U1D3 - Area & Perimeter of Composite Figures

Saturday, February 3, 2018 7:50 AM

U1D3_T Perimeter...

U1D3 **Warm Up**:

Define perimeter. Distance around the 'outside' of an object

Define Area.

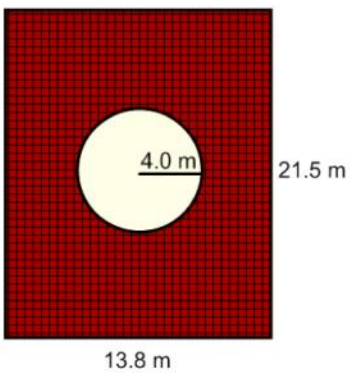
The space the two-dimensional surface covers.

Perimeter and Area of Composite Figures

Often complex shapes can be divided into simple shapes to calculate perimeter and area.

Example 1. A circular swimming pool is to be bordered by interlocking brick as shown in the diagram.

a) Determine the area to be covered by interlocking brick.



$A = A_{\square} - A_{\circ}$

$A = lw - \pi r^2$

$= (21.5)(13.8) - \pi(4)^2$

$= 246.\overset{\frown}{43}4\ldots$

$\doteq 246.4$

$\therefore$ the area is $246.4\ m^2$

b) If the bricks are sold by the skid, and each skid has enough bricks to cover 9 m^2, how many skids must be purchased?

$246.4 \div 9$

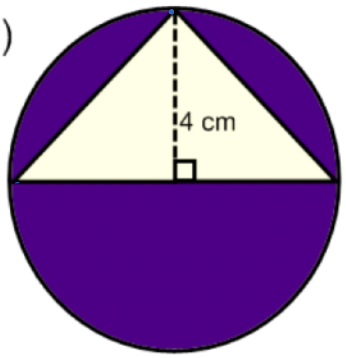
$= 27.3\overline{7}$

$\Rightarrow$ bump up to 28.

$\therefore$ we would buy 28 skids of bricks.

Example 2. Calculate the area of the shaded region.

a)



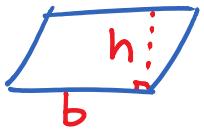
$A = A_{\circ} - A_{\triangle}$

$= \pi r^2 - \frac{bh}{2}$

$= \pi (4)^2 - \frac{(8)(4)}{2}$

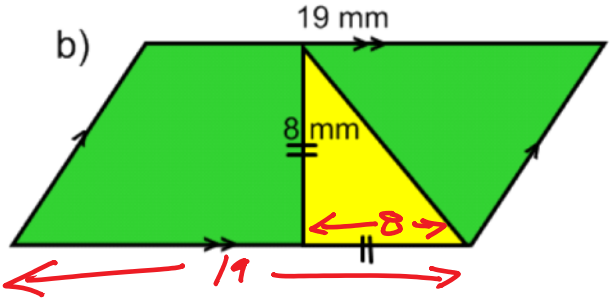
$= 34.265...$

$\doteq 34.3\ cm^2$



$A_{parallelogram} = bh$

b)



$A = A_{\square} - A_{\triangle}$

$= bh - \frac{bh}{2}$

$= 19(8) - \frac{8(8)}{2}$

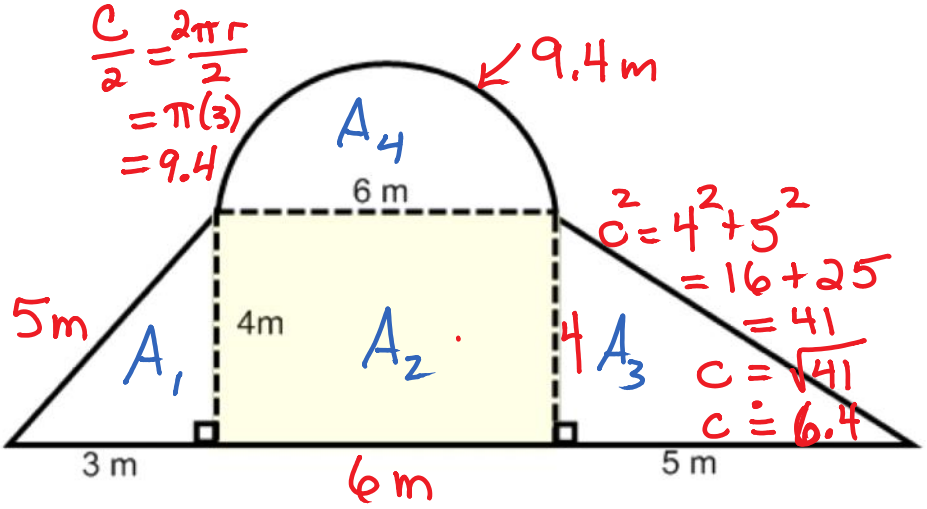
$= 152 - 32$

$= 120 \text{ mm}^2$

$\frac{160}{-8}$

Example 3. A restaurant is building an outdoor patio in the shape of the diagram below. The patio area will be made of interlocking paving stones with different stones along the border. The paving stones cost $\$52.95/m^2$. The border stones cost \$15.50/m. How much will the materials for the patio cost, including 13% taxes? Allow an additional 10% to account for stones that must be cut for the design.

Step 1: Calculate the unknown outside measurements.



Step 2: Calculate the total perimeter and add an additional 10%.

$P = 3+6+5+6.4+9.4+5$

$= 34.8$

Total $= 34.8 \times 1.1$ ← find 110% (original 100% plus 10%)

$\doteq 38.3\text{ m}$

Step 3: Identify the simple shapes that make up the area. Calculate the area of each shape.

$A = A_1 + A_2 + A_3 + A_4$

$= \frac{bh}{2} + lw + \frac{bh}{2} + \frac{\pi r^2}{2}$

Step 4: Calculate the total area and add 10% for waste.

$A = \frac{3(4)}{2} + 6(4) + \frac{(5)(4)}{2} + \frac{\pi (3)^2}{2}$

$= 6 + 24 + 10 + 14.13\ldots$

$= 54.1$

Total $= 54.1 \times 110\%$

$= 54.1 \times 1.1$

$= 59.51$

$\therefore$ area is 59.5 m^2

Step 5: Calculate the total cost before taxes.

$P \times 15.50 + A \times 52.95$

$\text{Cost} = 38.3 \times 15.50 + 59.5 \times 52.95$

$= 3744.175$

$\doteq \$3744.18$

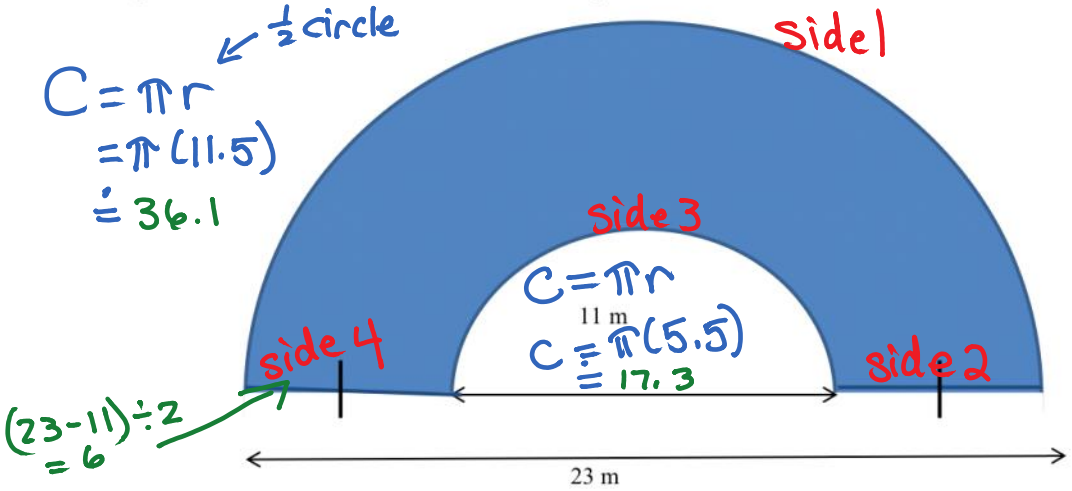
Step 6: Calculate the total cost including taxes.

$\text{Total Cost} = 3744.18 \times 1.13$

$\doteq 4230.92$

$\therefore$ it would cost $\$4230.92$.

Example 4: Calculate the perimeter of the shaded region. Round your answer to one decimal place.



Total Perimeter = 36.1 + 6 + 17.3 + 6

= 65.4 m