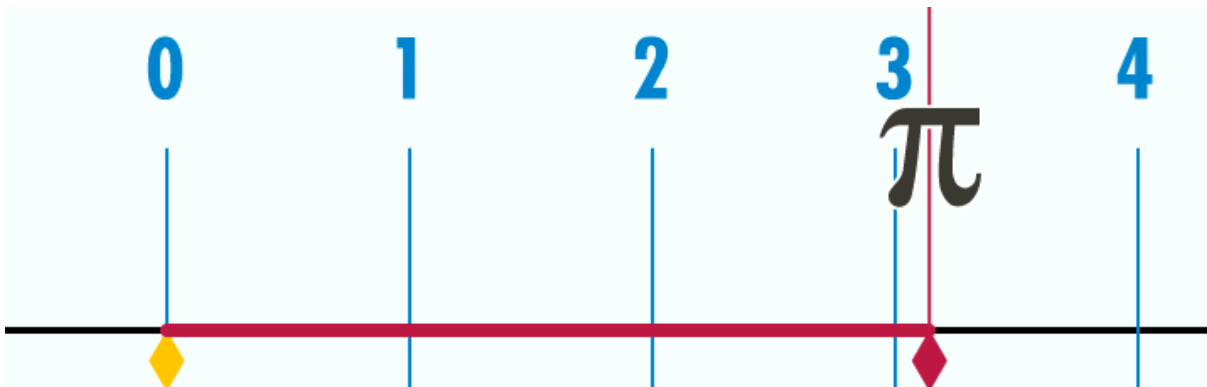


Interactive Math Notebook 3

Interactive Notebook #3: Measurement



3.1 intro (left)

Insert foldable model [here](#)

Find the **P**erimeter and **A**rea for each:

1. **Square** with side length of 5cm

$$P = 4s$$

$$A = b^2$$

$$P = 4(5)$$

$$A = 5^2$$

$$P = 20\text{cm}$$

$$A = 25\text{cm}^2$$

2. A **rectangle** with a base of 6cm and a height of 4 cm

$$P = 2b + 2h$$

$$A = bh$$

$$P = 2(6) + 2(4)$$

$$A = 6(4)$$

$$P = 12 + 8$$

$$A = 24\text{cm}^2$$

$$P = 20 \text{ cm}$$

1. A square with a side length of 9cm
2. A rectangle with a base of 7cm and a height of 3cm
3. A square with an area of 81cm^2 (b and P)
4. A rectangle with a height of 5 and an Area of $20u^2$ (P and b)
5. A square with a base of 11m (P & A)

Challenge:

1. Find the Perimeter and Area of a square whose side length is k centimetres
2. Find the Perimeter and Area of a rectangle with a base of f and a height of y

3.1 Intro (right)

Vocab:

Perfect Squares: the products of whole numbers multiplied by themselves

$$1 \times 1 = 1$$

$$2 \times 2 = 4$$

$$3 \times 3 = 9$$

$$4 \times 4 = 16$$

$$5 \times 5 = 25$$

$$6 \times 6 = 36$$

$$7 \times 7 = 49$$

$$8 \times 8 = 64$$

$$9 \times 9 = 81$$

$$10 \times 10 = 100$$

$$11 \times 11 = 121$$

$$12 \times 12 = 144$$

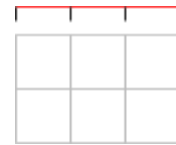
The **square root** $\sqrt{\quad}$ of a perfect square is the original factor

Eg. $4 \times 4 = 16 \quad \therefore \sqrt{16} = 4$

NB: $\therefore = \text{therefore}$

$\therefore n^2$ and $\sqrt{\quad}$ are **Inverse Operations**

Perimeter: the distance around some object; straight sides, closed figures, (|, linear u)



Area: how many 2-dimensional units would cover the shape, ($\square$, u^2)



A square has an area of $20m^2$. What are the side lengths?

Remember: A square is a special rectangle

Area of a square = b^2

So, the Side length of a **square** is the $\sqrt{\text{Area}}$

And $\therefore$ the $\sqrt{\text{Area of a Square}}$ is the length of one side

3.2 Practice (left)

Find the [areas/Perimeter](#) of the following shapes: sketch the shapes and label too!!!

1. Area & perimeter of a 4 ft wide and 5 ft long rectangular garden
2. Perimeter & area of a 65m by 30m rectangular trampoline
3. Area & perimeter of a square where the height is 6m
4. Perimeter of a square with an area of 49m^2
5. Area of a triangle with a height of 4m and a base of 10m
6. Area of a rectangle with a height of 7m and a base of 3m
7. Area of a triangle with a height of 6m and a base of 11m

More practice [here](#)

Printable practice: [here](#)

Relating Perimeter and Area

practice: [here](#)

More practice with Friendly Numbers: [here](#)

Final printable practice: [here](#)

3.2 (right)

Area of Polygon:ls: Base x Height is all you need!

Insert foldable [here](#)

Rectangle → $A = bh$

Parallelogram → $A = bh$

Trapezoid → $A = \frac{(b_1 + b_2) \times h}{2}$

3.3 (left)

1. Independently, find the Perimeter and Area of the following:

- a. An equilateral triangle with a base of 4m, and a height of 6m
- b. A rectangle with a base of 5m and a height of 3m
- c. A trapezoid with a bottom of 4m, and a top of 3, and height of 2m and a slant side length of 2.5.
- d. A parallelogram with a height of 6m, a base of 5m, and a side length of 7m
- e. A square table with a base of 79cm
- f. A rectangular garden with a height of 7ft and a base of 6ft

Then... Find the area of the following:

1. A circle with a radius of 4m
2. A circle with the diameter of 6cm
3. A circle with a radius of 3 cm

And find the circumference of the following

1. A circle with a radius of 5 m
2. A circle with a diameter of 7 m
3. A circle with a radius of 4 m

And challenge time -- find area of a circle that has a circumference of 31.4 m

3.3 (right) [Circles](#)

Diameter (d): the distance across a circle, which goes directly through the centre **$d = 2r$**

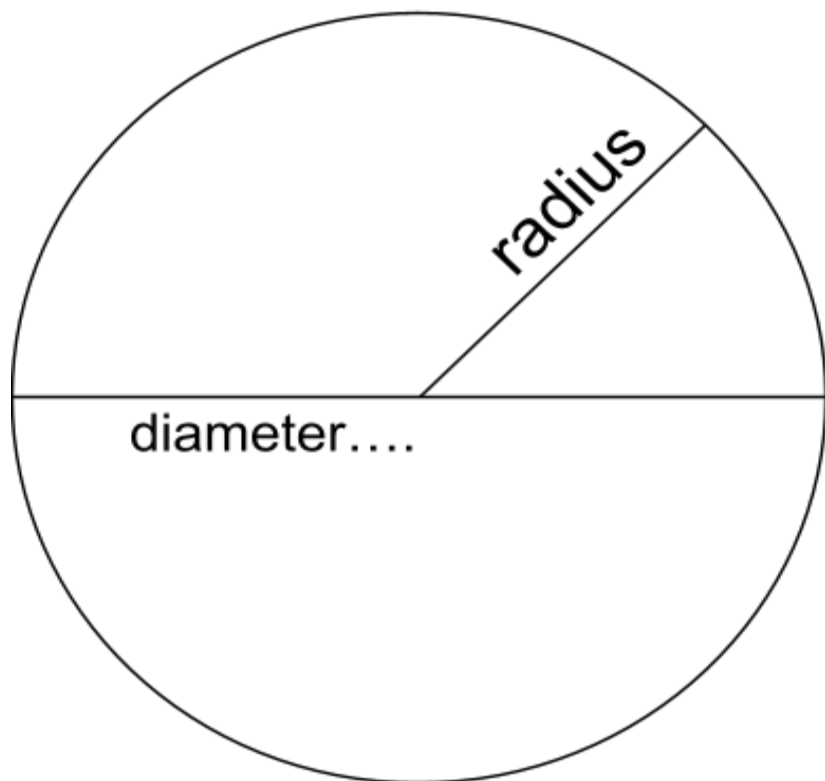
Radius (r): the distance from the centre of a circle to the edge of a circle **$r = \frac{d}{2}$**

Circumference (C): the outside of a circle
(linear measure)

Pi (π) : an irrational # representing the ratio between the circumference of a circle and its diameter

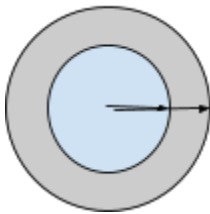
$$A = \pi r^2$$

$$C = 2r\pi \quad \text{or} \quad \pi d$$



3.4 More circles (Left)

1. A pool has a diameter of 10m . What is the circumference?
2. Max has a round tablecloth. According to its package, it has a circumference of 6.28 metres. What is the tablecloth's radius?
3. A pool has a radius of 7.5m. There is a 1m wide path ALL AROUND the pool. What is the area of the PATH?



4. When Kinsley won a contest, she got a bronze medal with a radius of 4 centimetres. Find the area
5. A coffee cup had a diameter of 9cm. What is the circumference of the cup?
6. When laid flat, a round parachute has a radius of 4 metres. What is the parachute's circumference?
7. A circular platter has a radius of 15cm. It sits upon a circular placemat which has a diameter of 42cm. When looking from above, what is the area of the placemat that is visible?

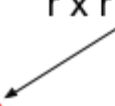
3.4 More Circles (Right) Flexibility with Formulae

If $A = \pi r^2$ how do we find the radius?

Example:

A Circle has an area= 132.665m^2 how do we solve for r?

$$\begin{array}{rcl} A & = & \pi r^2 \\ 132.665\text{m}^2 & = & \pi r^2 \\ \frac{132.665}{3.14} & = & \frac{3.14}{3.14} r^2 \end{array}$$

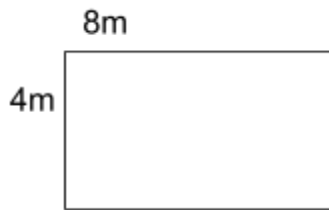
$r \times r$ 

$$\begin{array}{rcl} 42.25 & = & r^2 \\ \sqrt{42.25} & = & \sqrt{r^2} \\ 6.5 & = & r \end{array}$$

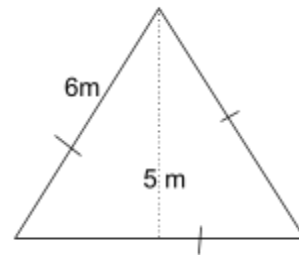
3.5 (Left & Right)

Find the Perimeter and Area:

1.



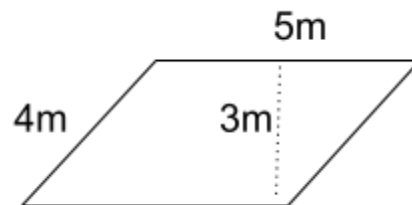
3.



2.



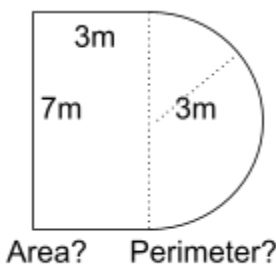
4.



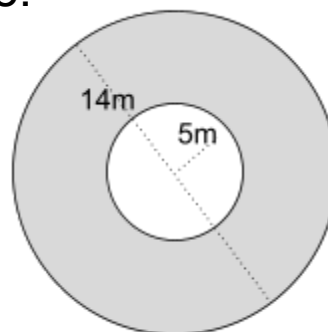
Solve for the missing aspect:

1. A circle, radius of 9m. Find Area.
2. A circle, diameter of 6cm. Find Area.
3. A circle, Area of 706.5m Find diameter
4. A circle, Circumference of 113.04m Find radius.
5. A circle, Area of 153.86. Find circumference
6. A circle, Circumference of 35.54m Find area.

7.



8.



Area of Shaded doughnut?

3.6(left & right) practice :

A. if a square has sides that are 5cm long, what is the P? the A?

B. if a right angle triangle has two legs that are 5 cm long and a slant that is 7 cm long, what is the area?

$$A = \frac{bh}{2} \quad A = \frac{(5)(5)}{2} \quad A = 12.5\text{cm}^2$$

C. John is building a triangular garden in the corner of his yard. He wants his garden to take up 5 feet of fence on one side, and 6 feet on the other. What is the area of the garden?

$$A = \frac{bh}{2} \quad A = \frac{5(6)}{2} \quad A = 15\text{ft}^2$$

D. if a round garden has a diameter of 4m, what length of fence is needed to go around the garden?

$$C = (\pi)d \quad C = 3.14(4) \quad C = 12.56\text{m}$$

3.7 (left)

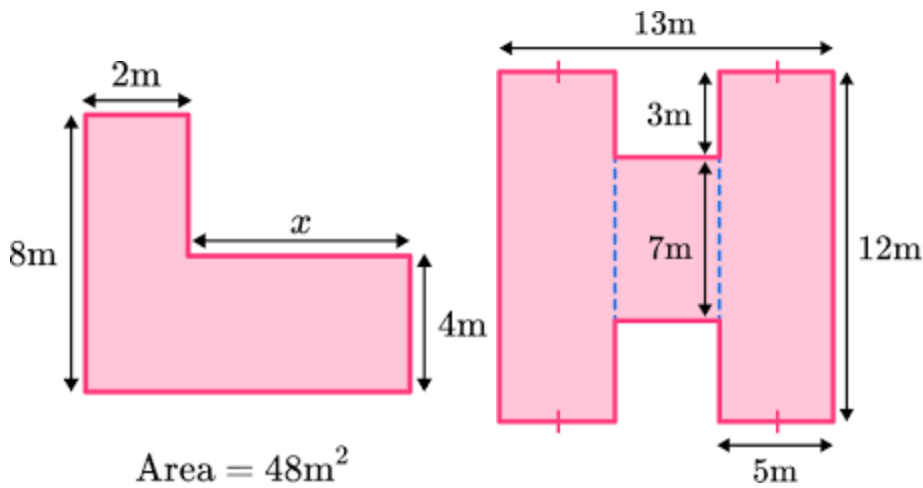
Find Perimeter and Area of the following: [key](#)

1. A square with a base of 17mm
2. A rectangle with a base of 5cm and 9cm
3. A trapezoid with a top of 12 mm, a base of 20mm, a height of 5mm, and a slant length of 9mm
4. A parallelogram with a height of 11cm and a base of 17cm and a slant of 13cm
5. A right angle triangle with a height of 6m and a base of 10m
6. C and A of A Circle with a radius of 6m
7. C and A of A circle with a diameter of 12cm
8. A square has a perimeter of 64cm. What is the area?
9. A rectangle has an area of 24cm^2 and a base of 4cm. What is the perimeter?
10. A right angle triangle has an area of 18m^2 and a height of 12m. What is the perimeter?
12. A square has an area of 49m^2 -- find the perimeter
13. A right angle triangle has a Perimeter of 24m. It has a hypotenuse of 10m, and a height of 6m. What is the area?

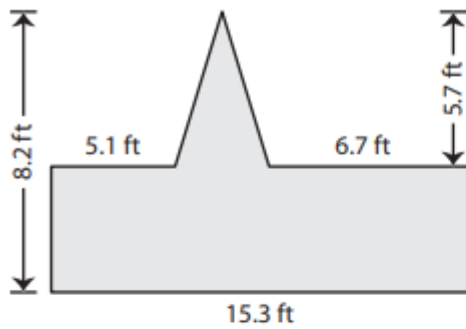
3.8 Working Backwards: Finding Side Lengths:

Shape	Given Perimeter	Find side	Given Area	Find side
Square	$P=4s$	$\frac{P}{4} = s$	$A = s^2$	$\sqrt{A} = s$
Rectangle	$P = 2b + 2h$	Substitute values, T1eq	$A = bh$	$\frac{A}{b} = h$ $\frac{A}{h} = b$
Triangle	$P = s+s+s$	$S = P-(s+s)$	$A = \frac{bh}{2}$	$\frac{2A}{h} = b$ $\frac{2A}{b} = h$
Eq tri	$P=3S$	$\frac{P}{3} = s$	$A = \frac{bh}{2}$	$\frac{2A}{h} = b$ $\frac{2A}{b} = h$
circle	$C = \pi d$	Diameter = $\frac{C}{\pi}$	$A = \pi r^2$	Radius = $\sqrt{\frac{A}{\pi}}$

3.9 Composite Shapes:

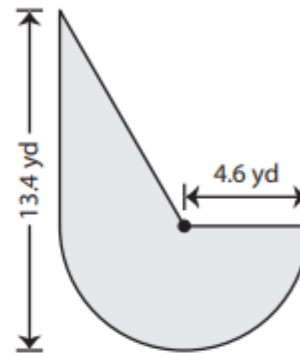


1)



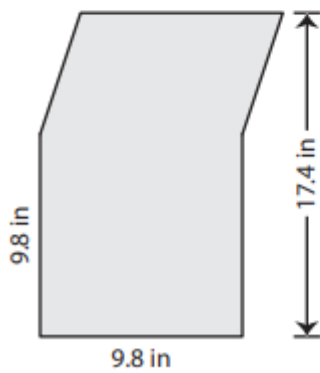
Area = _____

2)



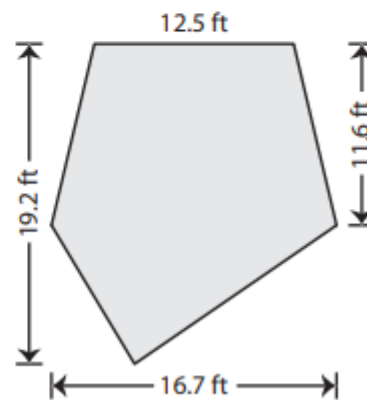
Area = _____

3)



Area = _____

4)



Area = _____

3.9 Composite shapes:

Composite shapes - closed figures made up of several smaller polygons

Finding Perimeter: solving for all unmarked sides, then sum all sides

Finding Area: break shape into recognizable parts, find individual areas, sum the areas

Challenges:

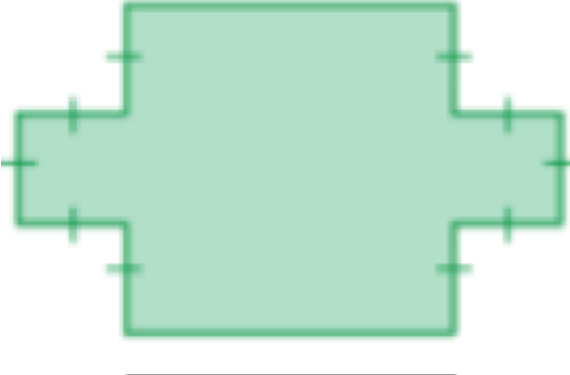
Finding implied measurements

Using the most efficient strategies

Labelling all work logically****

4 Scenarios:

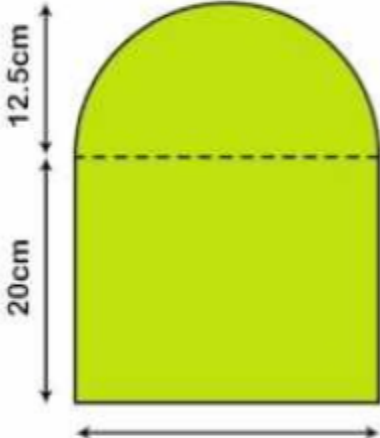
Additive composite shapes (normal polygons, all smooshed together)



15mm

	$P = 2(b) + 4s$ $P = 2(15) + 4(5)$ $P = 50\text{mm}$	$A = b^2$ $A = 15^2$ $A = 225\text{mm}^2$
	$P = 2(3)(5)$ $P = 30$	$A = 2b^2$ $A = 2(25) = 50$
	$P: 80\text{mm} \quad A = 275\text{mm}^2$	

Additive partial shapes (include half circles, half trapezoids, etc)



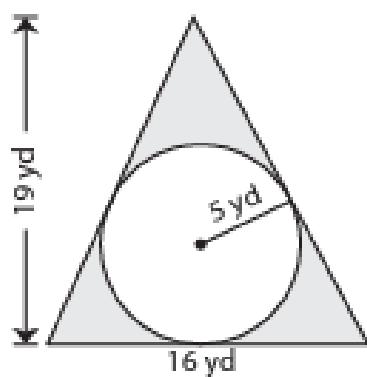
12.5cm

20cm

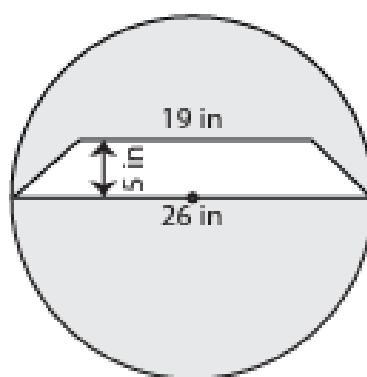
25cm

	$P = \frac{\pi d}{2}$ $P = \frac{3.14(25)}{2} = 14.07$	$A = \frac{\pi r^2}{2}$ $A = \frac{3.14(12.5^2)}{2} = 245.31$
	$P = s + s + s$ $P = 20 + 25 + 20$ $P = 65$	$A = bh$ $A = 20(25)$ $A = 500$
	$\text{Total } P = 79.07\text{cm} \quad \text{Total } A = 745.31\text{cm}^2$	

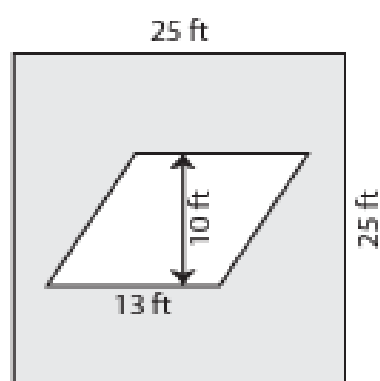
3.10 Composite shapes: left



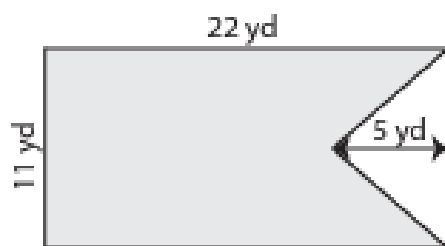
Area = _____



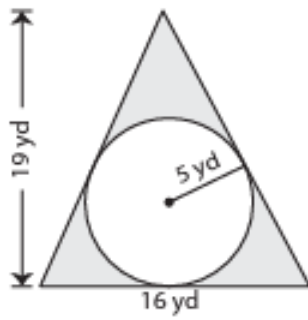
Area = _____



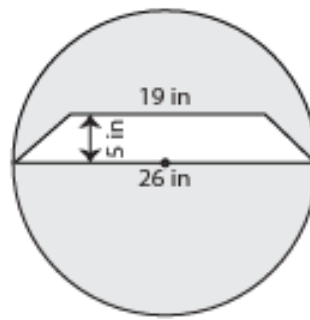
Area = _____



Area = _____

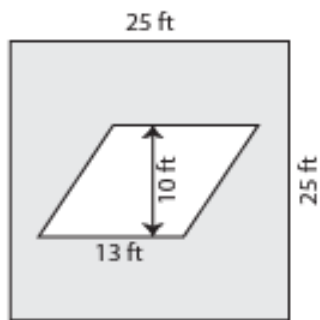


Area = 73.5 yd²



Area = 418.16 in²

6)



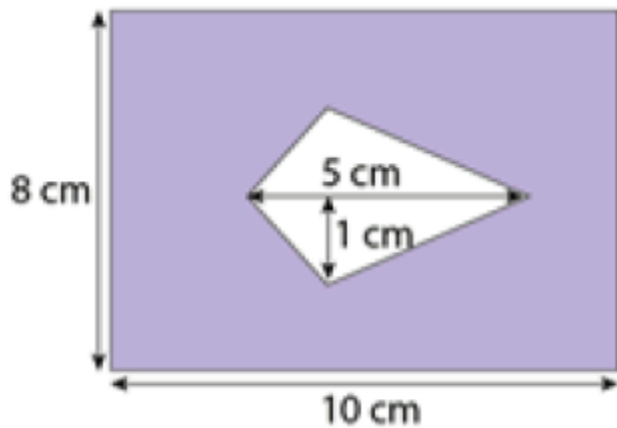
Area = 495 ft²



Area = 214.5 yd²

3.10 Composite shapes: right

Subtractive composite shapes (shapes you have to subtract from a larger area)



$$P = 2b + 2h$$

$$P = 2(10) + 2(8)$$

$$P = 36\text{cm}$$

$$A = bh$$

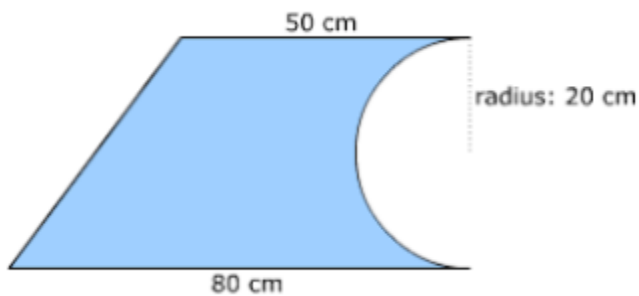
$$A = 10(8)$$

$$A = 80\text{cm}^2$$

$$A = \frac{2(5)(1)}{2} = 5\text{cm}^2$$

$$\text{Total } A = 80 - 5 = 75\text{cm}^2$$

Subtractive partial shape (subtracting half-circles, half-trapezoids etc)



$$A_{\triangle} = \frac{bh}{2}$$

$$A_{\square} = bh$$

$$A_{\square} = 50(40)$$

$$A_{\triangle} = \frac{30(40)}{2}$$

$$A_{\square} = 2000\text{cm}^2$$

$$A_{\triangle} = 600\text{cm}^2$$

$$A_{\phi} = \frac{\pi r^2}{2}$$

$$A_{\phi} = \frac{\pi 20^2}{2}$$

$$A_{\phi} = \frac{\pi 400}{2}$$

$$A_{\phi} = 628\text{cm}^2$$

$$\therefore 2000 + 600 - 628 = 1972\text{cm}^2$$

