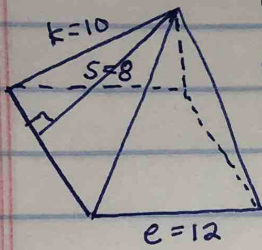


HM3 Surface Area Day 3: 16-19, 20-26

16



Formulas

$$SA = LA + \text{Area of Base}$$

$$SA = \frac{1}{2} \text{ Perimeter of Base} \cdot \text{Slant Height} + L \cdot W$$

$$SA = \frac{1}{2} (12+12+12+12)(8) + (12 \cdot 12)$$

$$SA = 192 + 144 \rightarrow SA = 336 \text{ units}^2$$

Shape by Shape:

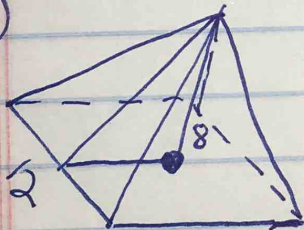
4 triangles, one square

• 4 triangles: $4(\frac{1}{2} \cdot b \cdot h)$
 $4(\frac{1}{2} \cdot 12 \cdot 8)$

• Square: $12 \cdot 12$
 144

$192 + 144 = 336 \text{ units}^2$

17



★ only asks for LATERAL AREA ★

Formulas

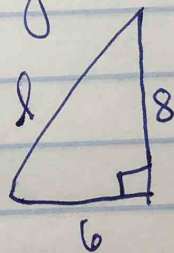
$$LA = \frac{1}{2} \text{ Perimeter of Base} \cdot \text{Slant Height}$$

Shape by Shape

$$4 \Delta S: 4(\frac{1}{2} b h)$$

★ we don't use 8 for "h"
 b/c the height of the lateral faces is the slant height ★

use Pythagorean Theorem to find the slant height:



$$6^2 + 8^2 = l^2$$

$$100 = l^2$$

$$10 = l$$

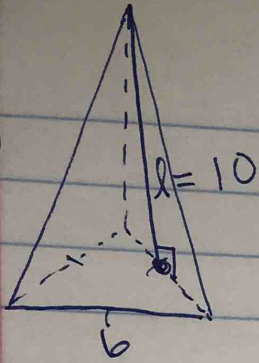
$$4(\frac{1}{2} \cdot 12 \cdot 10)$$

$$LA = \frac{1}{2} (12+12+12+12)(10)$$

$$LA = 240 \text{ m}^2$$

$$LA = 240 \text{ m}^2$$

18



Formulas:

$$SA = LA + \text{Area of Base}$$

$$SA = \frac{1}{2} \text{Perimeter} \cdot \text{Slant Height} + \frac{1}{2} b \cdot h$$

$$SA = \frac{1}{2} (b + b + b) (10) + \frac{1}{2} (b) h$$

Shape by Shape:

4 Δ s

• Base Δ : $\frac{1}{2} (b) h$

$$\frac{1}{2} (b) (3\sqrt{3})$$

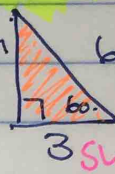
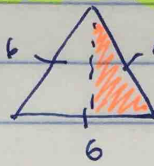
$$9\sqrt{3}$$

3 Lateral Δ s: $3 (\frac{1}{2} \cdot b \cdot 10)$

$$90$$

$$SA = 90 + 9\sqrt{3} \text{ in}^2$$

need to find the height of the base triangle:

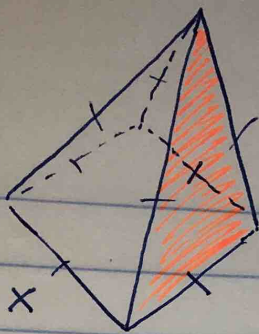


$$h = 3\sqrt{3}$$

$$SA = \frac{1}{2} (18) (10) + \frac{1}{2} (6) (3\sqrt{3})$$

$$SA = 90 + 9\sqrt{3} \text{ in}^2$$

19



$$SA = 1000 \text{ ft}^2$$

Formulas

$$SA = LA + \text{Area of Base}$$

$$SA = \frac{1}{2} \text{Perimeter of Base} \cdot l + \text{Area of Base}$$

$$1000 = \frac{1}{2}(x+x+x+x)l + (x \cdot x)$$

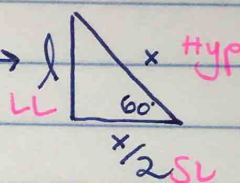
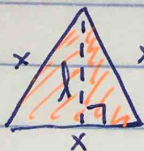
Shape by Shape

one square, 4 triangles

$$SA = \text{area square} + 4(\frac{1}{2}b \cdot h)$$

$$1000 = (x \cdot x) + 4(\frac{1}{2} \cdot x \cdot l)$$

★ find "l" → the slant height
is the height of the lateral face



$$l = \frac{x\sqrt{3}}{2}$$

$$1000 = \frac{1}{2}(4x)\left(\frac{x\sqrt{3}}{2}\right) + x^2$$

↓ these are the same now!!!

$$1000 = x^2 + 4\left(\frac{1}{2} \cdot x \cdot \frac{x\sqrt{3}}{2}\right)$$

$$1000 = \left(\frac{1}{2}\right)(4x)\left(\frac{x\sqrt{3}}{2}\right) + x^2$$

$$1000 = (2x)\left(x\frac{\sqrt{3}}{2}\right) + x^2$$

$$1000 = x \cdot x\sqrt{3} + x^2$$

$$1000 = x^2\sqrt{3} + x^2$$

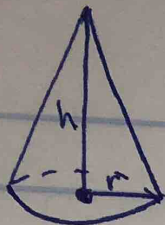
$$1000 = 1.732x^2 + x^2$$

$$1000 = 2.732x^2$$

$$366.03 = x^2$$

$$x = 19.13 \text{ feet}$$

20



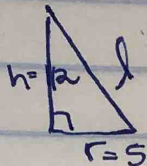
$h=12$
 $r=5$

* only asks for LATERAL AREA!

$LA = \pi r l$

$LA = \pi(5)l$

* find l with pythag. thm:



$12^2 + 5^2 = l^2$

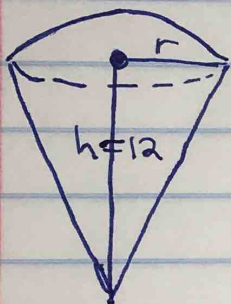
$169 = l^2$

$13 = l$

$LA = \pi(5)(13)$

$LA = 65\pi \text{ cm}^2$

21



$h=12 \text{ in}$

circumference = $6\pi \text{ in}$

$LA = ?$

$6\pi = 2\pi r$

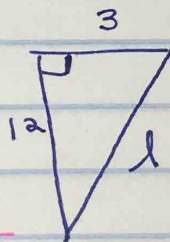
$3 = r$

$LA = \pi r l$

$LA = \pi \cdot 3 \cdot \sqrt{153}$

$LA = 116.58$

or 117 in^2



$3^2 + 12^2 = l^2$

$9 + 144 = l^2$

$153 = l^2$

$\sqrt{153} = l$

22



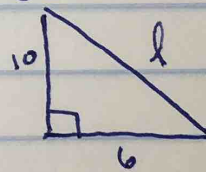
$h=10$

$r=6$

total SA?

$SA = LA + \text{Area of Base}$

$SA = \pi r l + \pi r^2$



$6^2 + 10^2 = l^2$

$136 = l^2$

$\sqrt{136} = l$

$11.7 = l$

$SA = \pi(6)(11.7) + \pi(6)^2$

$SA = 220.54 + 113.1$

$SA = 333.6 \text{ cm}^2$

23



wants only Lateral Area

$$LA = \pi r l$$

$$LA = \pi(5)(8)$$

$$LA = 40\pi \text{ units}^2$$

24



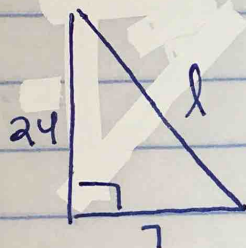
wants only Lateral Area

$$\text{Area} = 49\pi \text{ m}^2$$

$$49\pi = \pi r^2$$

$$49 = r^2$$

$$7 = r$$



$$7^2 + 24^2 = l^2$$

$$625 = l^2$$

$$25 = l$$

$$\rightarrow LA = \pi r l$$

$$LA = \pi(7)(25)$$

$$LA = 175\pi \text{ m}^2$$

25



$$\text{Area} = 36\pi \text{ cm}^2$$

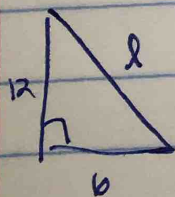
$$36\pi = \pi r^2$$

$$36 = r^2$$

$$6 = r$$

$$SA = LA + \text{Area of Base}$$

$$SA = \pi r l + \pi r^2$$



$$12^2 + 6^2 = l^2$$

$$180 = l^2$$

$$\sqrt{180} = l$$

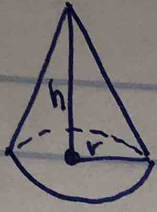
$$13.4 = l$$

$$\rightarrow SA = \pi(6)(13.4) + \pi(6)^2$$

$$SA = 252.6 + 113.1$$

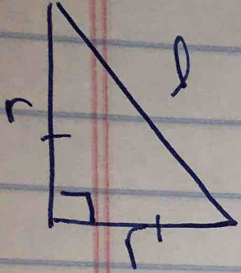
$$SA = 365.7 \text{ cm}^2$$

26



$$SA = 1000 \quad r = h$$

$$1000 = \pi r l + \pi r^2$$



$$r^2 + r^2 = l^2$$

$$2r^2 = l^2$$

$$\sqrt{2r^2} = l$$

$$r\sqrt{2} = l$$

$$\rightarrow 1000 = \pi r(r\sqrt{2}) + \pi r^2$$

$$1000 = \pi r^2 \sqrt{2} + \pi r^2$$

$$1000 = 4.44r^2 + 3.14r^2$$

$$1000 = 7.58r^2$$

$$131.98 = r^2$$

$$r = 11.49 \text{ cm}$$