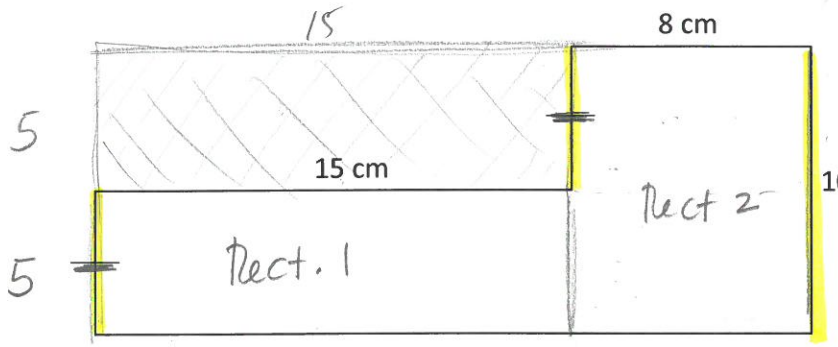
Lesson Three: Area of Irregular Shapes

There are times where you need to find the area of a shape which is not one of our 'standard' shapes (rectangle, square, triangle, circle). The following examples will show how we use formulas for the area of shapes that we already know, and apply them to new shapes.

Example 1: Area of a Composite Shape

Find the area of the figure shown below:



OTHER WAY

Whole rectangle

$A = 10 \times 23$

$A = 230\ cm^2$

Area to "cut out"

$A = 15 \times 5 = 75 cm^2$

Remaining area $= 230 - 75$

$= 155 cm^2$

$A = l \times w$

$A = 15 \times 5$

$A = 75\ cm^2$

$A = l \times w$

$A = 8 \times 10$

$A = 80\ cm^2$

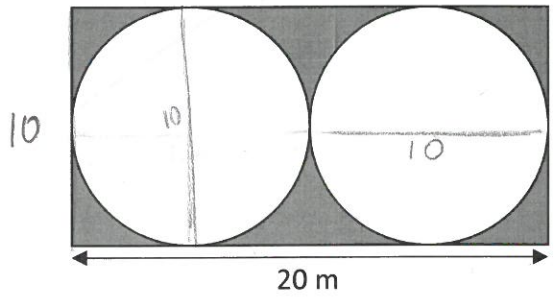
Total Area

$75 + 80$

$= 155\ cm^2$

Example 2: Shaded Area

Find the shaded area of the following figure:



Area of Rectangle

$A = l \times w$

$A = 20 \times 10$

$A = 200\ m^2$

Area of ONE circle

$A = \pi r^2$

$A = \pi \times 5^2$

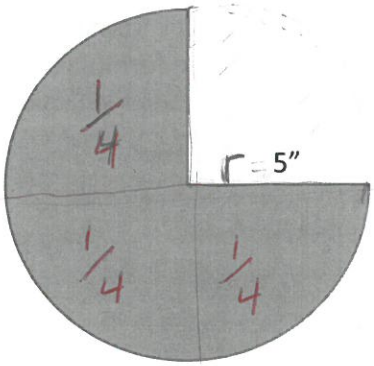
$A = 78.54\ m^2$

Area of shaded part

$200 - 78.54 - 78.54$

$= 42.92\ m^2$

Example 3: Fraction of shape
Find the area of the following figure.



Almost a circle

$\frac{1}{4}$ of circle is gone.

$\frac{3}{4}$ of circle remains.

Area of circle (whole)

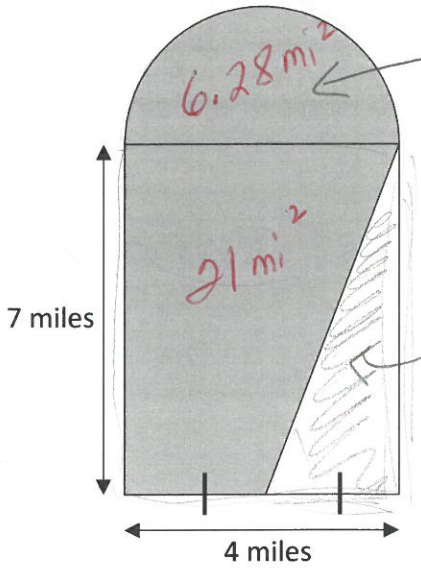
$A = \pi r^2$

$A = \pi \times 5^2 = 78.54 in^2$

So, $\frac{3}{4}$ of circle

$\frac{3}{4} \times 78.54 = 58.91 in^2$

Example 4: Putting It All Together
Find the shaded area of the following figure:



Half-circle

Look at the whole rectangle take-away the triangle piece.

$28 - 7 = 21$

$A = \pi \times r^2$

$A = \pi \times 2^2$

$A = 12.57 mi^2$

Half circle

$\frac{1}{2} \times 12.57 = 6.28 mi^2$

Whole rectangle

$A = l \times w$

$A = 4 \times 7$

$A = 28 mi^2$

Triangle

$A = \frac{1}{2} \times b \times h$

$A = \frac{1}{2} \times 2 \times 7 = 7 mi^2$

Total shaded area

$= 6.28 + 28 - 7$

$= 27.28 mi$

Lesson Four: Perimeter and Area Applications

This lesson will apply the skills you learned to find the area of a shape to "real-world" problems. There are two things to remember when working through these problems:

1. Most costs are provided 'per unit' (per box, per can, etc.). You are not allowed to purchase part of a box (or can, or...). This means you must round your answers appropriately for the situation.
2. Any question that contains a price "plus tax" or "plus PST" or "plus GST" require you to include the appropriate taxes in your final cost. Recall that (in MB) PST = 7% and GST = 5%.
3. If no tax calculation is required the phrase "taxes included" will be used.

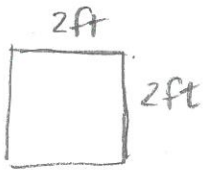
Example 1

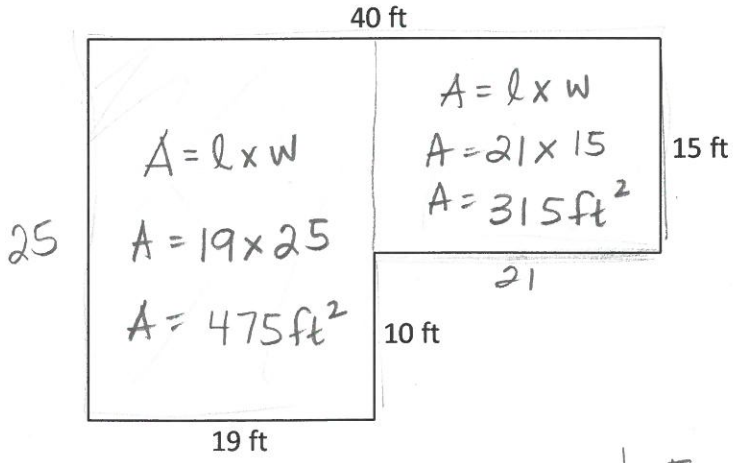
Area

You plan to tile a basement floor, shown below, with large ceramic tiles. The tiles that you have chosen are square and measure 2 feet on each side. You will need to buy 10% more tiles than you actually need, to account for waste. Tiles are sold in boxes of 12 for $65.99 plus tax.

You also plan to install baseboard around the perimeter of the room. Baseboard costs $0.73 per linear foot. You will also need to purchase 10% more than what is needed to account for waste when cutting.

Determine the total cost for tiles and baseboard for this basement floor.





We need 19 cases.

taxes

19 x 65.99 = 1253.81 x 1.12

= $1404.27

TILES

Total area = 475 + 315

= 790 ft²

Get 10% more

100% + 10% = 110%

790 x 110% / 100 =

790 x 1.10 = 869 ft²

Each tile covers

2 x 2 = 4 ft²

1 tile / 4 ft² = x tiles / 869 ft²

869 / 4 = x

217.25 tiles

218 tiles

How many cases?

12 tiles / 1 case = 218 tiles / x case

12x / 12 = 218 / 12

x = 18.17 cases

x = 19 cases