Stewards Academy

Maths Spring 2

Year 10 Foundation

Blended Learning Booklet

Name:

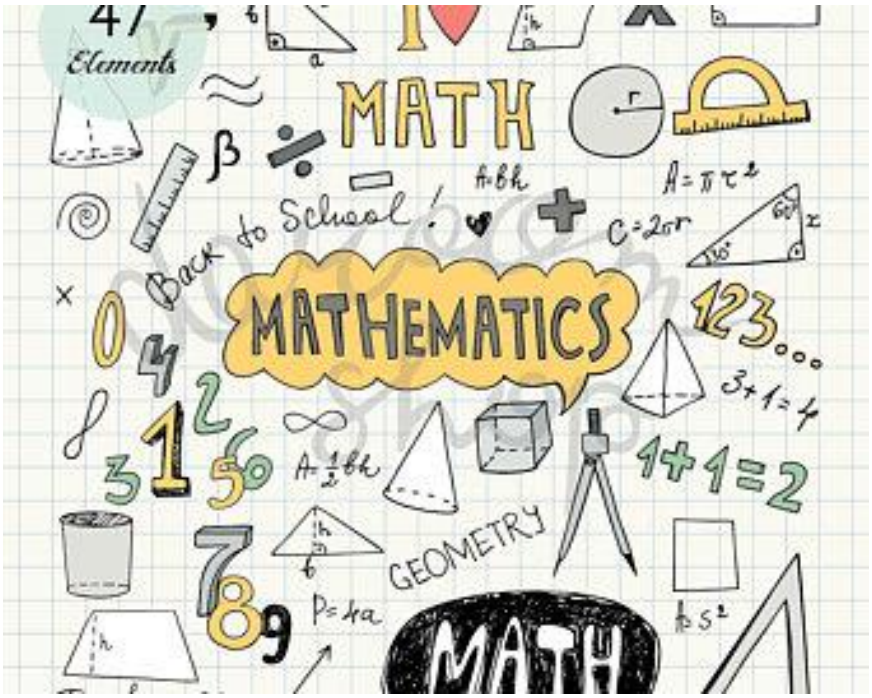
Form:

Each week covers topics you would complete in your 3 Maths lessons that week. Write out the title and LI and then complete the tasks.

All video links are online using the ClassCharts link.

The Knowledge Organiser on page 4 has further practice questions and page numbers linking to your pocket revision guides for all the key information and examples to help you with this unit.

Upload all work onto ClassCharts for feedback.



Contents

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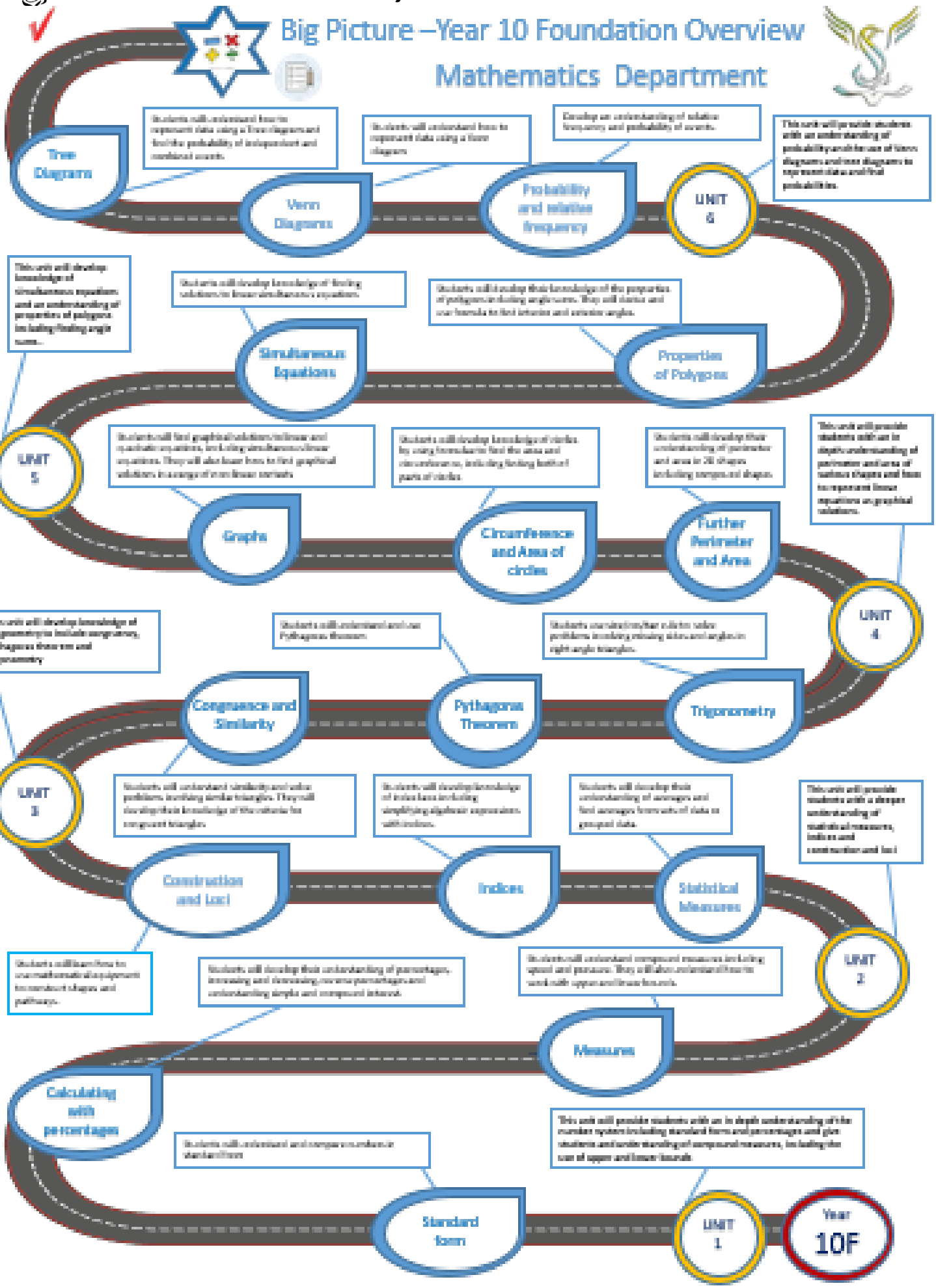
Big Picture –Year 10 Foundation Overview

Mathematics Department



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Year 10 - Foundation

Spring Two

Area and Perimeter, Circumference and Area of Circles, Graphs

Revision Guide pages:

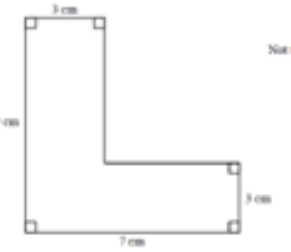
Area and Perimeter – 75, 76

Circumference and Area of Circles – 74

Graphs – 48 - 52

Task 1

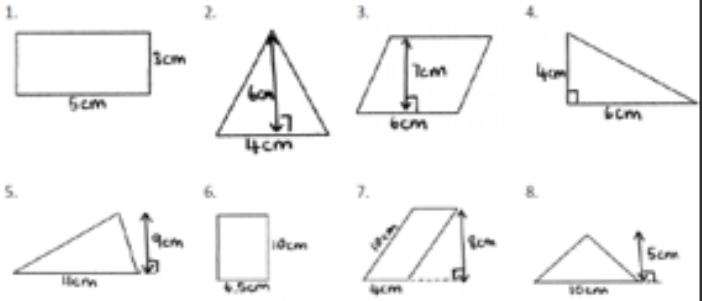
Calculate the area of this shape.



Not to scale

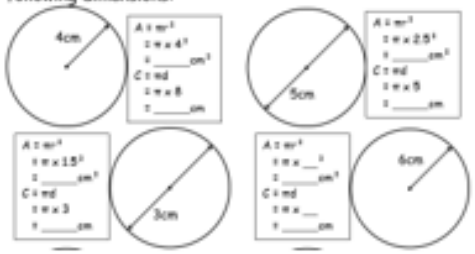
You **must** show all your working.

Task 2 – Find the area (and perimeter where possible) for each shape.

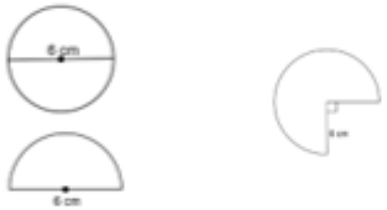


Task 3

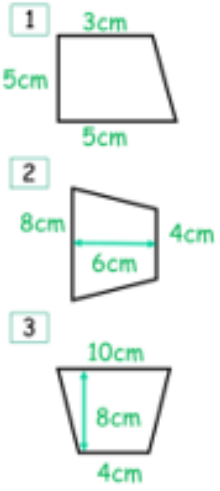
Calculate the area and circumference of the circles with the following dimensions:



Calculate the area in terms of π

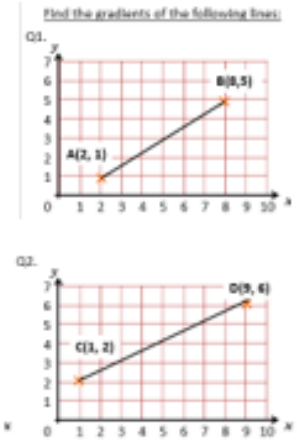


Task 4 – Calculate the area of each shape

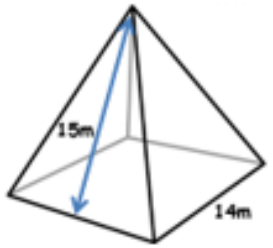


Task 5

Find the gradients of the following lines:



Task 6 – Calculate the surface area



Task 7

Circle the equation of the line that is parallel to the x-axis.

$y = -5$ $\quad x - y = 0$ $\quad x = 3$ $\quad x + y = 0$

(Total 1 mark)

Task 8

Work out the equation of the line that passes through

a) (1,5) and (6, 15)
b) (-1,-4) and (3, 16)

Task 9

Complete this table:

equation	gradient	y-intercept
$y = 3x + 4$		
$y = \frac{x}{2} - 5$		
$y = 2 - 3x$		
$y = x$		
$y = -2x - 7$		

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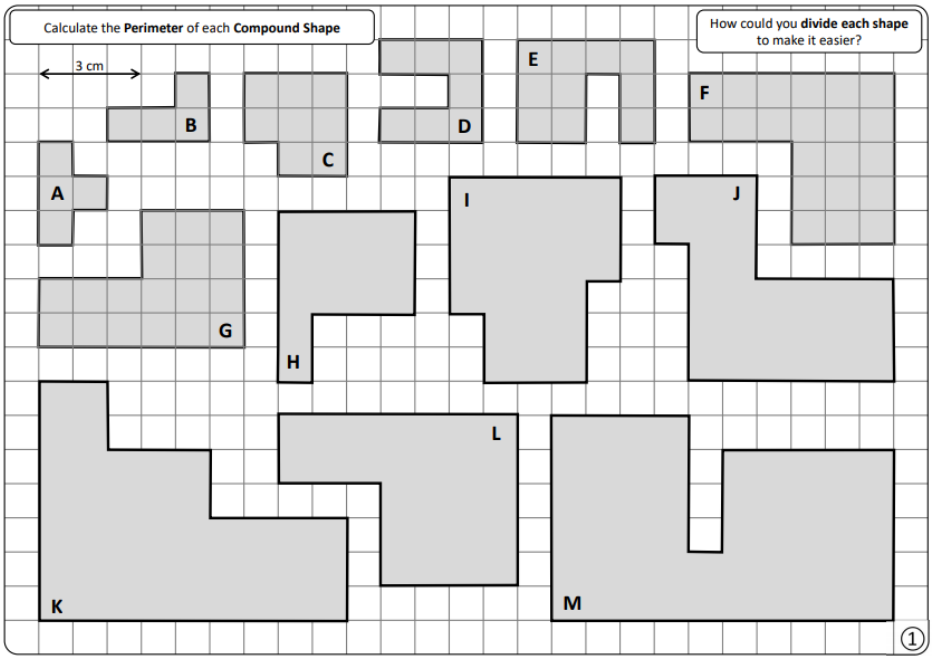
Week 1:

- **LI: I can calculate the perimeter of composite shapes**
- **LI: I can calculate the area of a triangle, parallelogram and trapezium**

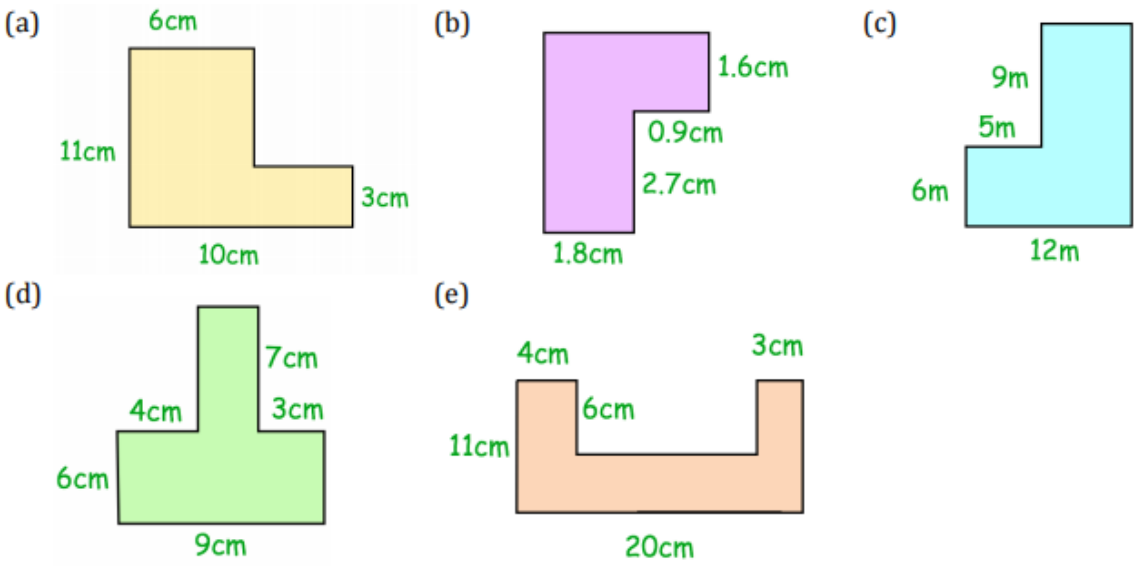
Demonstration Videos:

https://www.mathsgenie.co.uk/area-perimeter.html
https://corbettmaths.com/2013/12/20/area-of-a-triangle-video-49/
https://corbettmaths.com/2013/12/21/area-of-a-parallelogram-video-44/
https://corbettmaths.com/2012/08/02/area-of-a-trapezium-video/

Tasks: Perimeter



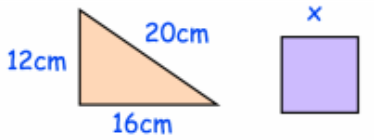
Question 7: Find the perimeter of each of these shapes



Challenges and Exam Practice:

Question 2: A rectangle has a perimeter of 18cm.
Write down a possible pair of values for its length and width

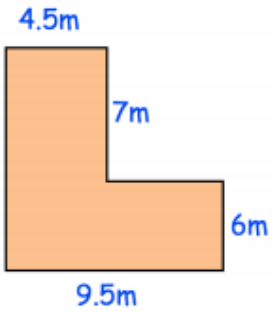
Question 3: The triangle and square have the same perimeter.
Find x



Question 5: The length of a rectangular field is 60m greater than the width of the field.
The field has a length of 310m.
Find the perimeter of the field.

Question 6: Felicity wants to place a wooden fence around her vegetable garden.
Each metre of fencing costs £5.80

Work out the cost of the new fence



11. The perimeter of the rectangle and the square are the same.

Find the width of the rectangle, x.

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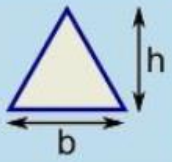
Tasks: Area of a Triangle, Parallelogram and Trapezium

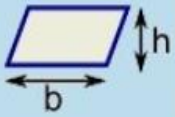


Triangle

Area = ½ × b × h

b = base

h = vertical height

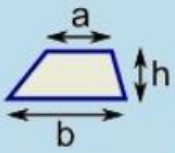


Parallelogram

Area = b × h

b = base

h = vertical height



Trapezoid (US)

Trapezium (UK)

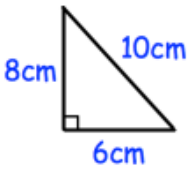
Area = ½(a+b) × h

h = vertical height

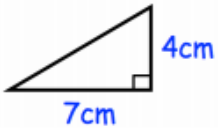
Task 1

Question 1: Find the area of each triangle.

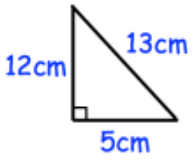
(a)



(b)



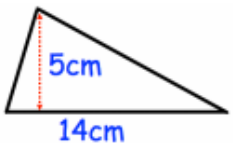
(c)



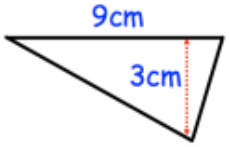
Question 2: Find the area of each triangle.

(a)

(b)



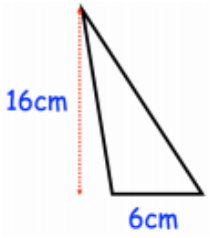
(c)



Question 3: Find the area of each triangle.

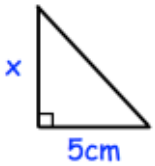
(a)

(b)

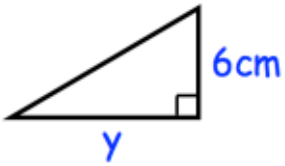


(c)

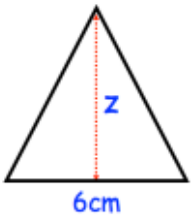
7: The area of the triangle is $20cm^2$, find x.



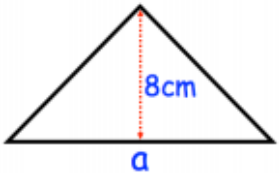
8: The area of the triangle is $30cm^2$, find y.



9: The area of the triangle is $12cm^2$, find z.

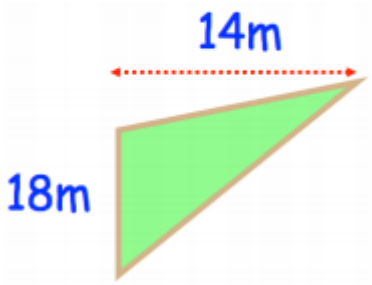


10: The area of the triangle is $56cm^2$, find a.



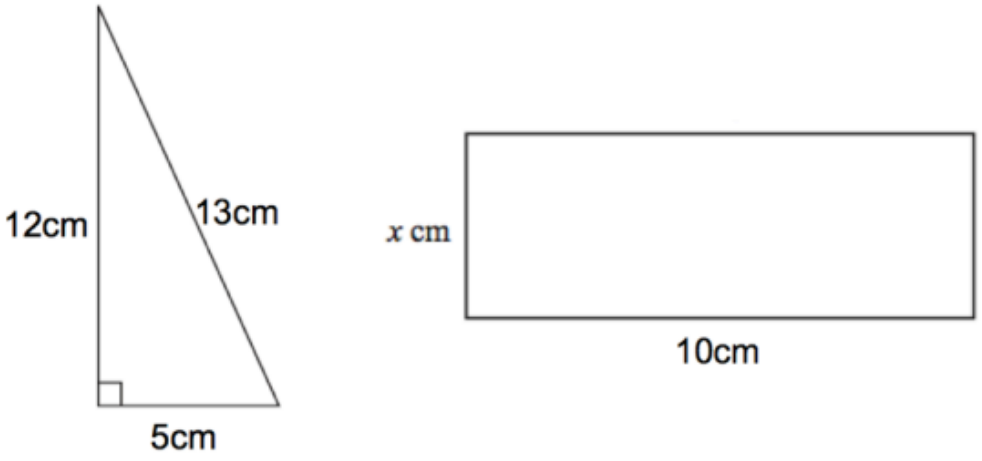
Challenge:

Question 4: Shown below is a triangular field.
Each chicken requires $3m^2$.
How many chickens can be kept in this field?



Exam Question

6. Below is a right-angled triangle and a rectangle.



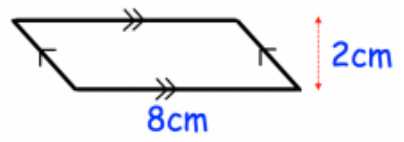
The area of the right-angled triangle is equal to the area of the rectangle.

Calculate x

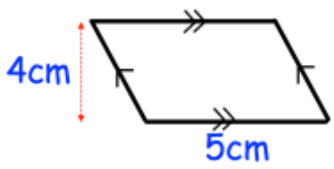
Task 2

Question 2: Work out the area of each of the parallelograms below.
Include suitable units.

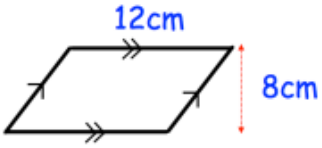
(a)



(b)



(c)



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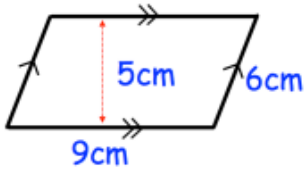

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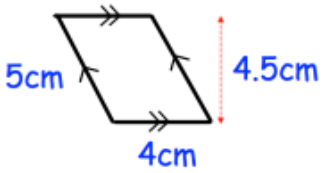
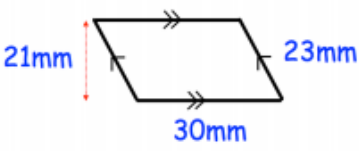
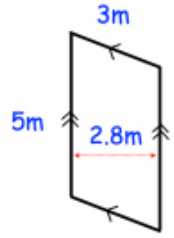


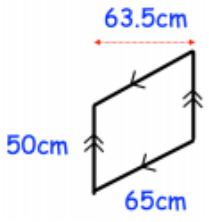
(f)



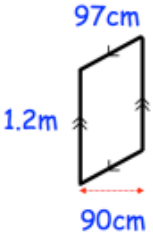
(g)



(h)

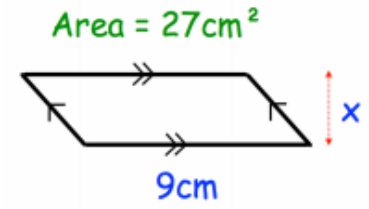


(i)



Question 4: The areas of each of the parallelograms has been given.
Calculate the length of the missing sides.

(a)



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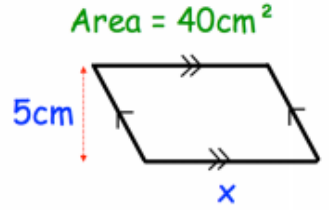

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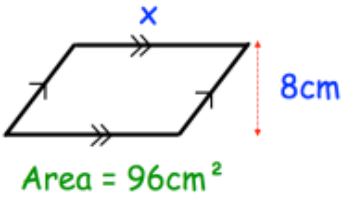
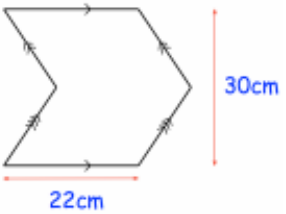
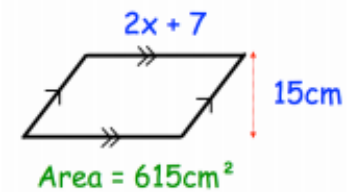


Challenge

Question 1: The logo below is created by joining two congruent parallelograms.
Calculate the area of the logo.



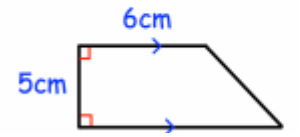
Question 2: Find x



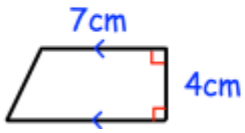
Task 3

Question 1: Find the area of each trapezium.

(a)



(b)



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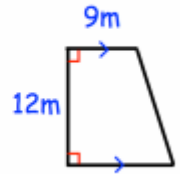
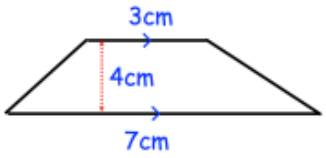
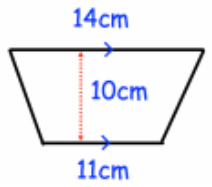


Question 2: Find the area of each trapezium.

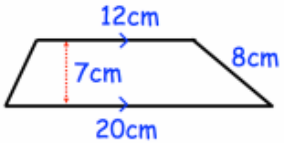
(a)



(b)



(c)



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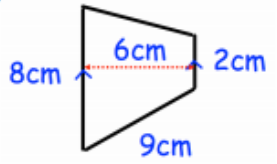
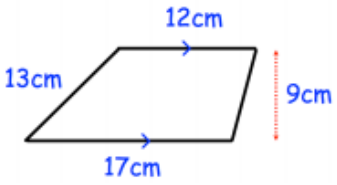


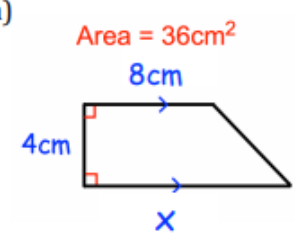
(e)

(f)

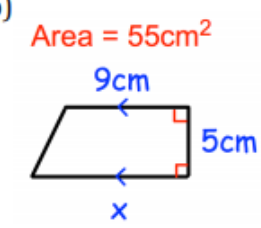


Question 4: Find x for each trapezium.

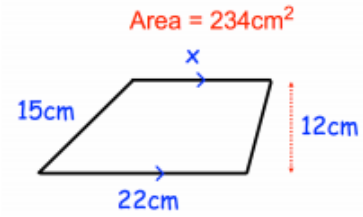
(a)



(b)

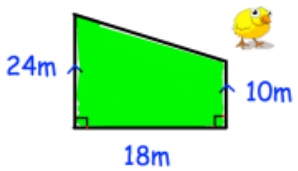


(c)

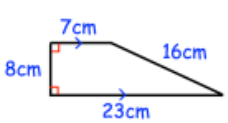


Challenge

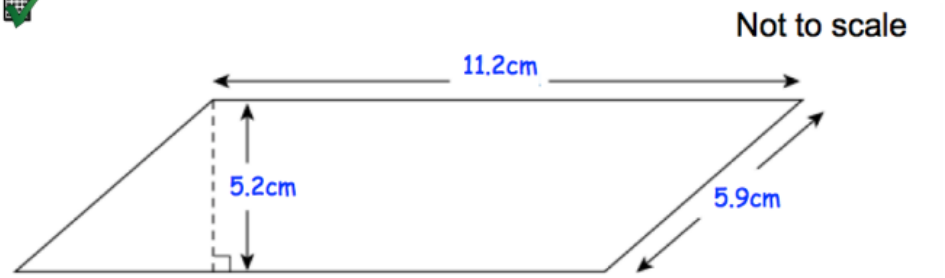
Question 2: Mr Taylor keeps chickens in the field shown.
Each chicken needs $3m^2$.
What is the maximum number of chickens he can keep in the field?



Question 3: The trapezium and the triangle have the same area.
Calculate the height of the triangle.

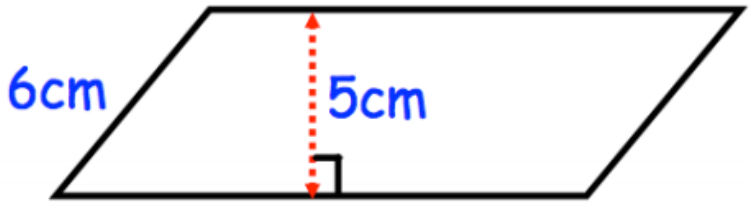


5. This diagram shows a parallelogram.



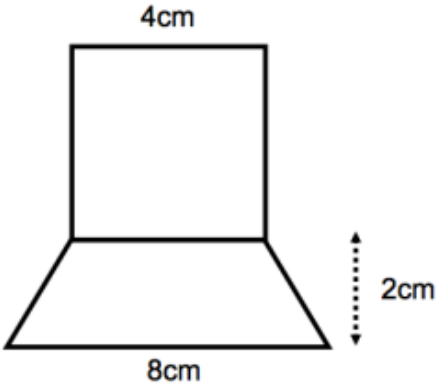
Calculate the area of this parallelogram.

7. The diagram shows a parallelogram that has perimeter 30cm.



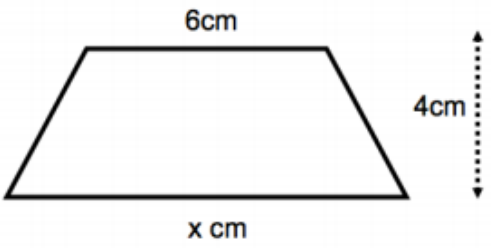
Calculate the area of the parallelogram.

6. A club logo is made from a square and a trapezium.



Calculate the area of the logo

5.



The area of the trapezium is 34cm².

Work out the value of x.

Stewards Academy

Week 2:

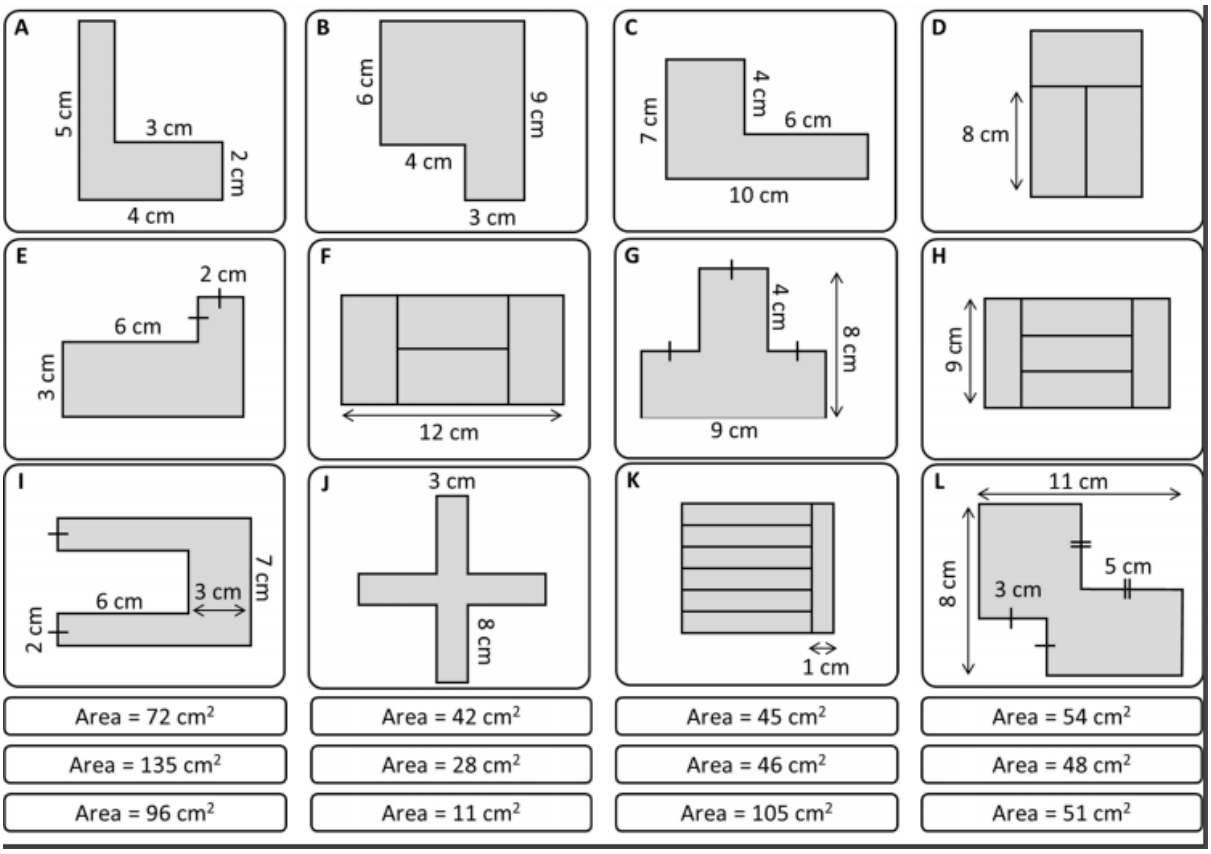
- **LI: I can calculate the area of a composite shape**
- **LI: I can calculate the surface area of a pyramid**

Demonstration Videos:

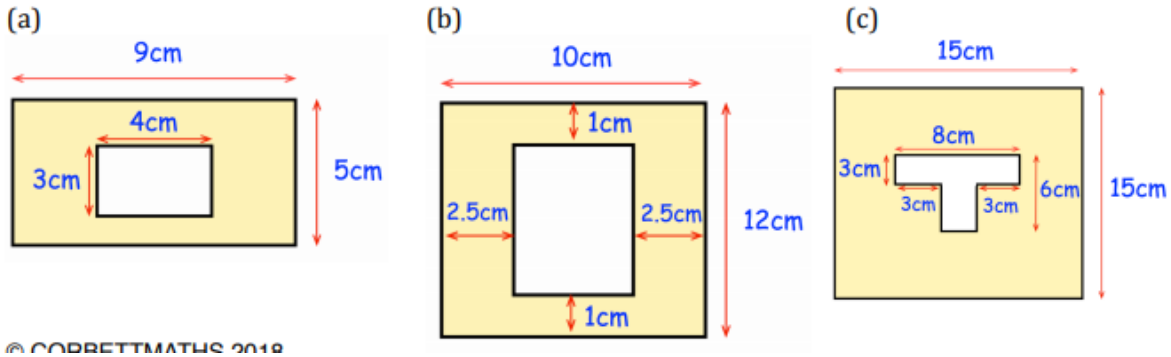
https://corbettmaths.com/2012/08/02/area-of-compound-shapes/
https://www.mathsgenie.co.uk/surfacearea.h
https://www.youtube.com/watch?v=vCf2yK4tzkk

Tasks: - Area of Composite Shapes

Task 1: Match the area of the shapes to the answers below

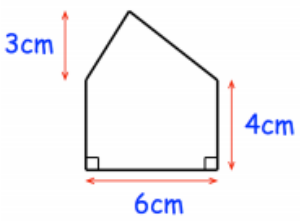


Question 2: Work out the shaded area.

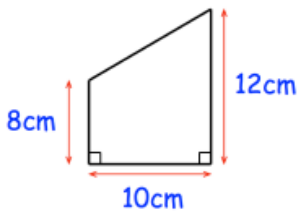


Question 3: Work out the area of each of these shapes.

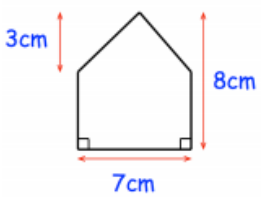
(a)



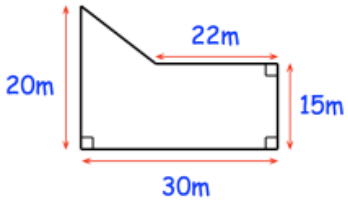
(b)



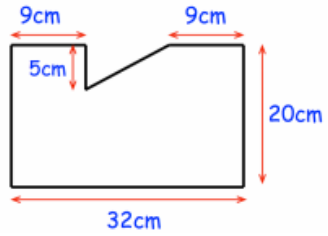
(c)



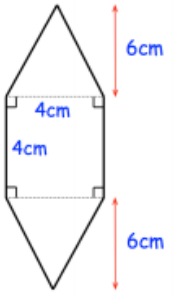
(d)



(e)

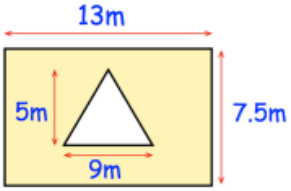


(f)

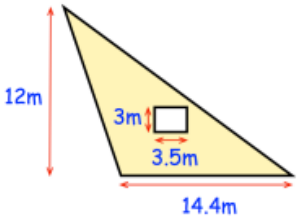


Question 4: Work out the shaded area.

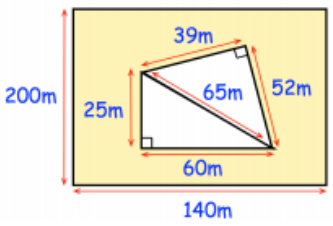
(a)



(b)



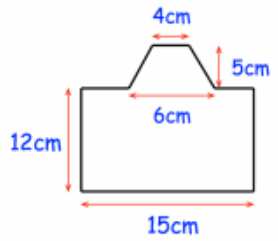
(c)



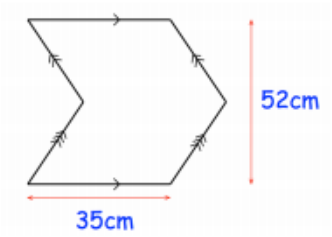
Question 5: Work out the area of each of these shapes.

Challenges:

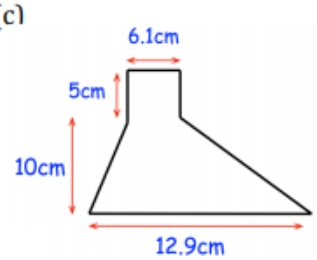
(a)



(b)



(c)



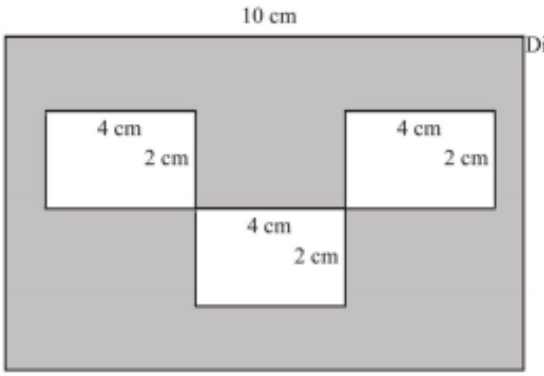


Diagram **NOT** accurately drawn

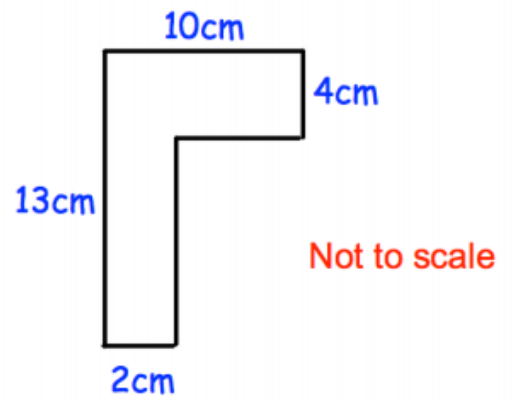
The diagram shows 3 small rectangles inside a large rectangle.
The large rectangle is 10 cm by 8 cm.
Each of the 3 small rectangles is 4 cm by 2 cm.

Work out the area of the region shown shaded in the diagram.

(Total 3 marks)

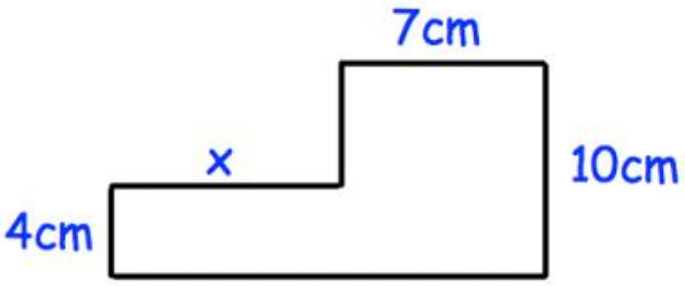
Exam Practice:

2. Shown is an L shape.



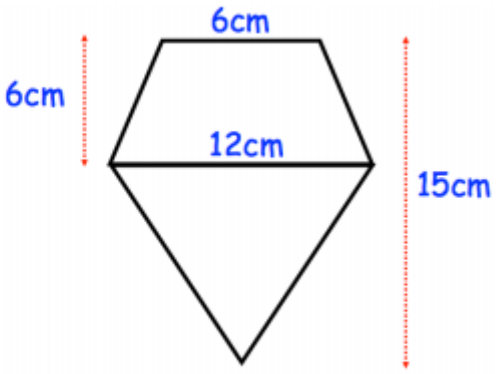
Calculate the area of the shape.

4.



The area of the compound shape is 106cm².
Work out the size of x.

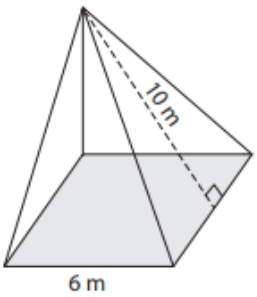
10. Bea makes a logo for a club in school.



Work out the area of the logo.

Tasks – Surface Area of a Pyramid

Example:



$$\text{Surface area} = \text{base area} + \frac{1}{2} \times \text{perimeter} \times \text{slant height}$$

$$\text{Base area} = \text{side} \times \text{side} = 6 \times 6 = 36 \text{ m}^2$$

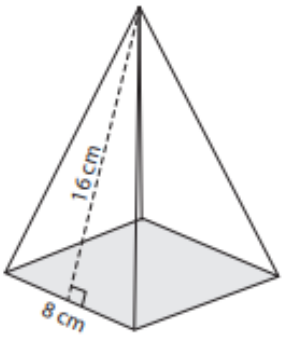
$$\text{Perimeter} = 4 \times \text{side} = 4 \times 6 = 24 \text{ m}$$

$$\text{Surface area} = 36 + \frac{1}{2} \times 24 \times 10$$

$$= \mathbf{156 \text{ m}^2}$$

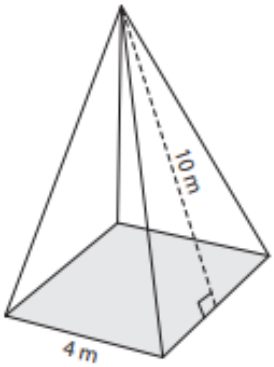
Find the surface area of each square pyramid.

1)



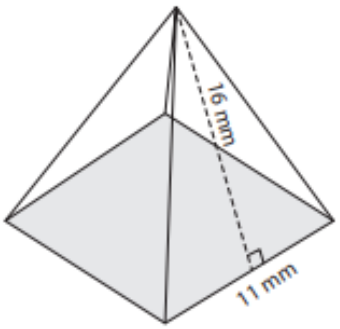
Surface Area = _____

2)



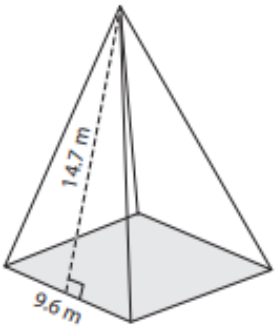
Surface Area = _____

3)



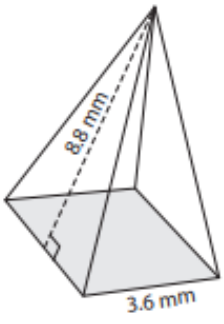
Surface Area = _____

4)



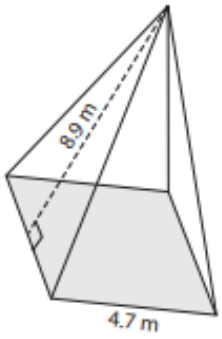
Surface Area = _____

5)



Surface Area = _____

6)



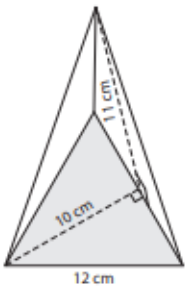
Surface Area = _____

Surface Area of Triangular Pyramids

Sheet 1

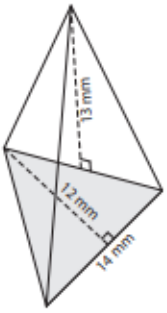
Find the surface area of each regular triangular pyramid.

1)



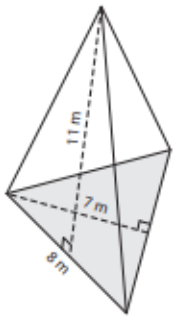
Surface Area = _____

2)



Surface Area = _____

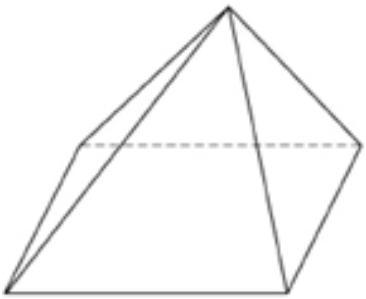
3)



Surface Area = _____

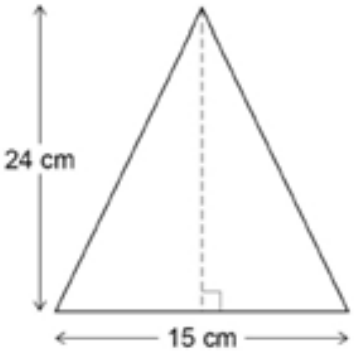
Exam Question

Fabric is used to make the four triangular faces of a pyramid.



Each triangular face has base 15 cm and perpendicular height 24 cm

Not drawn accurately



Cost of fabric £400 per square metre

Calculate the cost of the lampshade

Week 3:

- LI: I can use y = mx + c to identify the gradient and y-intercept of a line
- LI: I can find the equation of a line using one coordinate point and a known gradient
- LI: I can find the equation of a line using two given coordinate points

Demonstration Videos:

https://corbettmaths.com/2013/05/29/ymxc/
https://corbettmaths.com/2013/05/29/finding-the-equation-of-a-straight-line/
https://corbettmaths.com/2013/05/29/finding-the-equation-passing-through-two-points/

Key Information:

Memory

Equation of a straight line

$$y = mx + c$$

M is the gradient

(Remember you need two pairs of coordinates)

$$Gradient = \frac{Change\ in\ y}{Change\ in\ x} = \frac{y_2 - y_1}{x_2 - y_1}$$

C is the y-intercept

This is the value at which the line crosses the Y-axis

Tasks: Identifying the gradient and y intercept

Question 1: Write down the gradient of each of these lines.

(a) $y = 3x + 1$ (b) $y = 2x - 5$ (c) $y = 7x + 4$ (d) $y = 10x + 5$

(e) $y = x - 2$ (f) $y = 6x$ (g) $y = -4x + 3$ (h) $y = -3x - 7$

Question 2: Write down where each of these lines cross the y-axis (y-intercept)

(a) $y = 2x + 3$ (b) $y = 7x + 1$ (c) $y = 3x - 2$ (d) $y = x - 5$

(e) $y = 2x$ (f) $y = -4x + 6$ (g) $y = -5x - 3$ (h) $y = -3x$

Question 3: Write down the equation of the lines below

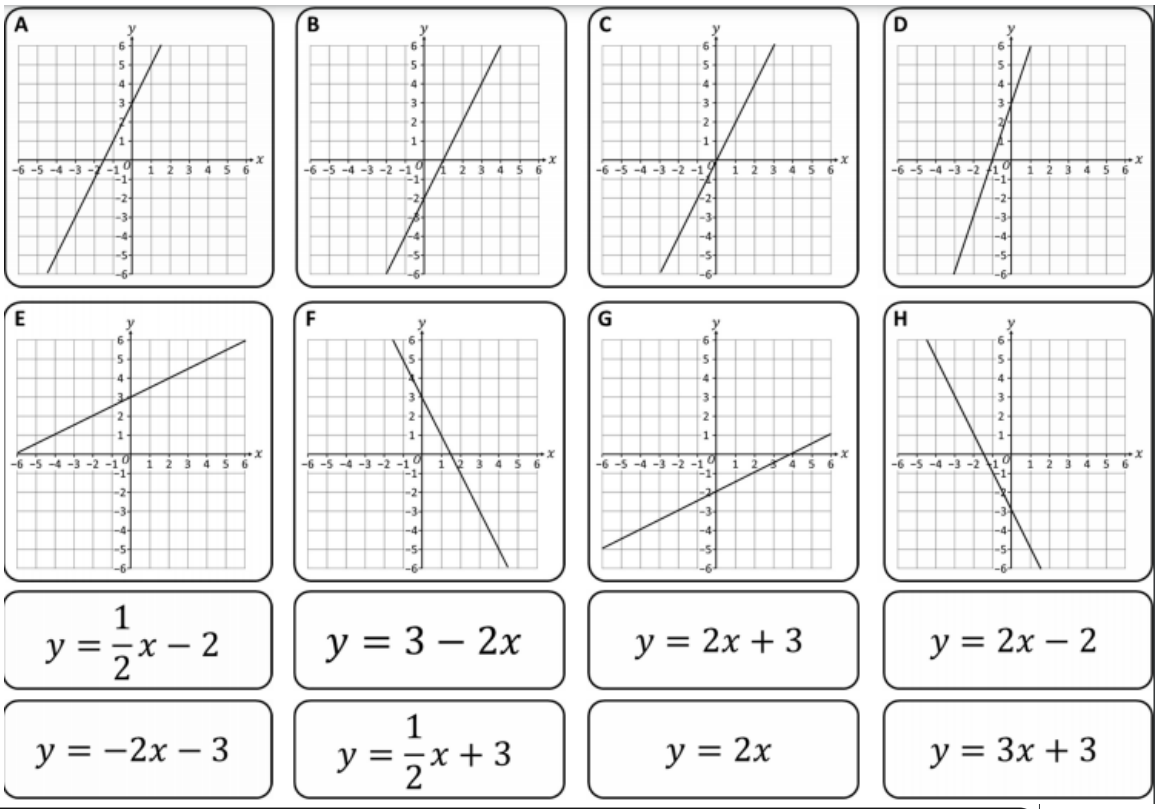
(a) gradient of 3 and y–intercept of 6 (b) gradient of 2 and y–intercept of –1

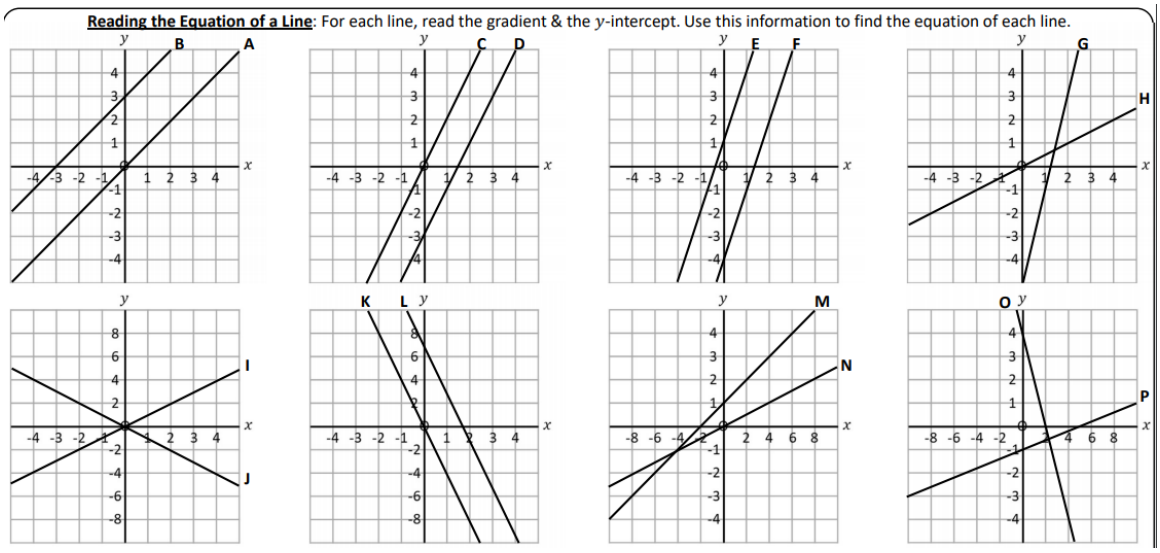
(c) gradient of –4 and y–intercept of 3 (d) gradient of 8 and y–intercept of 4

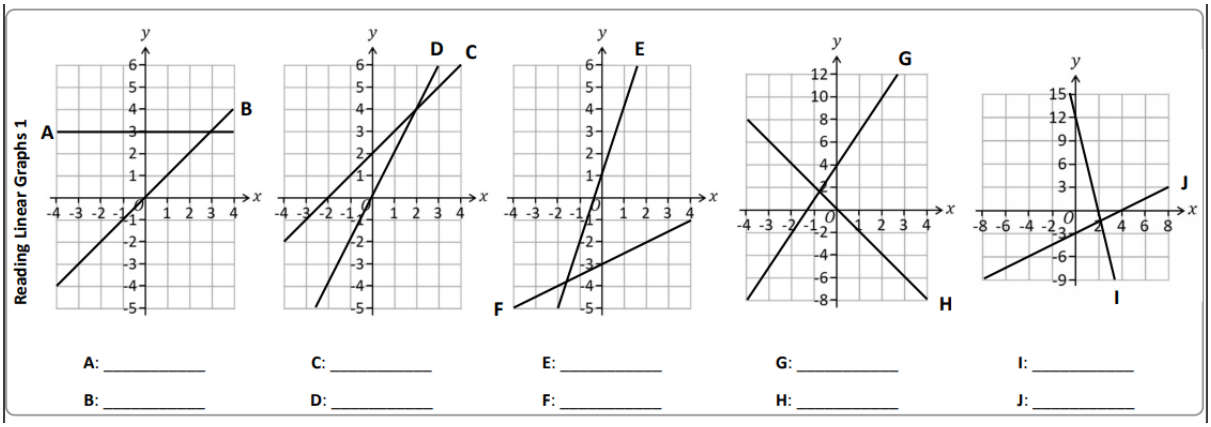
(e) gradient of 1 and passing though (0, 4) (f) passing through (0, –2) with gradient 4

(g) gradient of –5 and passing through the origin.

Task 2


A
B
C
D
E
F
G
H
$y = \frac{1}{2}x - 2$
$y = 3 - 2x$
$y = 2x + 3$
$y = 2x - 2$
$y = -2x - 3$
$y = \frac{1}{2}x + 3$
$y = 2x$
$y = 3x + 3$


Reading the Equation of a Line: For each line, read the gradient & the y-intercept. Use this information to find the equation of each line.
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P


Reading Linear Graphs 1
A
B
C
D
E
F
G
H
I
J
A: _____
B: _____
C: _____
D: _____
E: _____
F: _____
G: _____
H: _____
I: _____
J: _____

Challenge:

Decide if each card is **TRUE or FALSE!**

A The equation of a line in the form $y = mx + c$ tells us the gradient (m) and the y-intercept (c).	**B** $y = 4x + 7$ Gradient = 4 y-intercept = 6	**C** $y = \frac{1}{2}x - 3$ Gradient = 0.5 y-intercept = -3	**D** $-y = 2x + 6$ Gradient = 2 y-intercept = 6
E $2y = 6x + 2$ Gradient = 3 y-intercept = 1	**F** $y = 8 - 3x$ Gradient = 3 y-intercept = 8	**G** $3y = 2x - 9$ Gradient = 0.6 y-intercept = -3	**H** Every straight line has a positive or a negative gradient.
I $y - 2x = 5$ Gradient = -2 y-intercept = 5	**J** $4y = 3x$ Gradient = 0.75 y-intercept = 0	**K** $x + y = 4$ Gradient = -1 y-intercept = 4	**L** $2y = x - 14$ Gradient = $\frac{1}{2}$ y-intercept = -7
M $2y + 5 = x$ Gradient = 0.5 y-intercept = -2.5	**N** $5 - y = 7x$ Gradient = 7 y-intercept = -5	**O** $4x - 2y = 7$ Gradient = 2 y-intercept = -3.5	**P** $9 - 5x = -2y$ Gradient = 2.5 y-intercept = -4.5

Question 12: Find the gradients and the y-intercepts of each of these lines

(a) x + y = 10 (b) x – y = 4 (c) 2x + y = 6

(d) 3x – y = –1 (e) 8x + 2y + 9 = 0 (f) 5x – 2y – 4 = 0

(g) 7x = 1 – 2y (h) 15y – 6x = 8 (i) ⅔x + 2y = 5

(j) ⅕y – ½x = 1 (k) ⅔x + ¾y = 1½

Name

Find the gradient of the lines

8	-3	0.2	-6	0.5
3	-6	1	-5	3
7	6	4	-1	2
-1	-4	2	-0.5	0.5
2	-3	5	-2	1

2y = x + 2	2y = 4x + 2	y = 10 - 3x	y - 8x = 20
2y + x = 10	6x + y = 12	2y - x = 4	2y - 6x = 3
x = y + 4	2y = 10 - 10x	3y = 18x - 12	4y + 16x = 12
5y - x = 10	2y + 4x = 8	y - 2x = 8	3y = 20 - 18x
3y = 15x + 12	x + y = 4	3y - 12x = 15	2y - 14x = 14

TOTAL

Exam Practice:

A straight line has equation $y = 3x - 2$

(a) Write down the gradient of the line. (1)

(b) Write down the coordinates of the point where the line crosses the y axis. (1)

(2 marks)

A straight line has equation $y = 5 - 3x$

(a) Write down the gradient of the line. (1)

(b) Write down the coordinates of the point where the line crosses the y axis. (1)

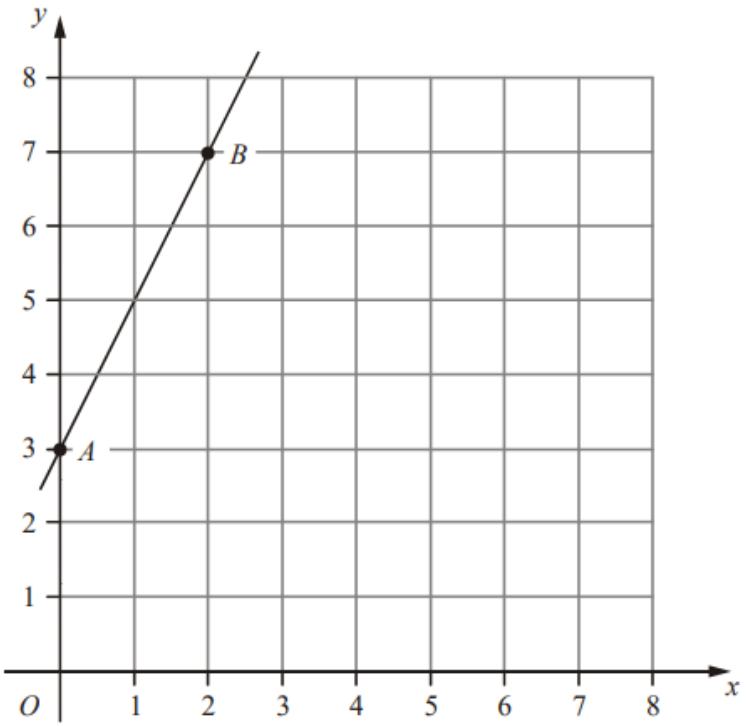
(2 marks)

A straight line has equation $2y - 10x = 8$

(a) Work out the gradient of this line. (2)

(b) Write down the equation of a line parallel to this line. (1)

(3 marks)



Find the equation of the line that passes through A and B.

(3 marks)

Tasks – Finding the Equation of a line given the gradient and one coordinate point.

Question 8: Find the equation of the straight line that:

(a) has a gradient of 4 and passes through the point (1, 10)

(b) has a gradient of 2 and passes through the point (−3, 3)

(c) has a gradient of 1 and passes through the point (5, 2)

(d) has a gradient of −3 and passes through the point (−2, 8)

(e) has a gradient of −5 and passes through the point (3, −1)

(f) has a gradient of ½ and passes through the point (4, 5)

(g) has a gradient of ⅖ and passes through the point (−5, −5)

(h) has a gradient of −⅔ and passes through the point (9, 15)

Challenge

Question 4:

(a) Does the point (2, 5) lie on the line $y = 3x - 1$?

(b) Does the point (4, 1) lie on the line $y = 3x + 1$?

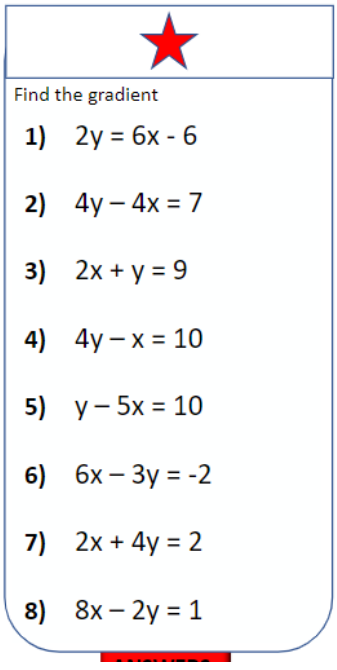
(c) Does the point (3, 1) lie on the line $y = x - 3$?

(d) Does the point (5, 7) lie on the line $y = -3x + 22$?

(e) Does the point (−4, −8) lie on the line $y = -2x$?

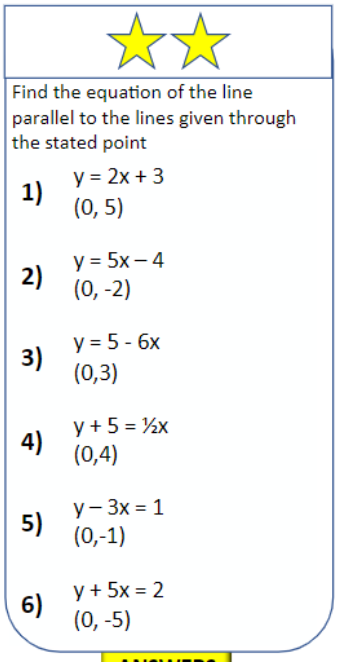
(f) Does the point (−1, 8) lie on the line $y = 2x + 11$?

(g) Does the point (12, 60) lie on the line $y = 7x - 18$?



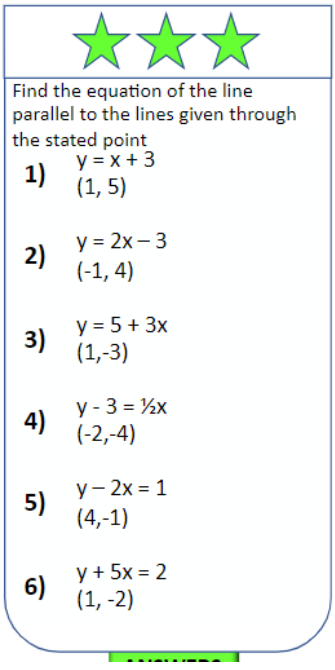
Find the gradient

1) $2y = 6x - 6$
2) $4y - 4x = 7$
3) $2x + y = 9$
4) $4y - x = 10$
5) $y - 5x = 10$
6) $6x - 3y = -2$
7) $2x + 4y = 2$
8) $8x - 2y = 1$



Find the equation of the line parallel to the lines given through the stated point

1) $y = 2x + 3$ (0, 5)
2) $y = 5x - 4$ (0, -2)
3) $y = 5 - 6x$ (0,3)
4) $y + 5 = ½x$ (0,4)
5) $y - 3x = 1$ (0,-1)
6) $y + 5x = 2$ (0, -5)



Find the equation of the line parallel to the lines given through the stated point

1) $y = x + 3$ (1, 5)
2) $y = 2x - 3$ (-1, 4)
3) $y = 5 + 3x$ (1,-3)
4) $y - 3 = ½x$ (-2,-4)
5) $y - 2x = 1$ (4,-1)
6) $y + 5x = 2$ (1, -2)

Exam Practice:

3 A line passes through the point (0, -5).
The gradient of this line is 3.
Write down the equation of this line.

(2 marks)

10. The equations of four lines are given below.

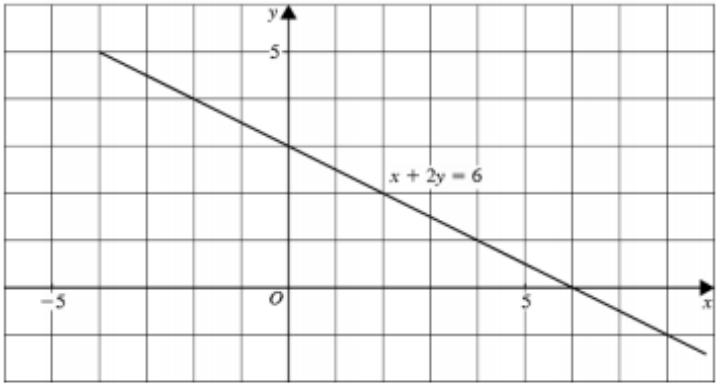
Line A	y = 4x + 1
Line B	y + 2x = 8
Line C	y = 9 – 2x
Line D	y – 3x = 3

Which lines go through the point (2, 9)?

.....

(2)

11 The line with equation $x + 2y = 6$ has been drawn on the grid.



(a) Rearrange the equation $x + 2y = 6$ to make y the subject. (2)

(b) Write down the gradient of the line with equation $x + 2y = 6$ (2)

(c) Write down the equation of the line which is parallel to the line with equation $x + 2y = 6$ and passes through the point with coordinates (0, 7). (1)

(5 marks)

16. A line has a gradient of –½ and passes through the point (–6, –8).
Find the equation of the line.

.....

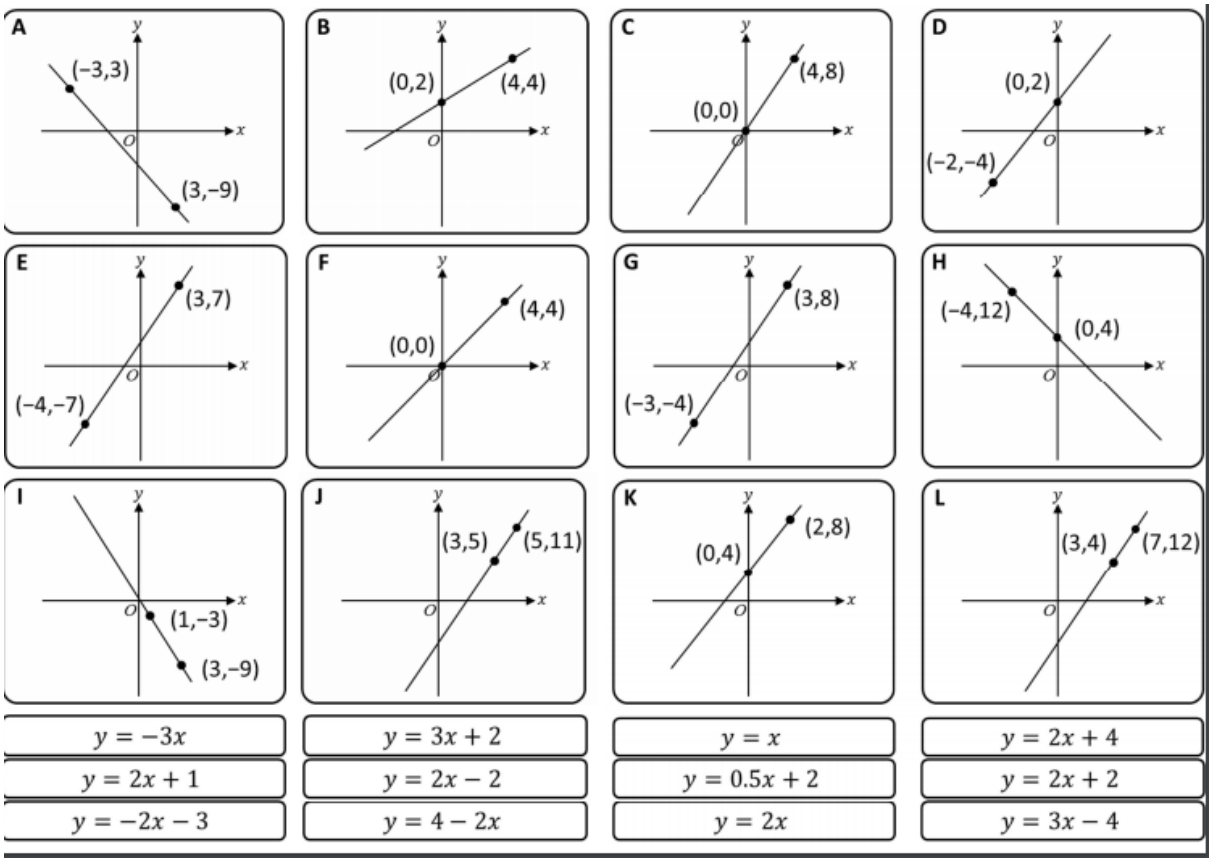
(3)

Stewards Academy

Tasks – Finding the equation of a line given two coordinate points

Finding the Equation of a Line from Coordinates Complete each column from left to right to find the equation of each line.

Point **A** coordinates	Point **B** coordinates	Change in x	Change in y	Gradient	Substitute **A** coordinates into $y = mx + c$ →	Solve to find c	Equation of the line **AB**
(4, 9)	(5, 11)	+1	+2	+2	$(\mathbf{9}) = 2(\mathbf{4}) + c$	+1	$y = 2x + 1$
(1, 5)	(2, 8)						
(4, 5)	(7, 11)						
(3, 8)	(−1, −4)						
(−1, −6)	(3, 10)						
(−2, −3)	(−4, −13)						
(4, −5)	(0, 3)						
(−2, −3)	(6, −11)						
(4, −19)	(−2, −1)						



Question 7: Find the equation of the straight line that passes through the points

(a) (0, 3) and (4, 19) (b) (0, 2) and (6, 20) (c) (0, 0) and (1, 4)

(d) (0, −9) and (9, 0) (e) (0, −6) and (7, 8) (f) (−8, −10) and (0, 14)

(g) (0, 2) and (10, 7) (h) (−4, 1) and (0, 7) (i) (−4, 0) and (0, 18)

Question 10: Find the equation of the straight line that passes through these pairs of points

(a) (2, 5) and (4, 11) (b) (−4, 2) and (1, 7) (c) (−5, −8) and (−4, −4)

(d) (−1, −2) and (−6, 3) (e) (−6, −4) and (−3, 2) (f) (3, 5) and (4, 1)

(g) (−5, 4) and (5, 2) (h) (1, 6) and (5, 4) (i) (−10, −5) and (−7, 4)

Challenge:

Question 2: Do the points (1, 4), (4, 10) and (9, 20) lie in a straight line?

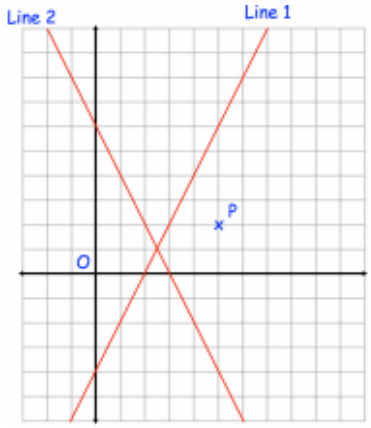
Question 3: A line has equation $y = 2x + 6$
The line crosses the x−axis at the point A
The line crosses the y−axis at the point B
The point C has coordinates (1, 8)

(a) Find the coordinates of the point A
(b) Find the coordinates of the point B
(c) Find the equation of the straight line passing through the points A and C.

Question 5: Line 1 has equation $y = 3x - 12$

(a) Find the coordinates of P

(b) Find the equation of Line 2



Exam Practice:

13. The point A (–3, 5) and the point B (1, –15) lie on the line L.

Find the equation of the line L.

14. The point A (1, 1) and the point B (5, –1) lie on the line L.

Find the equation of the line L.

Week 4:

- LI: I can identify parts of a circle
- LI: I can calculate the circumference of a circle
- LI: I can calculate the length of an arc
- LI: I can calculate the perimeter of a sector

Demonstration Videos:

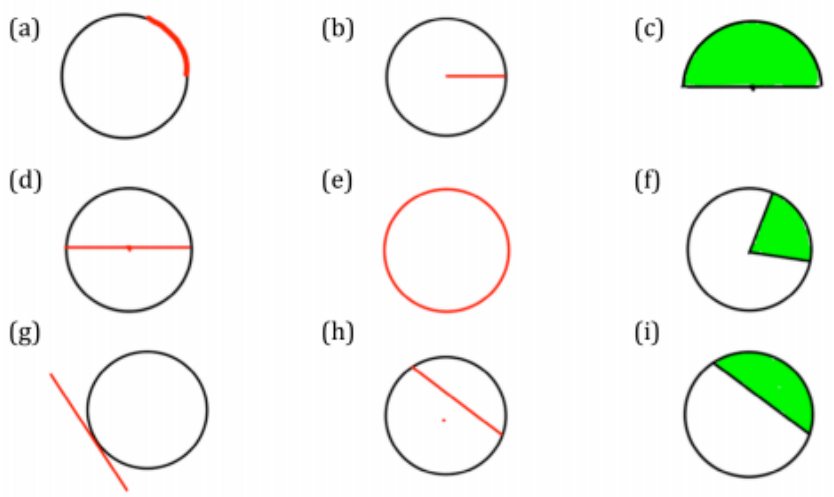
https://corbettmaths.com/2013/12/21/parts-of-the-circle-video-61/
https://corbettmaths.com/2013/12/21/circumference-video-60/
https://corbettmaths.com/2013/03/26/arc-length/
https://corbettmaths.com/2012/08/02/perimeter-of-a-semi-circle/

Tasks: Identifying parts of a circle

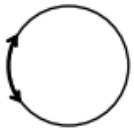
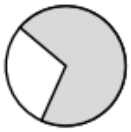
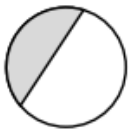
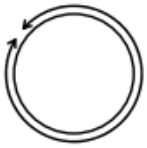
Circle Vocabulary: Match each word with its definition.

Arc	Line joining two points on a circumference.
Segment	Perimeter of a circle.
Chord	Part of a circle between a chord and an arc.
Radius	Line touching the circumference of a circle once.
Diameter	Distance from the centre of a circle to the edge.
Circumference	Part of the circumference of a circle.
Tangent	Part of a circle between two radii and an arc.
Sector	Width of a circle.

Question 1: Name the parts of the circle shown in each diagram



TRUE or **FALSE**? Cut out all 16 cards. Sort them into two piles: **TRUE & FALSE**

A  Center	**B** The diameter of a circle is twice the radius.	**C**  Diameter	**D**  Arc
E The area enclosed by a diameter & an arc is a semi-circle.	**F** A chord divides a circle into two sectors.	**G**  Major sector	**H** A sector has an angle at the centre of more than 90°.
I  2 radii	**J** The area enclosed by a chord & an arc is called a segment.	**K** The circumference of a circle is over 3 times the diameter.	**L**  Minor segment
M An arc is part of the perimeter of a circle.	**N**  Circumfrence	**O**  Tangent	**P** The radius of a circle is longer than any chord in the circle

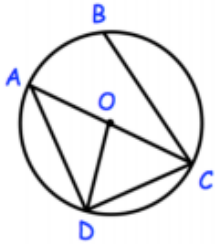
Challenges:

Question 3: Draw a circle with

(a) A radius of 4cm (b) A radius of 6cm (c) A diameter of 6cm

(d) A diameter of 10cm (e) A radius of 2.5cm (f) A diameter of 8.4cm

Question 4: Shown is a circle, centre O. What is the name given to each of the following straight lines.

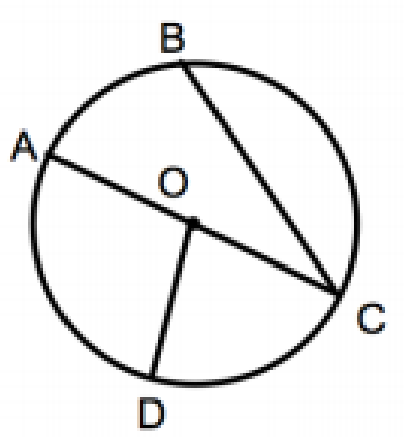


(a) OA (b) AC (c) CO (d) CD

(e) CA (f) OD (g) AD (h) BC

Exam Practice:

3. Points A, B, C and D are four points on the circle with centre O.



Here are six words that are used with circles.

Arc **Diameter** **Chord** **Tangent** **Circumference** **Radius**

Choose the correct word to describe each line below.

(a) The straight line AC is a ..... of the circle.

(1)

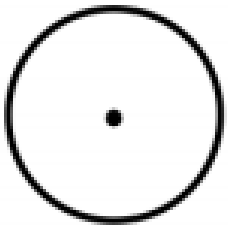
(b) The straight line OD is a ..... of the circle.

(1)

(c) The straight line BC is a ..... of the circle.

(1)

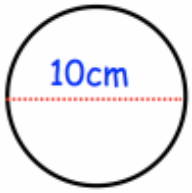
(d) Draw a sector of the circle below.

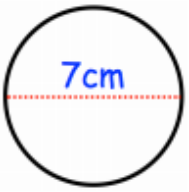


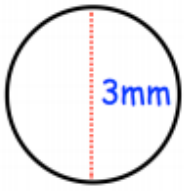
(1)

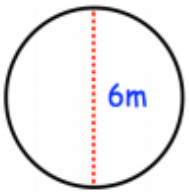
Tasks – Finding the Circumference of a Circle

Question 1: Calculate the circumference of the following circles.
Give your answers to 1 decimal place.

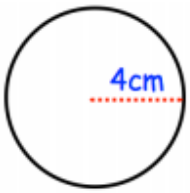
(a) 

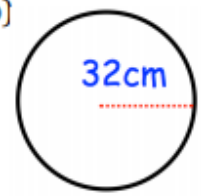
(b) 

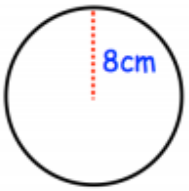
(c) 

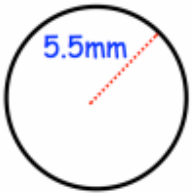
(d) 

Question 2: Calculate the circumference of the following circles.
Give your answers to 1 decimal place.

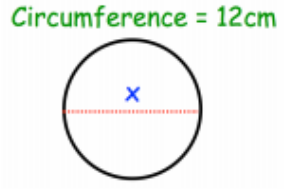
(a) 

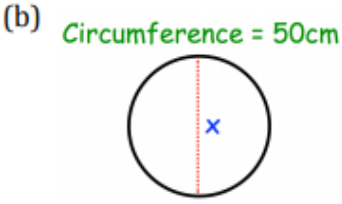
(b) 

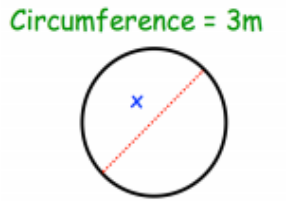
(c) 

(d) 

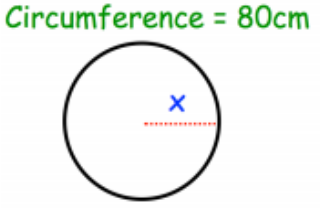
Question 7: Find the size of the diameter for each of the following circles.
Give your answer to 2 decimal places.

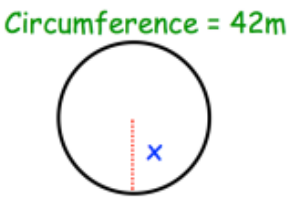
(a) 

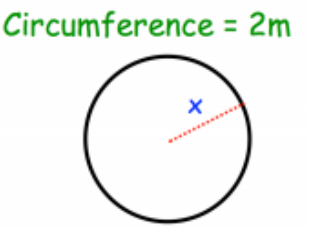
(b) 

(c) 

Question 8: Find the size of the radius for each of the following circles.
Give your answer to 2 decimal places.

(a) 

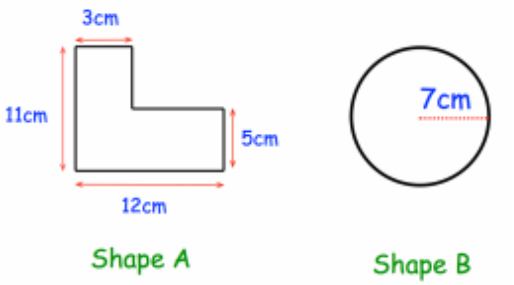
(b) 

(c) 

Challenge:

Question 3: A bicycle wheel has a diameter of 62cm. The wheel makes 80 complete revolutions.
How far has the bicycle travelled?
Give your answer in metres.

Question 4: Which shape has the greatest perimeter?



Exam Practice

3 A circle has a radius of 6.5 cm.
Work out the circumference of the circle.
Give your answer correct to 2 decimal places.

(Total for question 3 is 3 marks)

4 A circle has a diameter of 9 m.
Work out the area of the circle.
Give your answer correct to 1 decimal place.

(Total for question 4 is 3 marks)

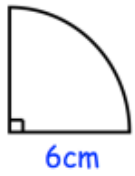
Tasks: Finding the length of an arc

Key Information:

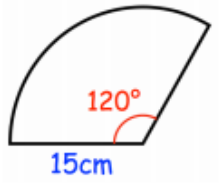
$$Length\ of\ an\ Arc = \frac{\theta}{360} \times \pi d$$ (d is the circumference of the circle, θ is the angle)

Question 1: For each sector below, calculate the length of the arc.
Give your answers to one decimal place and include suitable units.

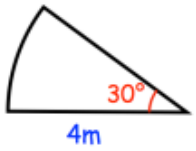
(a)



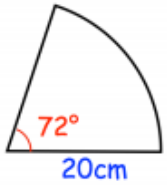
(b)



(c)

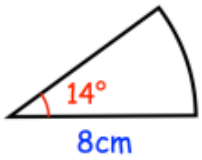


(d)

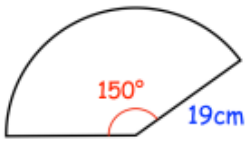


Question 2: For each sector below, calculate the length of the arc.
Give your answers to one decimal place and include suitable units.

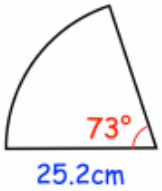
(a)



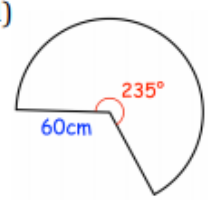
(b)



(c)

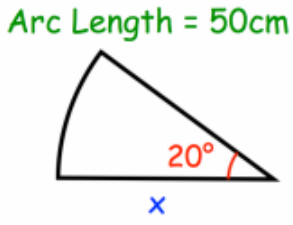


(d)

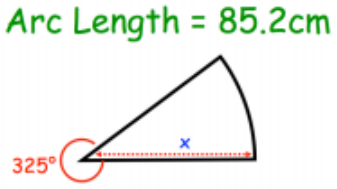


Question 6: The arc length of each sector has been given.
Calculate x
Give your answers to one decimal place and include suitable units.

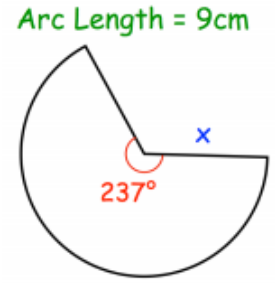
(a)



(b)

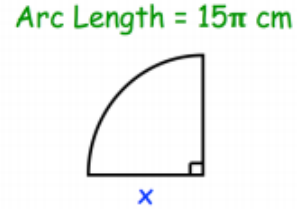


(c)

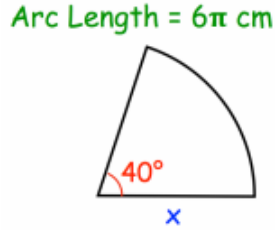


Question 7: The arc length of each sector has been given.
Calculate x

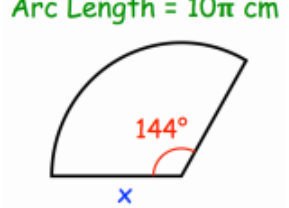
(a)



(b)



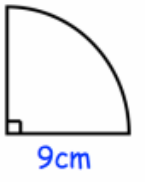
(c)



Tasks: Calculating the perimeter of a sector

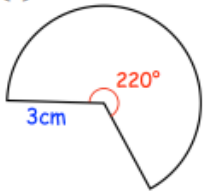
Question 4: Calculate the perimeter of each sector below
Give your answers to one decimal place and include suitable units.

(a)

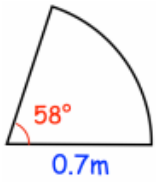


(b)

(c)

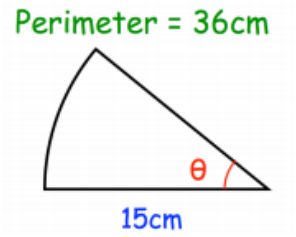


(d)

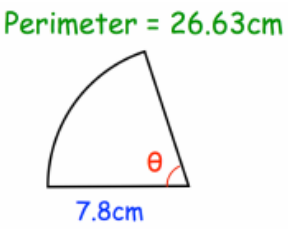


Question 9: The perimeter of each sector has been given.
Calculate the size of the angle
Give your answers to one decimal place.

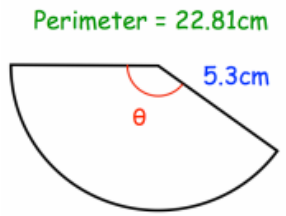
(a)



(b)

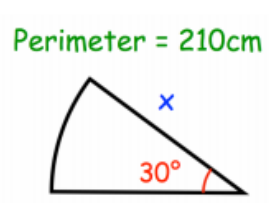


(c)

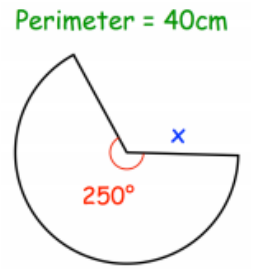


Question 10: The perimeter of each sector has been given.
Calculate x
Give your answers to one decimal place.

(a)

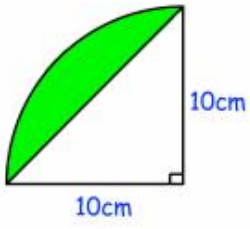


(b)

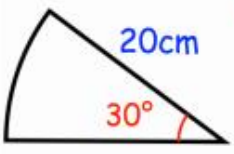


Challenges

Question 1: Calculate the perimeter of the segment.



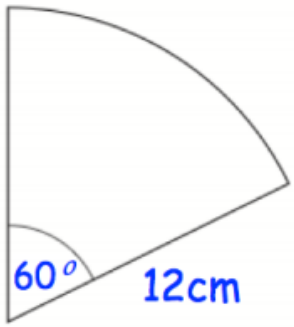
Question 2: James is calculating the perimeter of the sector.
Can you spot any mistakes?



$$Perimeter = \frac{30}{360} \times \pi \times 20 = 5.236cm$$

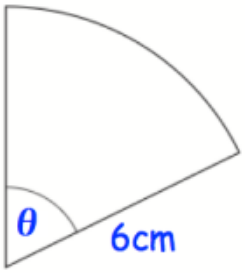
Exams Questions:

3. Shown is a sector of a circle.



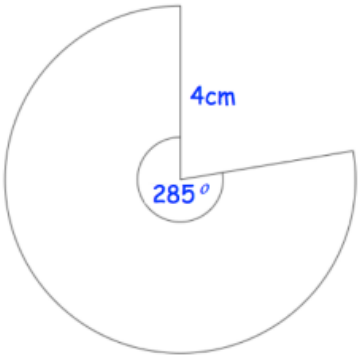
Calculate the length of the arc.

7. Shown is a sector.



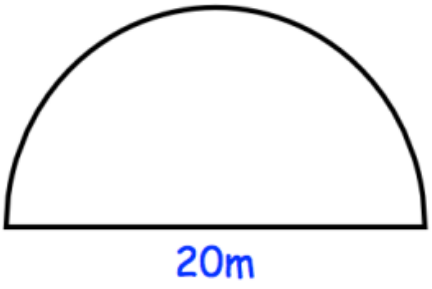
The arc length is 4.4cm.
Calculate the size of the angle.

6.



Calculate the perimeter of the sector.

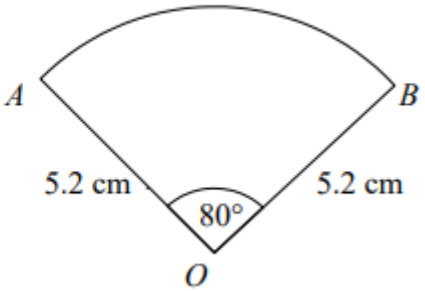
1. A semi-circle has diameter 20cm.



Taking π = 3.14, calculate the perimeter of the semi-circle.

6 AOB is a sector of a circle, centre O and radius 5.2 cm.
The angle of the sector is 80°.

Find the **perimeter** of the sector.
Give your answer correct to
3 significant figures.



(3 marks)

Week 5:

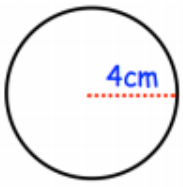
- LI: I can calculate the area of a circle and parts of a circle
- LI: I can calculate the area of a sector
- LI: I can solve circle problems in terms of Pi

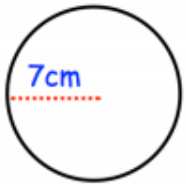
Demonstration Videos:

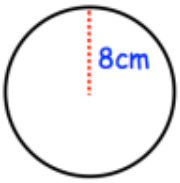
https://corbettmaths.com/2013/12/22/area-of-a-circle-video-40-and-59/
https://www.youtube.com/watch?v=jmFw7xZNZ_I – **Area of a sector**
https://www.youtube.com/watch?v=rPen5F-iaC4 – **Circumference in terms of Pi**
https://www.youtube.com/watch?v=k5hn5dWARGw – **Area in terms of Pi**
https://www.mathsgenie.co.uk/sectors-and-arcs.html

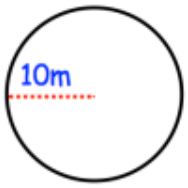
Tasks: Area of a Circle:

Question 1: Calculate the area of the following circles. Give your answers to 1 decimal place.

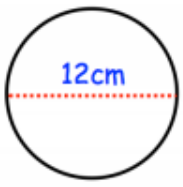
(a) 

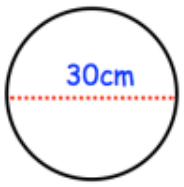
(b) 

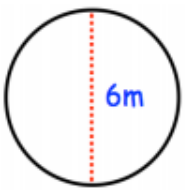
(c) 

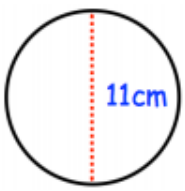
(d) 

Question 2: Calculate the area of the following circles. Give your answers to 1 decimal place.

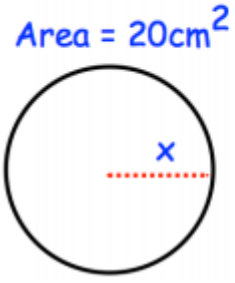
(a) 

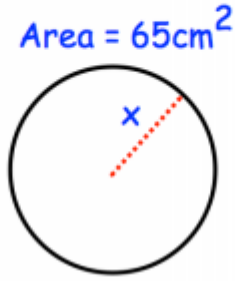
(b) 

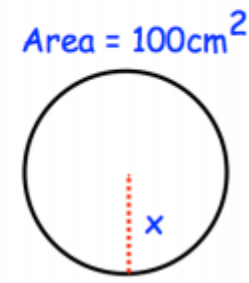
(c) 

(d) 

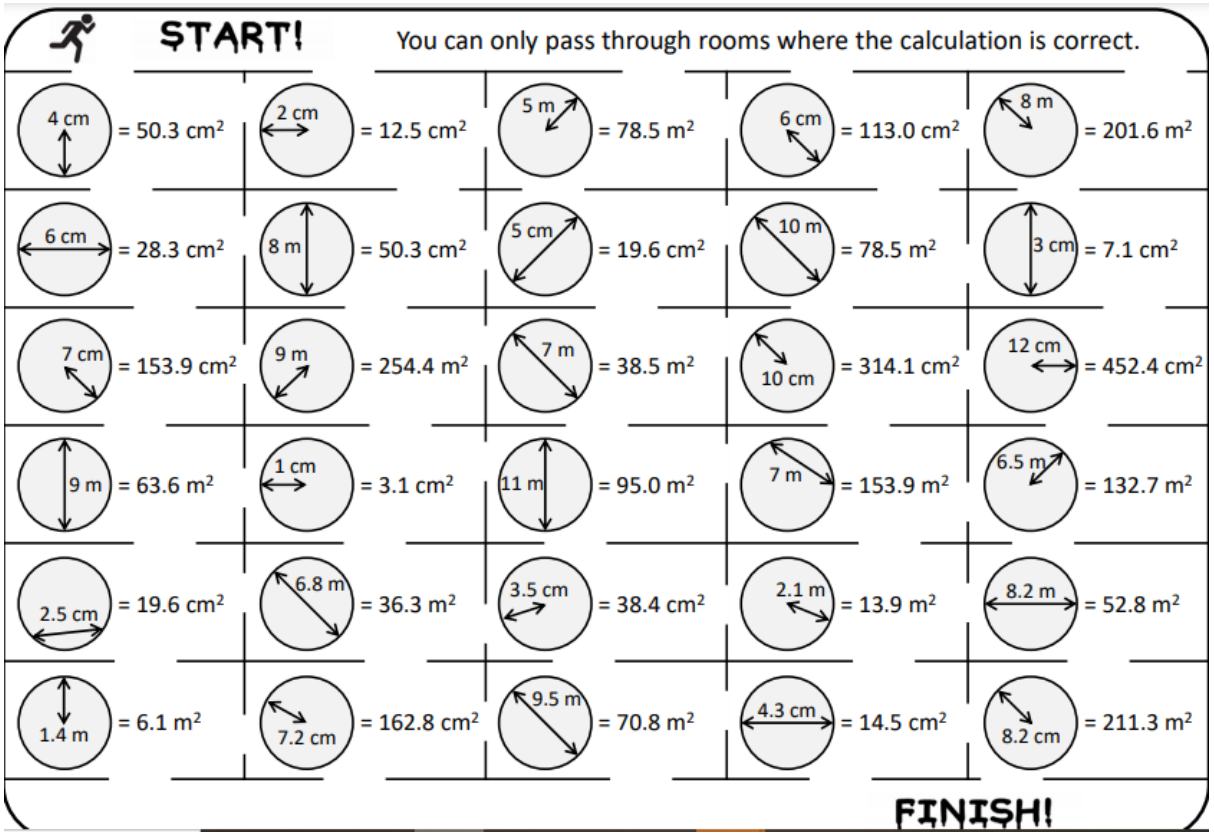
Question 7: Find the size of the radius for each of the following circles.
Give your answer to 2 decimal places.

(a) 

(b) 

(c) 

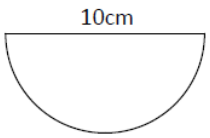
(d)



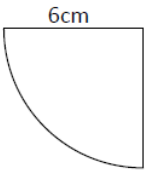
Challenge:

2. Find the **area** and **perimeter** of these shapes made from fractions of circles.

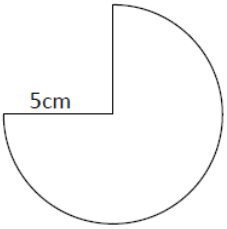
a)



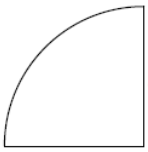
b)



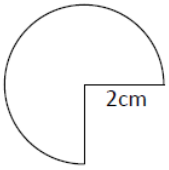
c)



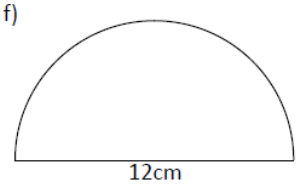
d)



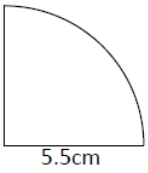
e)



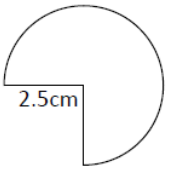
f)



g)

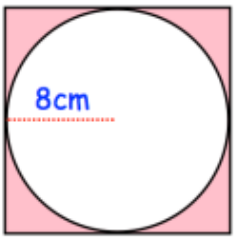


h)

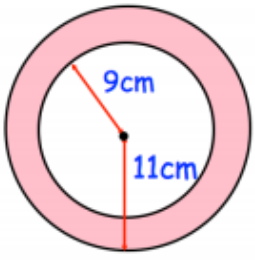


Question 4: Calculate the shaded area for each shape below.

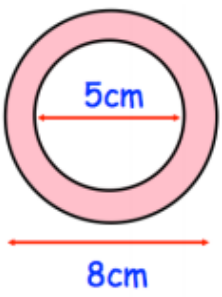
(a)



(b)

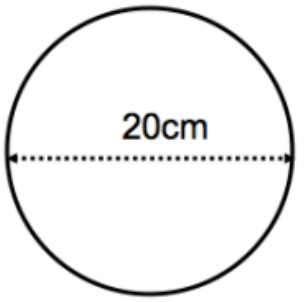


(c)



Exam Questions:

3. A circle has a diameter of 20cm.



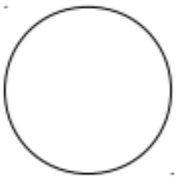
Work out the area of the circle.
Use π = 3.14

7 A semi-circle has an area of 50 m^2.

Find the perimeter of the semi-circle.
Give your answer correct to one decimal place.

(Total for question 7 is 3 marks)

8 A circular field has a diameter of 32 metres.
A farmer wants to build a fence around the edge of the field.

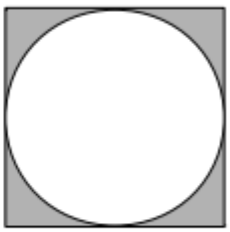


Each metre of fence will cost £15.95

Work out the total cost of the fence.

(Total for question 8 is 3 marks)

13 A circle is enclosed by a square as shown in the diagram.



Each side of the square measures 8cm.

Find the area of the shaded region.

Give your answer correct to 1 decimal place.

(Total for question 13 is 3 marks)

Stewards Academy

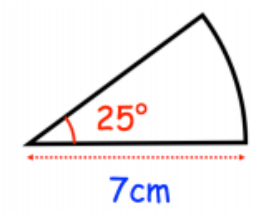
Tasks: Area of a Sector

Key Information:

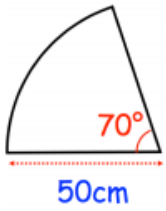
$$Area\ of\ a\ sector = \frac{\theta}{360} \times \pi r^2$$ (r is the radius of the circle, θ is the angle)

Question 2: Calculate the area of each of these sectors.
Give each answer to 2 decimal places and include suitable units.

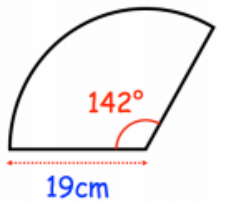
(a)



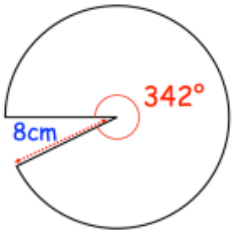
(b)



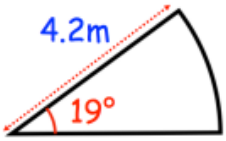
(c)



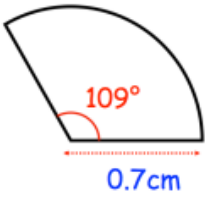
(d)



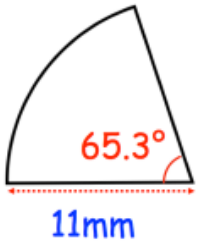
(e)



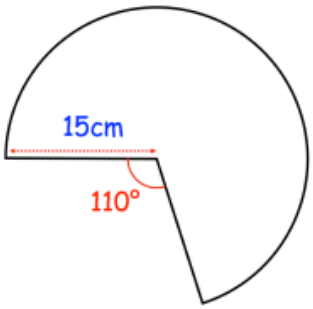
(f)



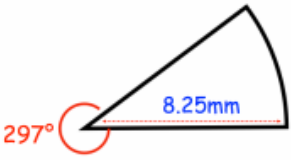
(g)



(h)

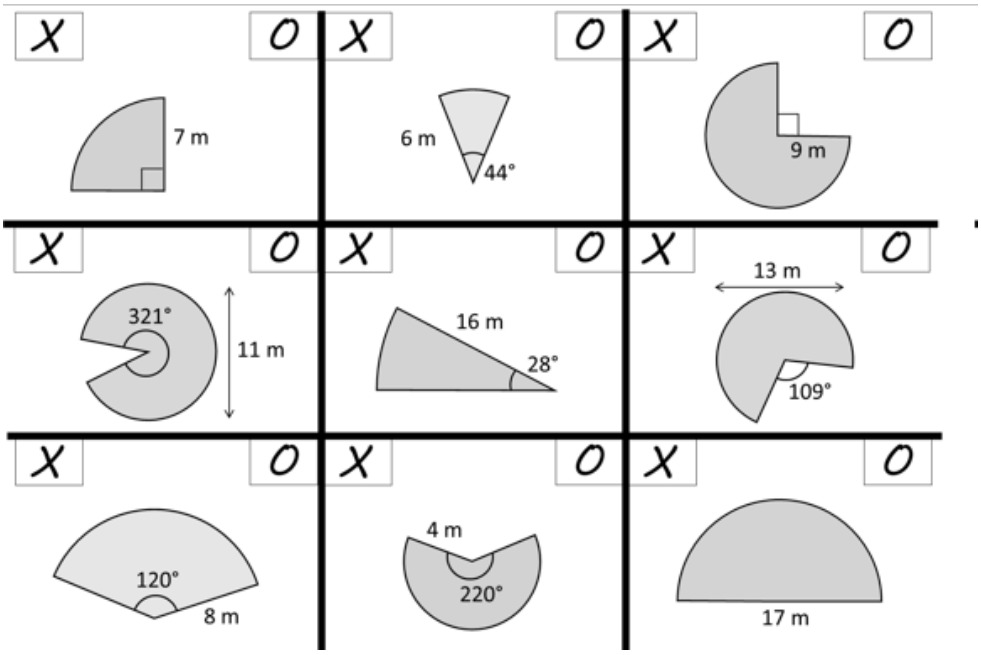


(i)



Question 3

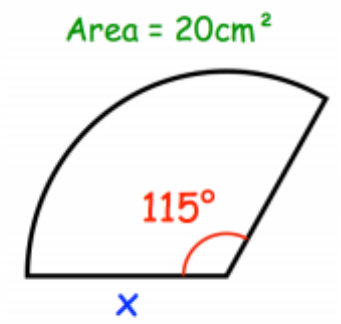
Find the area of each of these sectors



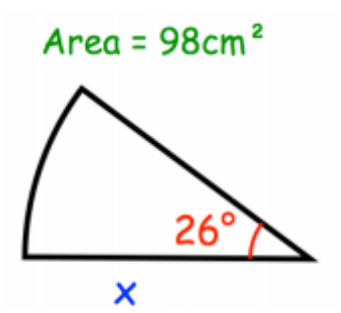
Challenges:

Question 4: The areas of these sectors have been given.
Calculate x.

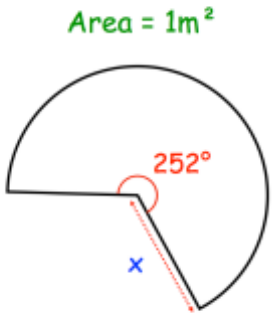
(a)



(b)

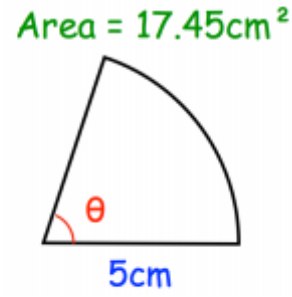


(c)

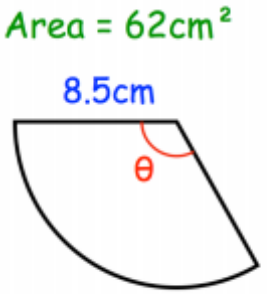


Question 5: The areas of these sectors have been given.
Calculate the missing angles.

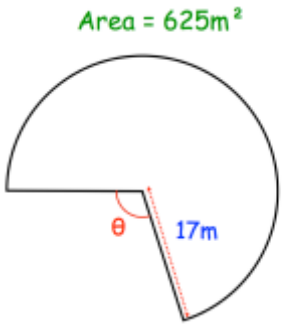
(a)



(b)



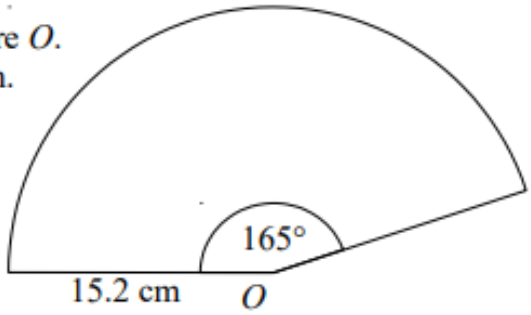
(c)



Exam Practice:

3 The diagram shows a sector, centre O.
The radius of the circle is 15.2 cm.
The angle of the sector is 165°.

Calculate the area of the sector.
Give your answer correct to
3 significant figures.



(3 marks)

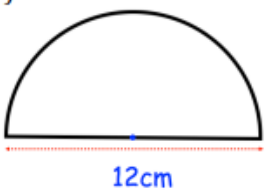
Tasks: Area problems in terms of Pi

Question 6: Work out the area of the following circles. Leave your answer in terms of π

(a) A circle with radius 7cm
(b) A circle with radius 1cm
(c) A circle with diameter 10cm
(d) A circle with radius 3cm
(e) A circle with diameter 4cm

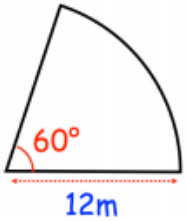
Question 3: Find the area of these sectors.
Leave your answer in terms of **π**

(a)

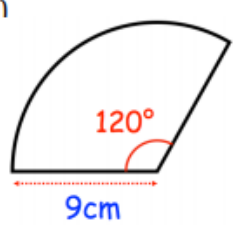


(b)

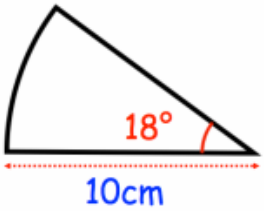
(c)



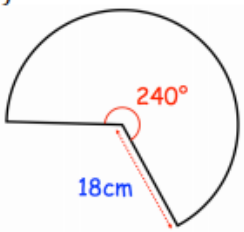
(d)



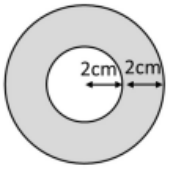
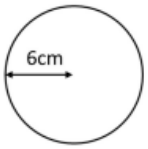
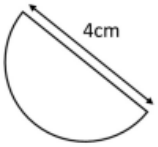
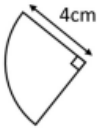
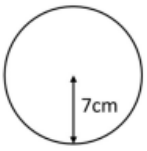
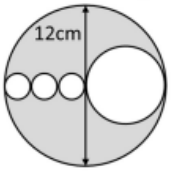
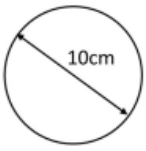
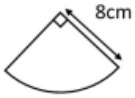
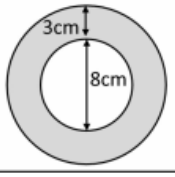
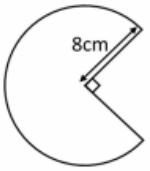
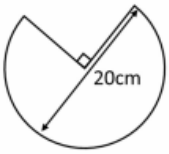
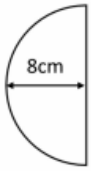
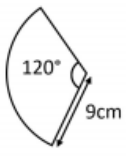
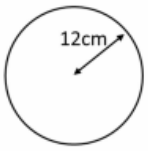
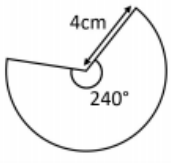
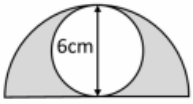
(e)



(f)



Match the questions to the answers given

What is the area of the shaded region? 	What is the area of this circle? 	What is the area of this shape? 	What is the area of this shape? 	27π cm^2	$10\frac{2}{3}\pi$ cm^2	48π cm^2	16π cm^2
What is the circumference of this circle? 	What is the area of the shaded region? 	What is the area of this circle? 	What is the area of this shape? 	33π cm^2	2π cm^2	32π cm^2	12π cm^2
What is the area of the shaded region? 	What is the area of this shape? 	What is the area of this shape? 	What is the area of this shape? 	24π cm^2	4π cm^2	75π cm^2	24π cm
What is the area of this shape? 	What is the circumference of this circle? 	What is the area of this shape? 	What is the area of the shaded region? 	36π cm^2	14π cm	25π cm^2	9π cm^2

Week 6:

- **LI: I can identify properties of 3d shapes**
- **LI: I can calculate the surface area of cones and spheres**

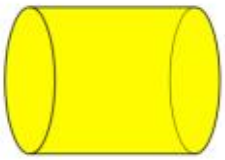
Demonstration Video:

https://corbettmaths.com/2013/12/23/names-of-3d-shapes-video-3/
https://corbettmaths.com/2013/12/27/edges-face-vertices-video-5/
https://corbettmaths.com/2013/03/26/surface-area-of-a-sphere/
https://corbettmaths.com/2013/10/24/surface-area-of-cone/

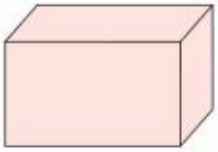
Tasks: Properties of 3d Shapes

Question 1 Name each of the 3D shapes below

(a)

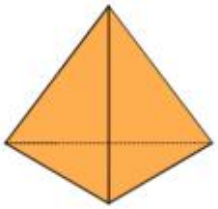


(b)

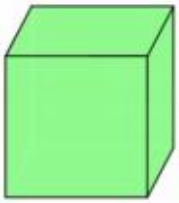


(c)

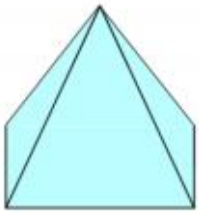
(d)



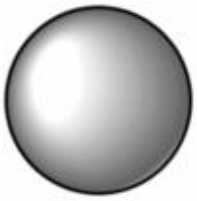
(e)



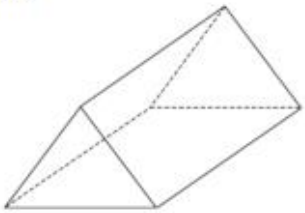
(f)



(g)



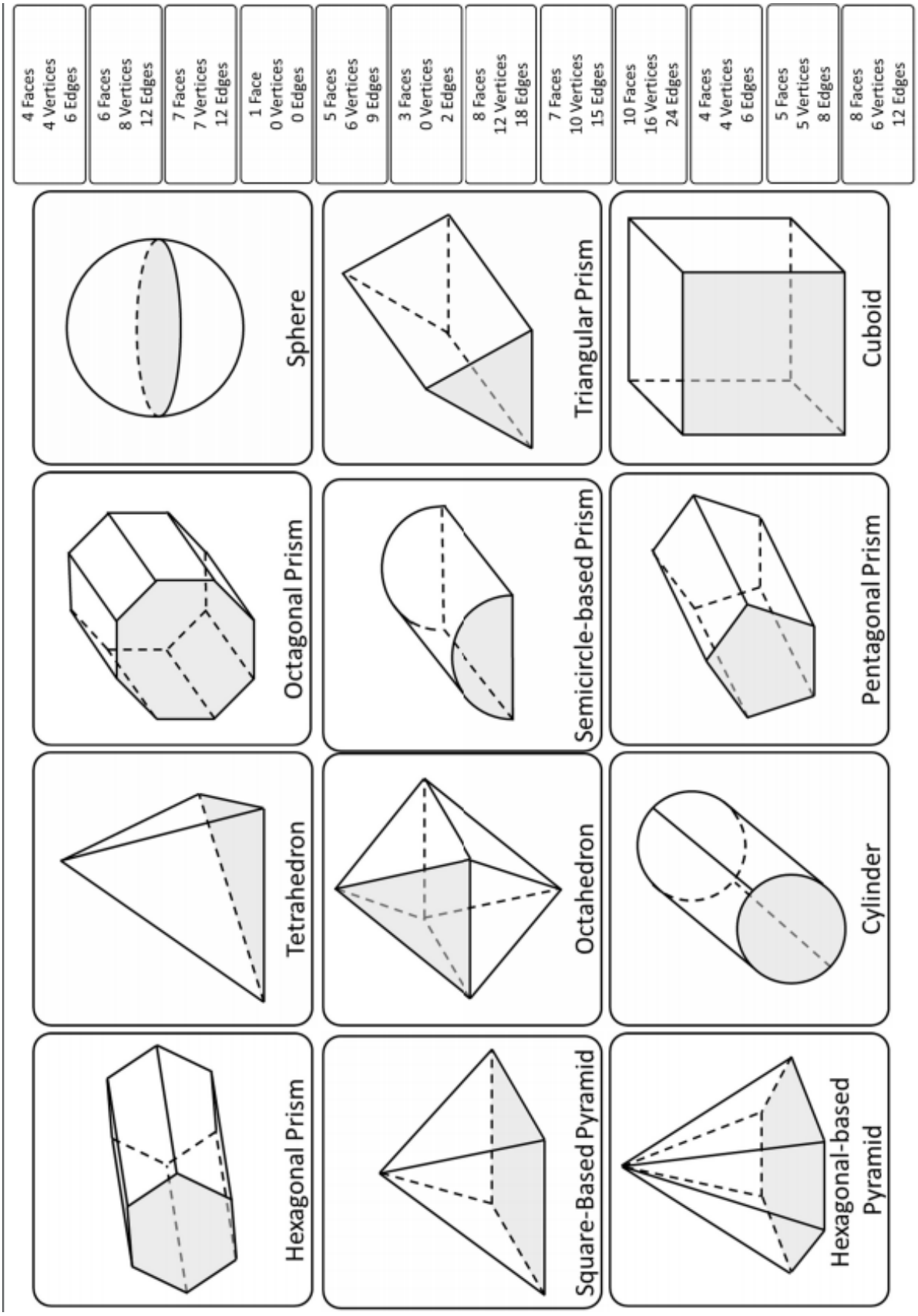
(h)



Question 2 Can you spot any mistakes in the question below?

	Faces	Edges	Vertices
Cube	12	6	8
Square-based Pyramid	5	5	5
Triangular Prism	9	9	6

Challenges: Match the Shape to its Properties



Exam Practice:

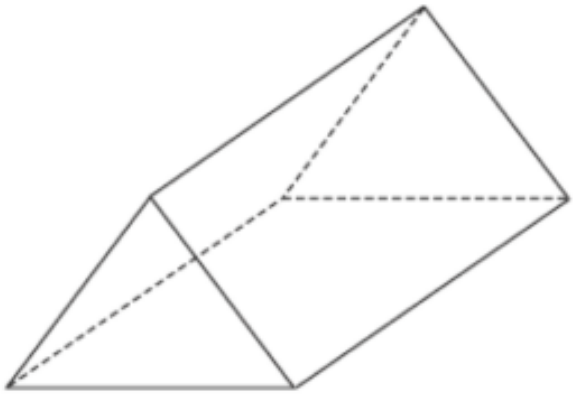
1 (a) How many edges are there on a square-based pyramid? **[1 mark]**
Circle your answer.

4 5 8 12

1 (b) How many faces of a triangular prism are triangles? **[1 mark]**
Circle your answer.

2 3 4 5

5. Below is a solid shape.



(a) What is the mathematical name for the shape?

.....
(1)

(b) Write down the number of vertices

.....
(1)

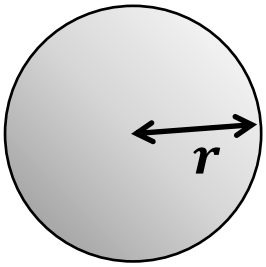
(c) Write down the number of faces

.....
(1)

(d) Write down the number of edges

.....
(1)

Tasks: Surface Area of Spheres

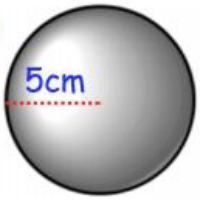


Surface area of a sphere $= 4\pi r^2$

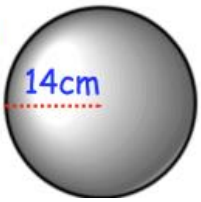
Where r is the radius of the Sphere

Question 1: Work out the surface area of each of these spheres.
Give each answer to 2 decimal places (you may use a calculator)

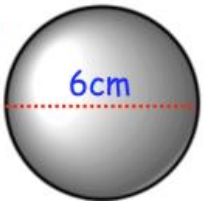
(a)



(b)



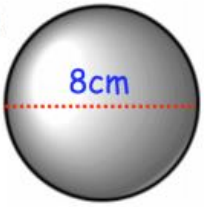
(c)



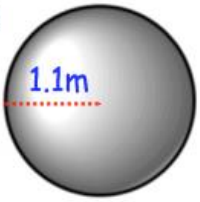
Question 2: Find the surface area of each of these spheres.
Give each answer in terms of **π** (you may not use a calculator)

(a)

(b)



(c)



Challenges:

Question 1: A glass paperweight is shown below.
The paperweight is a hemisphere with diameter 9cm.
Find the surface area of the paperweight

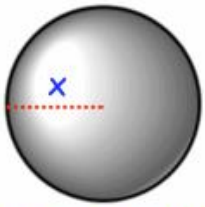
Question 2: Show the surface area of a sphere with radius 6cm is four times larger than the surface area of a sphere with radius 3cm.

Question 3: The formula for the surface area of a sphere is $A = 4\pi r^2$
Make r the subject of the formula

Question 4: Find the size of x in each of the sphere below.
Give your answers to two decimal places (you may use a calculator)

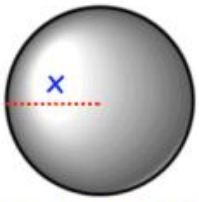
Exam Practice:

(a)



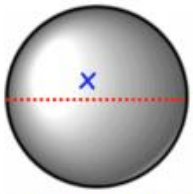
Surface area = 50cm²

(b)



Surface area = 940cm²

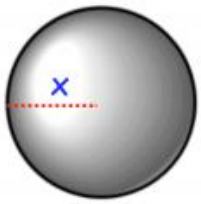
(c)



Surface area = 4800cm²

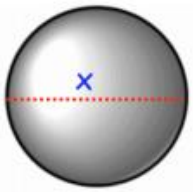
Question 5: Find the size of x in each of the sphere below.
You may not use a calculator

(a)



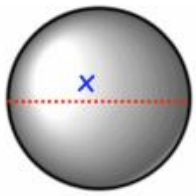
Surface area = 16π cm²

(b)



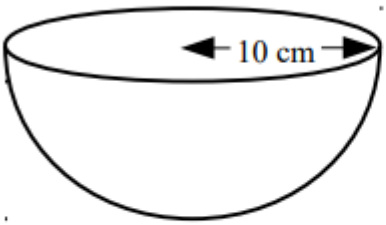
Surface area = 100π cm²

(c)



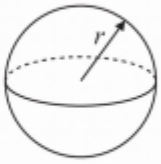
Surface area = 3600π cm²

2 The diagram shows a solid hemisphere with a radius of 10 cm.



Volume of sphere = $\frac{4}{3}\pi r^3$

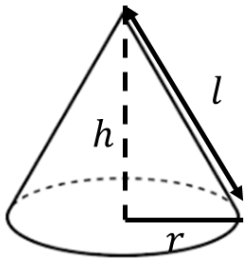
Surface area of sphere = $4\pi r^2$



Work out the total surface area of the hemisphere.
Give your answer in terms of π.

(3 marks)

Surface Area of Cones

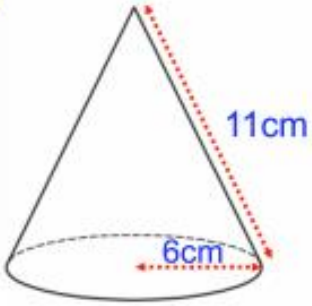


Surface area of cone $= \pi r^2 + \pi rl$

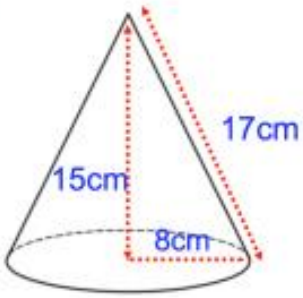
Area of base — Curved surface area

Question 1: Work out the surface areas of each of the following cones.
Give each answer in terms of **π**

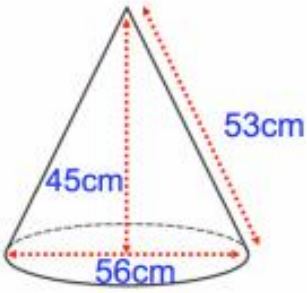
(a)



(b)

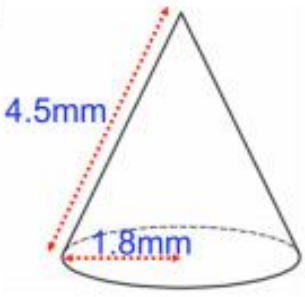


(c)

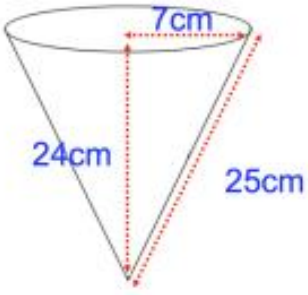


Question 2: Work out the surface areas of each of the following cones.
Give each answer to one decimal place.

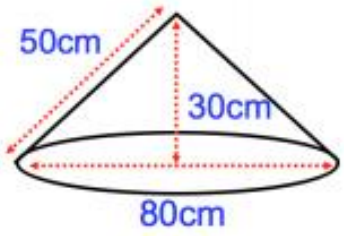
(a)



(b)

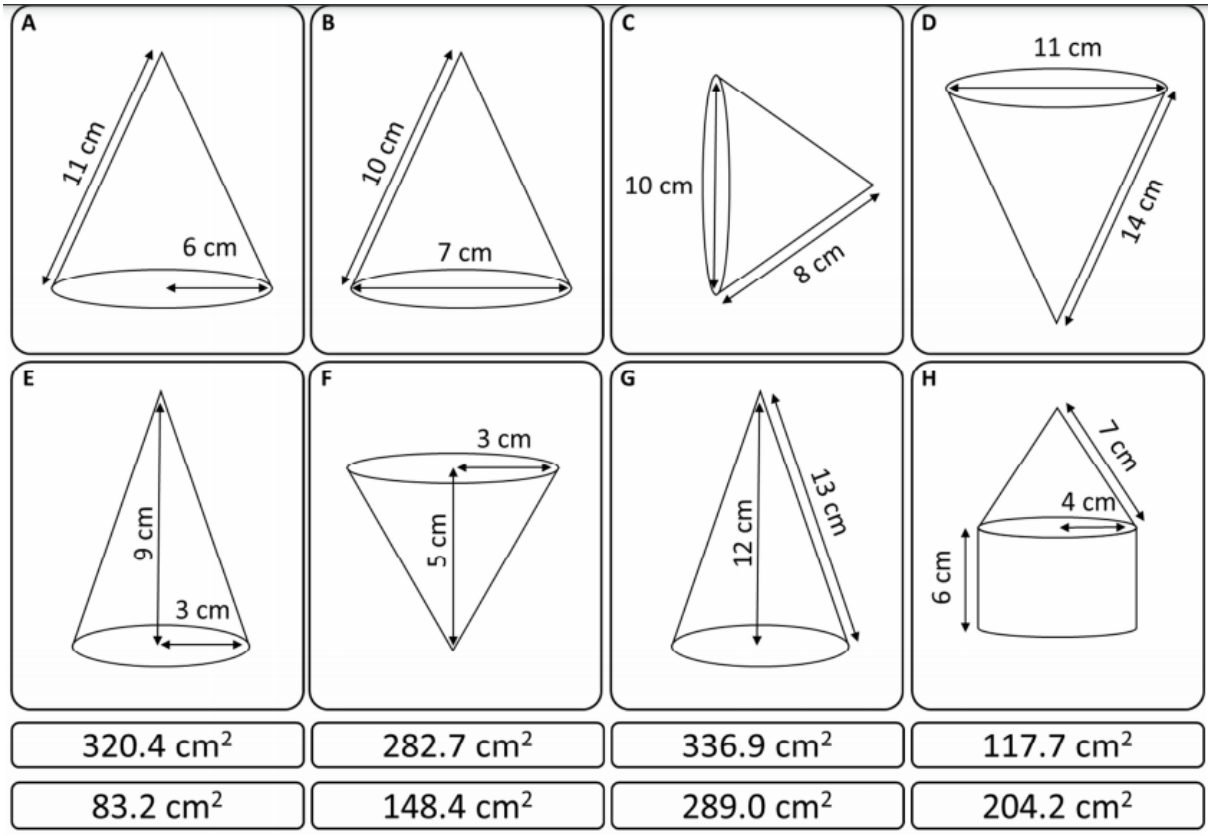


(c)



Stewards Academy

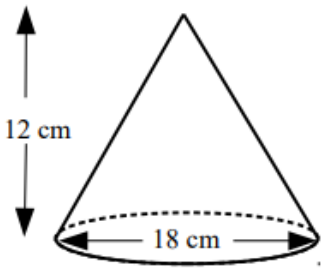
Match the cards



320.4 cm^2	282.7 cm^2	336.9 cm^2	117.7 cm^2
83.2 cm^2	148.4 cm^2	289.0 cm^2	204.2 cm^2

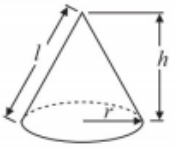
Exam Practice:

6 The diagram shows a solid cone.



Volume of cone $= \frac{1}{3}\pi r^2 h$

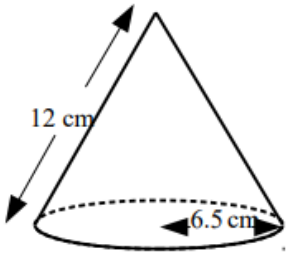
Curved surface area of cone $= \pi r l$



The height of the cone is 12 cm.
The base of the cone has a diameter of 18 cm.

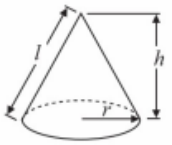
Work out the total surface area of the cone.
Give your answer in terms of π.

3 The diagram shows a solid cone.



Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$



The slanted height of the cone is 12 cm.
The base of the cone has a radius of 6.5 cm.

Work out the total surface area of the cone.
Give your correct to 3 significant figures.

(3 marks)

Questions	Question Title
1	Multiply whole number by fractions
2	Subtracting negative numbers
3	Simplifying expressions involving multiplication
4	Similar shapes
5	Find percentages of amounts (non-calc)
6a	Convert simple decimals to fractions
6b	Convert fractions to decimals
7	Area of 2D shapes, one number as a fraction of another
8	Division problem solving
9	Time, addition and subtraction word problem
10a	Median for a simple data set
10b	Mean for a simple data set
11	Calculating profit
12a	Addition and subtraction with decimals
12b	Division with decimal answers
13	Probability of more than one event
14	Inverse proportion
15	Factorising an expression, substitution
16	Coordinates, solving one-step equations
17	Square numbers
18	Writing scales as ratios
19	Convert fractions to percentages
20	Order of operations (indices and roots)
21a	Reflect a shape through a vertical line
21b	Rotate a shape around the origin
22	Fraction of a number, ratio
23	Plans and elevations
24	Sharing in a given ratio
25	Express one number as a fraction of another
26	Using gradient to find points
27a	Calculating relative frequency
27b	Relative frequency and testing for bias
28	Solving linear inequalities
29	Range from a set of data, add and subtract fractions
30	Algebraic inverse proportion
31	Perimeter problem solving with algebra
32	Comparing numbers in standard form