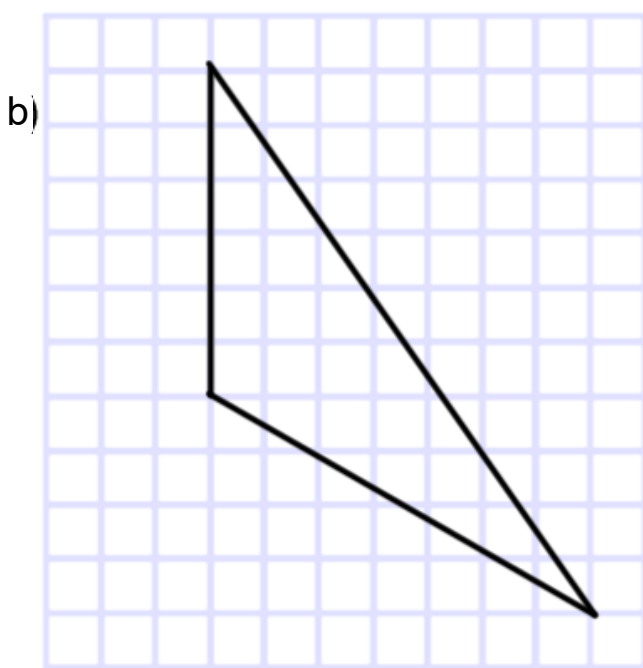
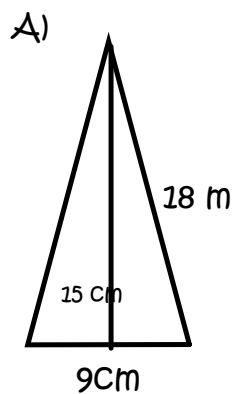




Warm Up Grade 7  
Lesson 5

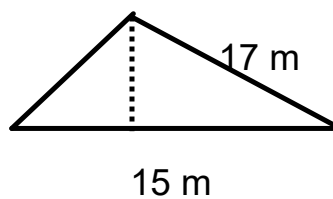


Find the Area for each of the following triangles:



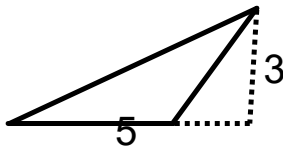
2) Find the height

area =  $165 \text{ m}^2$

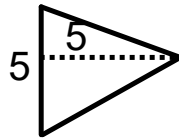


### Homework Solutions

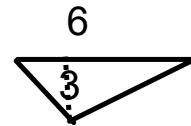
Homework Solutions Page 145 -146 # 1, 2, 4



$$\begin{aligned}
 1a) \quad A &= \frac{b \times h}{2} \\
 &= \frac{5 \text{ cm} \times 3 \text{ cm}}{2} \\
 &= \frac{15 \text{ cm}^2}{2} \\
 &= 7.5 \text{ cm}^2
 \end{aligned}$$



$$\begin{aligned}
 1b) \quad A &= \frac{b \times h}{2} \\
 &= \frac{5 \text{ cm} \times 5 \text{ cm}}{2} \\
 &= \frac{25 \text{ cm}^2}{2} \\
 &= 12.5 \text{ cm}^2
 \end{aligned}$$

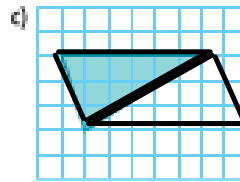
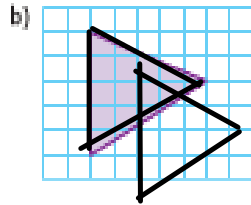
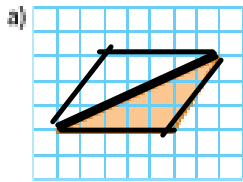


$$\begin{aligned}
 1c) \quad A &= \frac{b \times h}{2} \\
 &= \frac{6 \text{ cm} \times 3 \text{ cm}}{2} \\
 &= \frac{18 \text{ cm}^2}{2} \\
 &= 9 \text{ cm}^2
 \end{aligned}$$

pg. 145 # 1-8

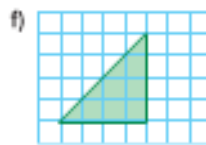
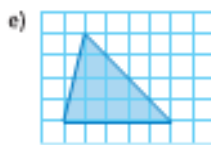
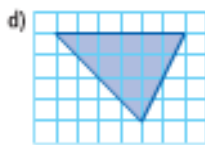
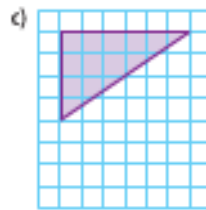
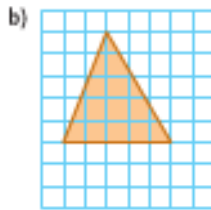
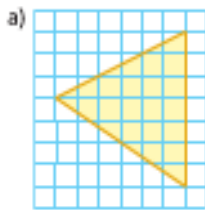
Homework Solutions

1. Copy each triangle on 1-cm grid paper. Draw a related parallelogram.



^

2. Each triangle is drawn on 1-cm grid paper. Find the area of each triangle. Use a geoboard if you can.



☺ a)  $A = \frac{b \times h}{2}$   
 $= \frac{7 \times 4}{2}$   
 $= \frac{28}{2}$   
 $= 14 \text{ cm}^2$

☺ b)  $A = \frac{b \times h}{2}$   
 $= \frac{5 \times 5}{2}$   
 $= \frac{25}{2}$   
 $= 12.5 \text{ cm}^2$

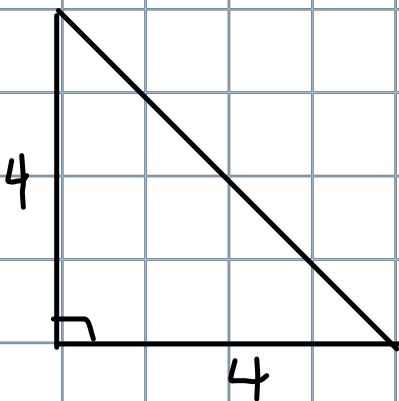
☺ c)  $A = \frac{b \times h}{2}$   
 $= \frac{6 \times 4}{2}$   
 $= \frac{24}{2}$   
 $= 12 \text{ cm}^2$

☺ d)  $A = \frac{b \times h}{2}$   
 $= \frac{6 \times 4}{2}$   
 $= \frac{24}{2}$   
 $= 12 \text{ cm}^2$

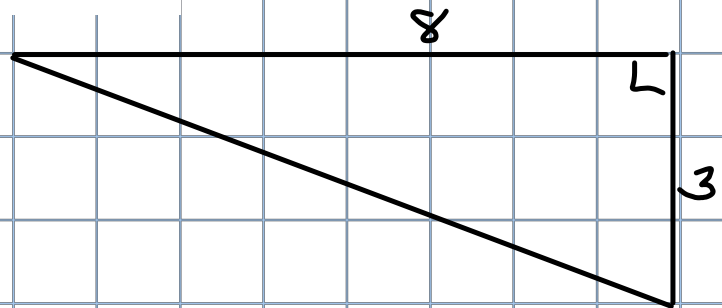
☺ e)  $A = \frac{b \times h}{2}$   
 $= \frac{5 \times 4}{2}$   
 $= \frac{20}{2}$   
 $= 10 \text{ cm}^2$

☺ f)  $A = \frac{b \times h}{2}$   
 $= \frac{4 \times 4}{2}$   
 $= \frac{16}{2}$   
 $= 8 \text{ cm}^2$

3. Draw two right triangles on 1-cm grid paper.
- Record the base and the height of each triangle.
  - What do you notice about the height of a right triangle?
  - Find the area of each triangle you drew.

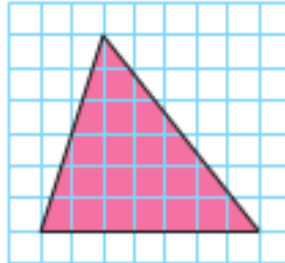


$$\begin{aligned} A &= \frac{b \times h}{2} \\ &= \frac{4 \times 4}{2} \\ &= \frac{16}{2} \\ &= 8 \text{ cm}^2 \end{aligned}$$



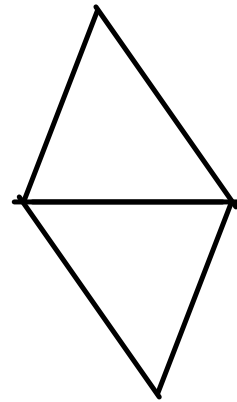
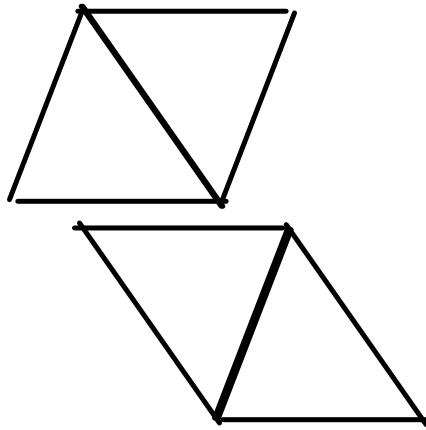
$$\begin{aligned} A &= \frac{b \times h}{2} \\ &= \frac{8 \times 3}{2} \\ &= \frac{24}{2} \\ &= 12 \text{ cm}^2 \end{aligned}$$

4. a) Find the area of this triangle.  
 b) Use 1-cm grid paper.  
 How many different parallelograms can you draw that have the same base and the same height as this triangle? Sketch each parallelogram.  
 c) Find the area of each parallelogram.  
 What do you notice?



😊 a)  $A = \frac{b \times h}{2}$   
 $= \frac{6 \times 4}{2}$   
 $= \frac{24}{2}$   
 $= 12 \text{ cm}^2$

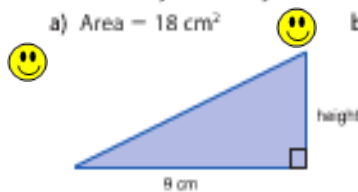
c) The area of each parallelogram is  $24 \text{ cm}^2$



**Homework Solutions**

Homework Solutions Page 145 -146 # 1, 2, 4

5. Use the given area to find the base or height of each triangle.  
How could you check your answers?



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

$$18 = \frac{9 \times \underline{\quad}}{2}$$

$$\frac{36}{2} = \frac{9 \times h}{2}$$

$$h = 4$$

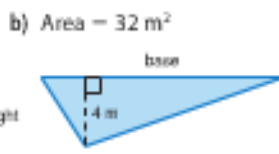
OR

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

$$= \frac{18 \times 2}{9}$$

$$= \frac{36}{9}$$

$$h = 4$$



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

$$32 = \frac{b \times 4}{2}$$

$$64 = b \times 4$$

$$\frac{64}{4} = b$$

$$16 = b$$

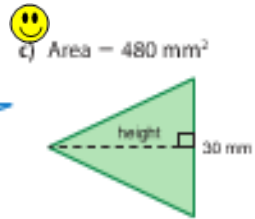
OR

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

$$= \frac{32 \times 2}{4}$$

$$= \frac{64}{4}$$

$$b = 16$$



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

$$480 = \frac{30 \times \underline{\quad}}{2}$$

$$480 = 15 \times h$$

$$\frac{480}{15} = h$$

$$32 = h$$

OR

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

$$= \frac{480 \times 2}{30}$$

$$= \frac{960}{30}$$

$$h = 32$$

6. Use 1-cm grid paper.

a) Draw 3 different triangles with each base and height.

i) base: 1 cm; height: 12 cm


ii) base: 2 cm; height: 6 cm

iii) base: 3 cm; height: 4 cm

b) Find the area of each triangle you drew in part a.

What do you notice?

a)

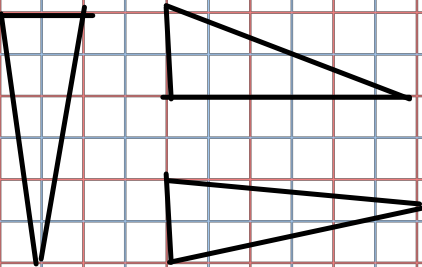


$$A = \frac{b \times h}{2}$$

$$= \frac{1 \times 12}{2}$$

$$= 6$$

b)

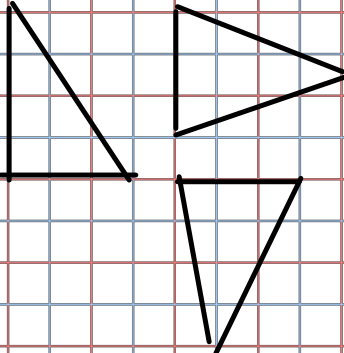


$$A = \frac{b \times h}{2}$$

$$= \frac{2 \times 6}{2}$$

$$= 6 \text{ cm}^2$$

c)



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

$$= \frac{3 \times 4}{2}$$

$$= 6 \text{ cm}$$

7. On 1-cm grid paper, draw two different triangles with each area below.  
Label the base and height each time.

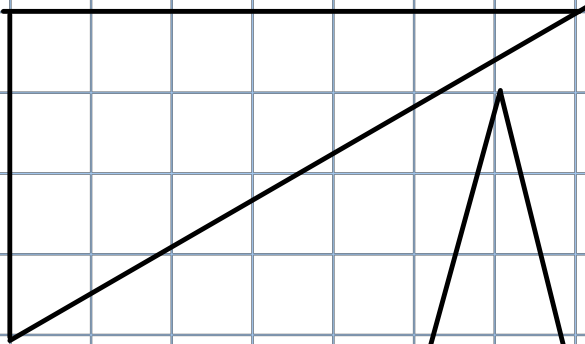
How do you know these measures are correct?

a)  $14 \text{ cm}^2$

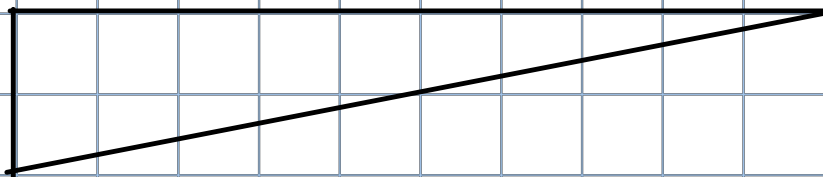
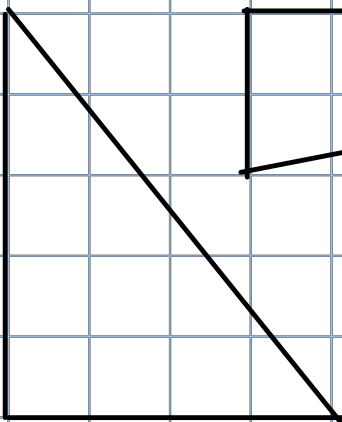
b)  $10 \text{ cm}^2$

c)  $8 \text{ cm}^2$

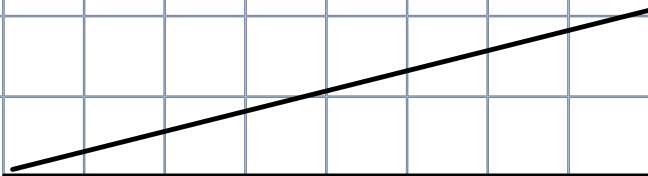
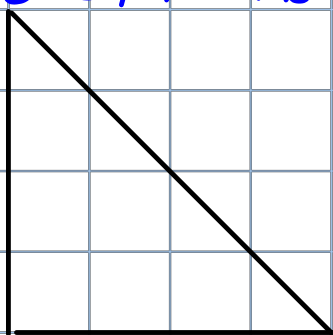
a)  $A = 14$   
so  $b \times h = 28$



b)  $A = 10$   
so  $b \times h = 20$



c)  $A = 8$   
so  $b \times h = 16$





8. a) Draw any triangle on grid paper.

What happens to the area of the triangle in each case?

- i) the base is doubled
- ii) both the height and the base are doubled
- iii) both the height and the base are tripled

b) What could you do to the triangle you drew in part a to triple its area?

Explain why this would triple the area.

$$b=2, h=4$$

$$A = \frac{2 \times 4}{2}$$

$$= 4$$

$$a) b=4, h=4$$

$$A = \frac{4 \times 4}{2}$$

$$= 8$$

a) if the base is doubled, the area doubles

$$c) b=4, h=8$$

$$A = \frac{4 \times 8}{2}$$

$$= 16$$

If the base and height both double, then the area is 4 times larger or quadrupled

$$d) b=6, h=12$$

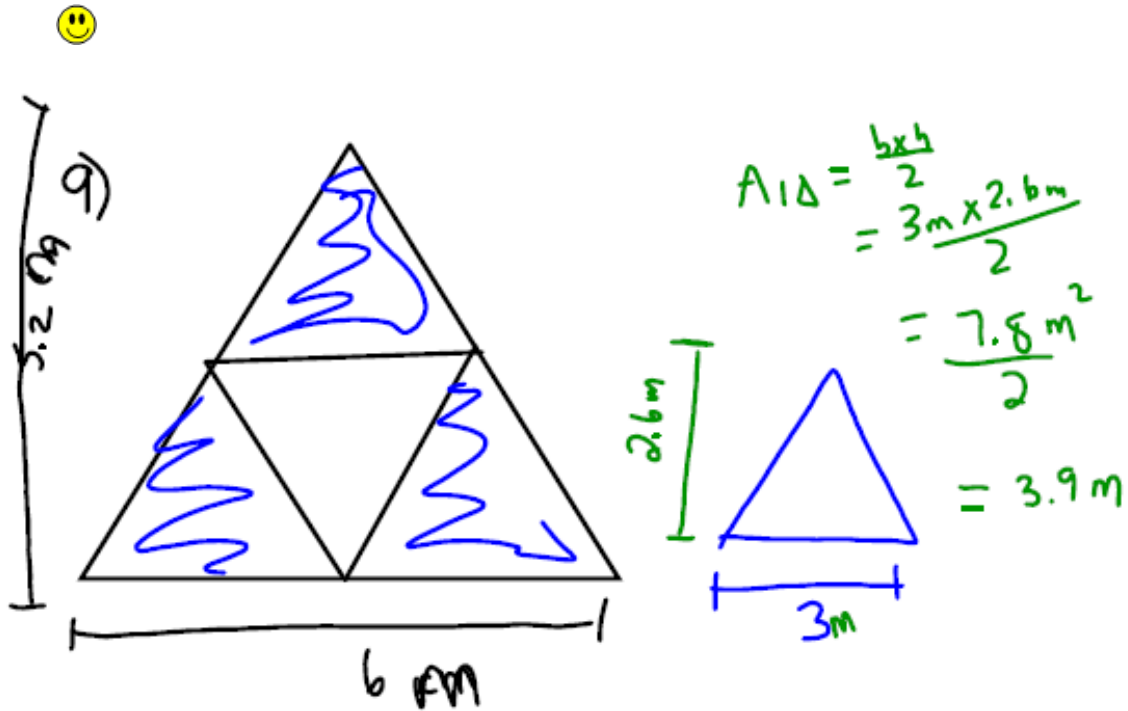
$$A = \frac{b \times h}{2}$$

$$= \frac{6 \times 12}{2}$$

$$= 36$$

If the base and height are both tripled, then the area is 9 times larger.

e) If you want triple the area triple either the height OR the base



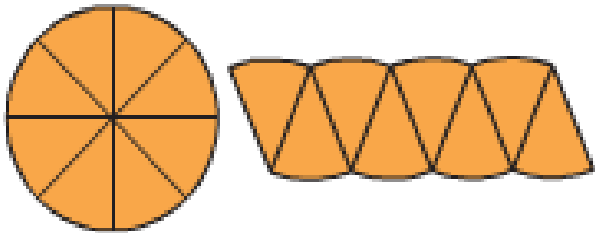
2)  $A_{3\Delta} = 3 \times 3.9$   
 $= 11.7\text{ m}^2$

b)  $11.7 \div 5.5 = 2.12\overline{72}$   
 buy 3 cans

Suppose a circle was cut into 8 congruent sectors.

Sector - a part of the circle

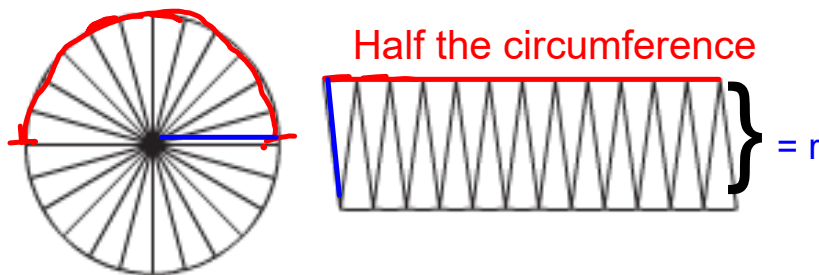
The 8 sectors were then arranged to approximate a parallelogram.



The more congruent sectors we use, the closer the area of the parallelogram is to the area of the circle.

Here is a circle cut into 24 congruent sectors.

The 24 sectors were then arranged to approximate a parallelogram.



Circumference =  $2\pi r$

Half of Circumference =  $\frac{2\pi r}{2}$

Half of Circumference =  $1\pi r$

$A = b \times h$

= (Half the circumference)  $\times$  (r)

=  $\pi r \times r$

=  $\pi r^2$

where  $r^2 = r \times r$

Area of a Circle

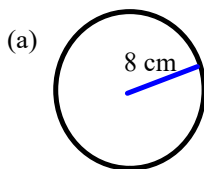
We have a formula to find the area of a circle,

$$\star \text{Area of Circle} = \pi r^2 \star$$

That is the area of a circle is  $\pi$  times the radius squared (which means radius x radius).  
 $\pi$  always = 3.14

Examples:

Find the area for each of the following:

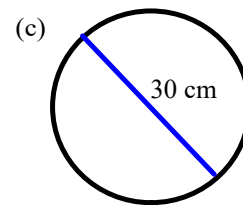
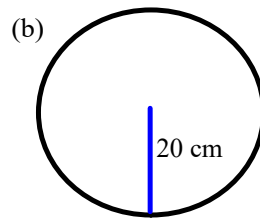


$$A = \pi r^2$$

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

$$= \pi (64)$$

$$= 64\pi$$



Solutions  
to b & c on  
next page

## Area of a Circle

We have a formula to find the area of a circle,

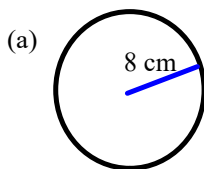
$$\text{Area of Circle} = \pi r^2$$

That is the area of a circle is  $\pi$  times the radius squared (which means radius x radius).

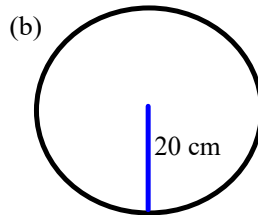
$\pi$  always = 3.14

Examples:

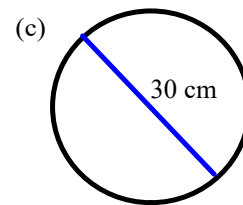
Find the area for each of the following:



$$\begin{aligned} A &= \pi r^2 \\ &= 3.14 \times 8 \times 8 \\ &= 200.96 \text{ cm}^2 \end{aligned}$$



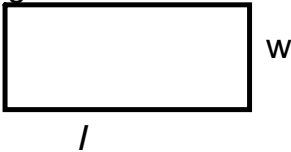
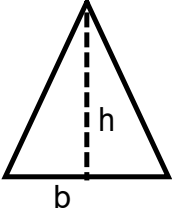
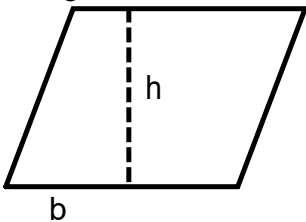
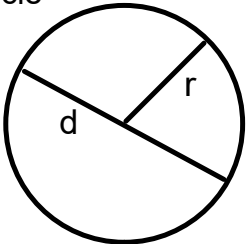
$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 20 \times 20 \\ &= 1256 \text{ cm}^2 \end{aligned}$$



$$\begin{aligned} d &= 30 \\ r &= 15 \\ A &= \pi \times r \times r \\ &= 3.14 \times 15 \times 15 \\ &= 706.5 \text{ cm}^2 \end{aligned}$$

To estimate the area of a circle  $\approx 3 \times r \times r$

### Grade 7 - Formula Sheet

	main formulas	rearranged formulas
<p>Rectangle</p> 	$Area = l \times w$	$w = \frac{Area}{l}$ $l = \frac{Area}{w}$
<p>Triangle</p> 	$Area = \frac{b \times h}{2}$	$b = \frac{2 \times Area}{h}$ $h = \frac{2 \times Area}{b}$
<p>Parallelogram</p> 	$Area = b \times h$	$b = \frac{Area}{h}$ $h = \frac{Area}{b}$
<p>Circle</p>  <p><math>d = 2r</math>      <math>r = d \div 2</math></p>	<p>Circumference = <math>\pi \times d</math></p> <p>Circumference = <math>2\pi r</math></p> <p>Area = <math>\pi \times r \times r</math></p>	$d = \frac{circumference}{\pi}$

# *Class / Homework*

Page 151

#1, #2, #3,#5(Show work)

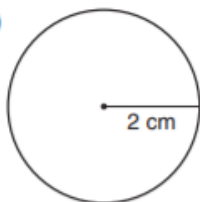
Since this is the last lesson of CH 4,

I will also have the solutions at the end of this PDF file.

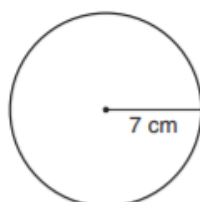
1. Calculate the area of each circle.

Estimate to check your answers are reasonable.

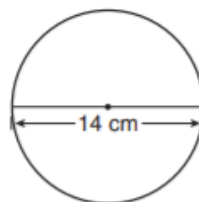
a)



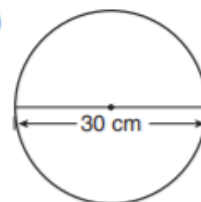
b)



c)



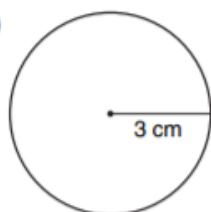
d)



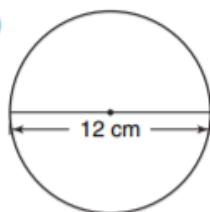
2. Calculate the area of each circle. Give your answers to two decimal places.

Estimate to check your answers are reasonable.

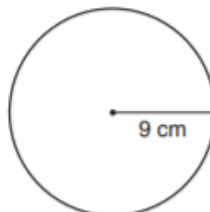
a)



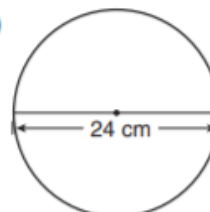
b)



c)



d)





**3.** Use the results of questions 1 and 2. What happens to the area in each case?

- a) You double the radius of a circle.
- b) You triple the radius of a circle.
- c) You quadruple the radius of a circle.

Justify your answers.

record your results. show your work.

**5.** In the biathlon, athletes shoot at targets. Find the area of each target.

- a) The target for the athlete who is standing is a circle with diameter 11.5 cm.
- b) The target for the athlete who is lying down is a circle with diameter 4.5 cm.

Give the answers to the nearest square centimetre.

Homework Solutions

Homework Solutions Page 151 # 1(a,b), 2(b,d), 3(a,b,c), 4or 5

★ pg 151

★ a)  $r = 2 \text{ cm}$

$$\begin{aligned}
 A &= \pi \times r \times r \\
 &= 3.14 \times 2 \times 2 \\
 &= 12.56 \text{ cm}^2 \\
 &\approx 3 \times 2 \times 2 = 12
 \end{aligned}$$

★ c)  $d = 14$   
so  $r = 7 \text{ cm}$

$$\begin{aligned}
 A &= \pi \times r \times r \\
 &= 3.14 \times 7 \times 7 \\
 &\approx 153.86 \text{ cm}^2
 \end{aligned}$$

★ b)  $r = 7 \text{ cm}$

$$\begin{aligned}
 A &= \pi \times r \times r \\
 &= 3.14 \times 7 \times 7 \\
 &= 153.86 \text{ cm}^2 \\
 &\approx 3 \times 7 \times 7 \text{ or } 3 \times 50 = 150
 \end{aligned}$$

★ d)  $d = 30 \text{ cm}$   
so  $r = 15 \text{ cm}$

$$\begin{aligned}
 A &= \pi \times r \times r \\
 &= 3.14 \times 15 \times 15 \\
 &= 706.5 \text{ cm}^2 \\
 &\approx 3 \times 225 \\
 &\quad 675
 \end{aligned}$$

$$\begin{aligned}
 2. a) r &= 3 \text{ cm} \\
 \star A &= \pi \times r \times r \\
 &= 3.14 \times 3 \times 3 \\
 &= 28.26 \text{ cm}^2 \\
 &\approx 3 \times 3 \times 3 = 27
 \end{aligned}$$

$$\begin{aligned}
 b) d &= 12 \text{ cm} \\
 \star r &= 6 \text{ cm} \\
 A &= \pi \times r \times r \\
 &= 3.14 \times 6 \times 6 \\
 &= 113.04 \text{ cm}^2 \\
 &\approx 3 \times 6 \times 6 = 108
 \end{aligned}$$

$$\begin{aligned}
 c) r &= 9 \text{ cm} \\
 \star A &= \pi \times r \times r \\
 &= 3.14 \times 9 \times 9 \\
 &= 254.34 \text{ cm}^2 \\
 &\approx 3 \times 9 \times 9 = 243
 \end{aligned}$$

$$\begin{aligned}
 d) d &= 24 \text{ cm} \\
 \star r &= 12 \text{ cm} \\
 A &= \pi \times r \times r \\
 &= 3.14 \times 12 \times 12 \\
 &= 452.16 \text{ cm}^2 \\
 &\approx 3 \times 12 \times 12 \\
 &\approx 3 \times 150 \\
 &450
 \end{aligned}$$

$\star$  a) Double the radius, and the area becomes 4 times as large (quadruple)

$$\begin{aligned}
 r=1 \quad A &\approx 3.14 \times 1 \times 1 \\
 &= 3.14
 \end{aligned}$$

$$\begin{aligned}
 r=2 \quad A &\approx 3.14 \times 2 \times 2 \\
 &= 12.56
 \end{aligned}$$

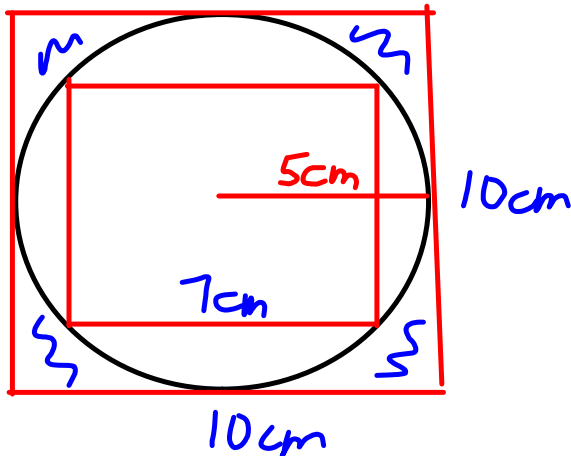
$\star$  b) Look at 2(a) and (c)

Triple the radius, and the area will be 9 times as large.

$$\star c) r=4 \quad A \approx 3.14 \times 4 \times 4 = 50.24$$

Quadruple the radius and the area will be sixteen times as large

pg 151  
4.



$$\text{Area of small square} = 7 \times 7 \\ = 49 \text{ cm}^2$$

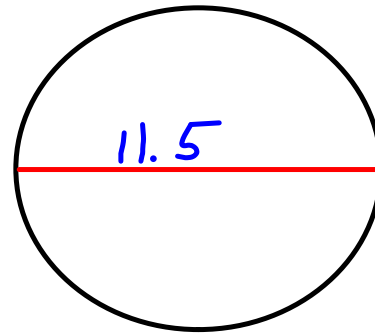
$$\text{Area of Large square} = 10 \times 10 \\ = 100 \text{ cm}^2$$

So <sup>the</sup> area of <sup>the</sup> circle is between 49 and 100  
 $\approx 75 \text{ cm}^2$

$$\begin{aligned} \text{b) } A &= \pi \times r \times r \\ &= 3.14 \times 5 \times 5 \\ &= 78.5 \text{ cm}^2 \end{aligned}$$

★ 5 a) Diameter = 11.5 cm

$$r = \frac{11.5}{2}$$
$$= 5.75 \text{ cm}$$



$$A = \pi \times r \times r$$
$$= 3.14 \times 5.75 \times 5.75$$
$$= 103.8 \text{ cm}^2 \quad \text{or } 104 \text{ cm}^2$$

★ b) D = 4.5

$$r = \frac{4.5}{2}$$
$$= 2.25$$

$$A = \pi \times r \times r$$
$$= 3.14 \times 2.25 \times 2.25$$
$$= 15.89 \text{ cm}^2 \quad \text{or } 16 \text{ cm}^2$$