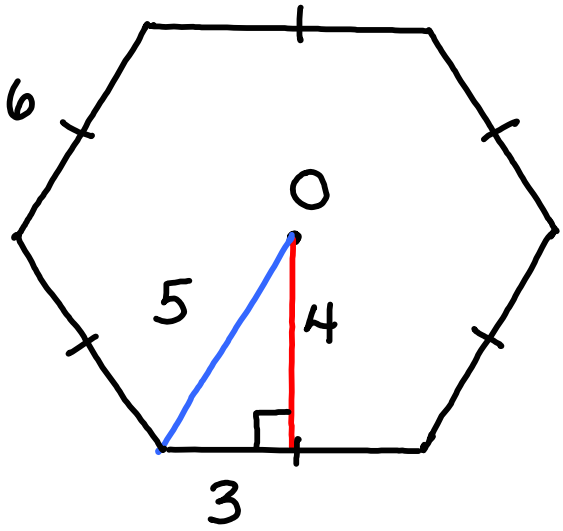


perimeter = sum of the sides

Area formula for a regular polygon

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

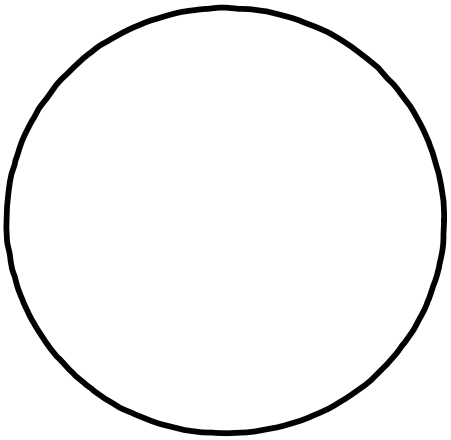
a = apothem
p = perimeter



$a = 4$
side $= 6$
$p = 36$

$$A = \frac{1}{2}ap$$
$$A = \frac{1}{2}(4)(36)$$
$$A = 72$$

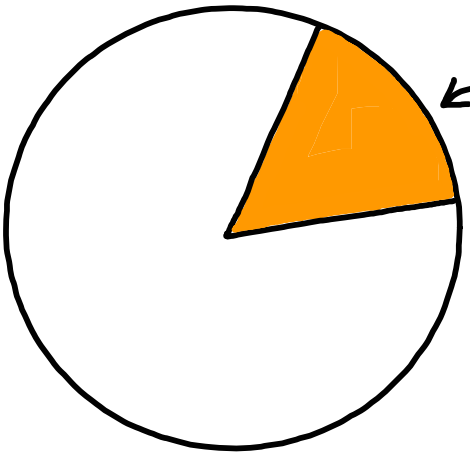
Area of Circles/Sectors and Arc Length



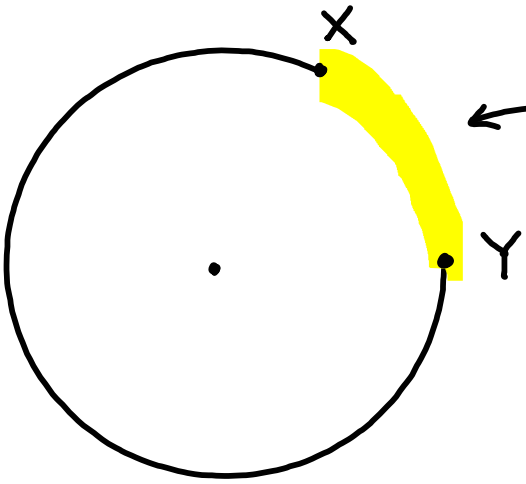
Circumference – perimeter of circle

$C = d\pi$

$C = 2\pi r$

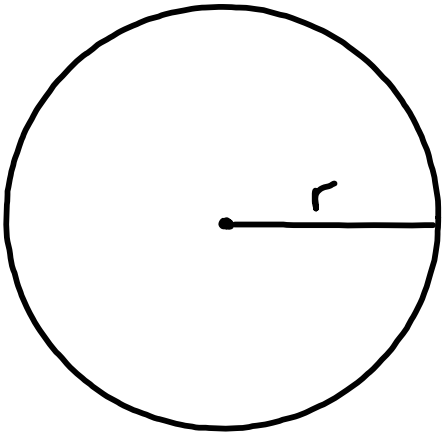


Sector



Arc lengths

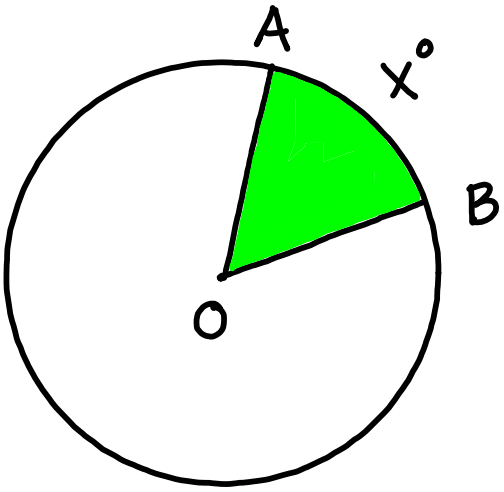
Area of Circles and Sectors



Area of Circle

$A = \pi r^2$

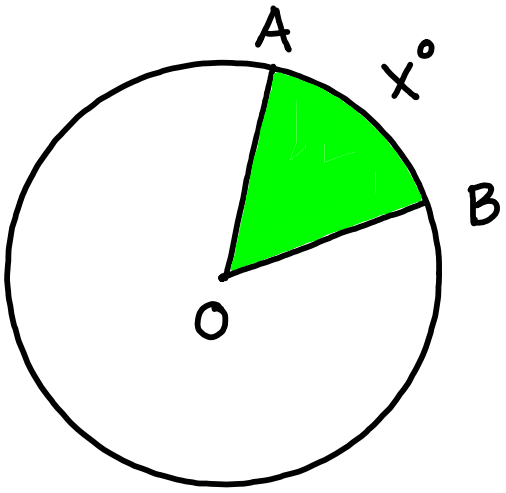
r = radius



Area of Sector

Area of sector AOB $= \frac{x^\circ}{360} \cdot \pi r^2$

Finding Arc lengths of Circles



Arc lengths

$$\text{Length of } \overset{\frown}{AB} = \frac{X^\circ}{360} \cdot 2\pi r$$