

# Stanground Academy

Mathematics Department  
Year 9 Higher work booklet



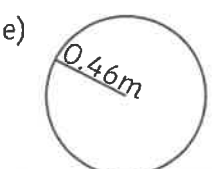
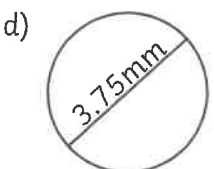
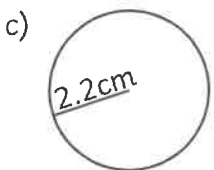
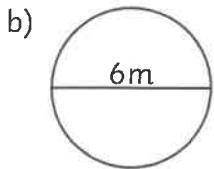
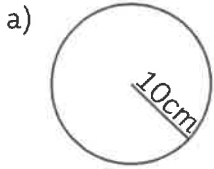
Student's Name: .....

Teacher: .....

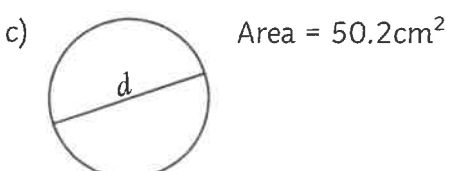
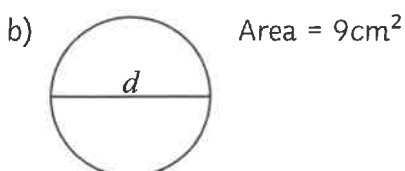
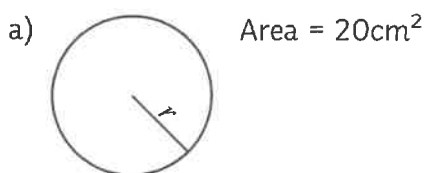


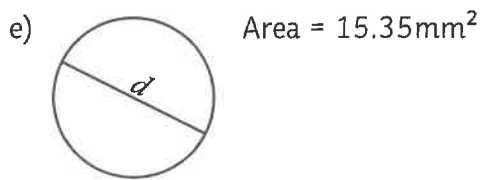
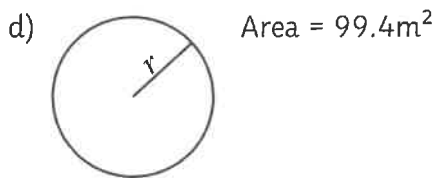
# Circles Area

1. Calculate the area of each circle, rounding your answers to two decimal places.

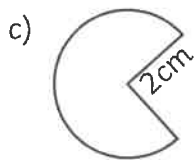
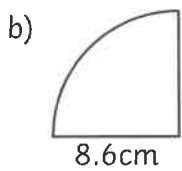
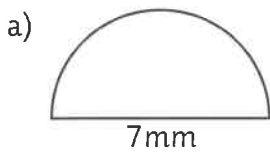


2. Calculate the length of the diameter or radius of each circle, rounding your answer to one decimal place.

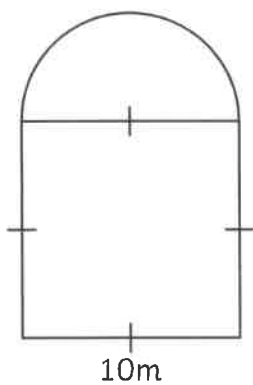




3. Calculate the area of each shape, rounding your answer to three significant places.

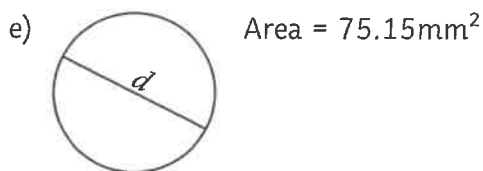
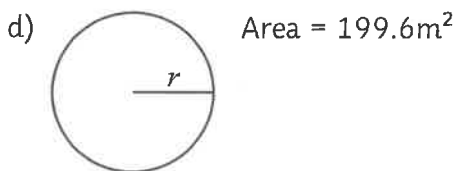
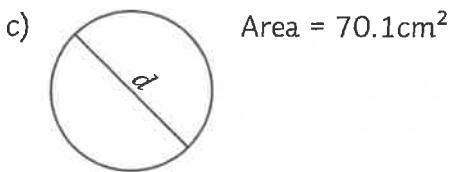
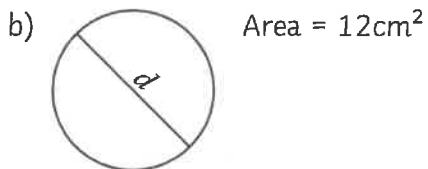
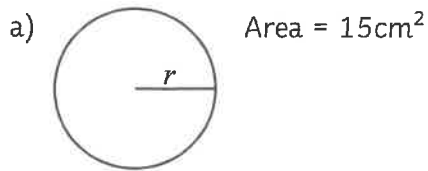


4. A feature door in a museum needs painting. Calculate the area of the door, stating your units and rounding your answer to the nearest whole number.

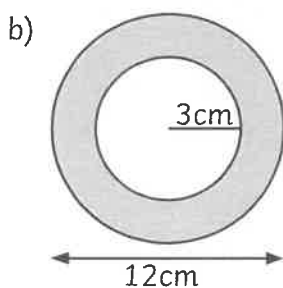
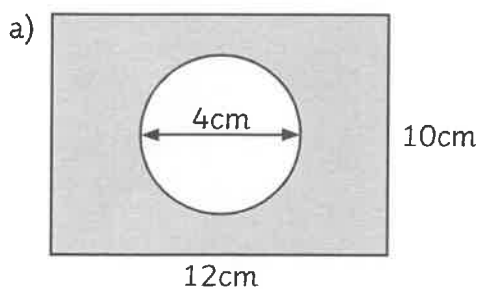


# Circles Area

1. Calculate the length of the diameter or radius of each circle, rounding your answers to two significant figures.



2. Calculate the shaded area of the following shapes, rounding your answers to two decimal places.



3. A trundle wheel is a device used to measure distance. Each revolution of the wheel measures a distance of 1m. Calculate the area, in centimetres squared, of the wheel, rounding your answer to one decimal place.

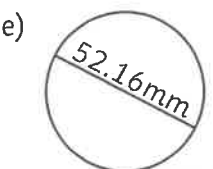
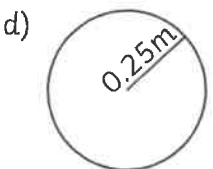
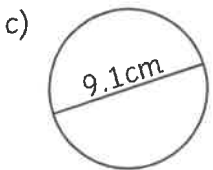
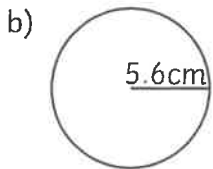
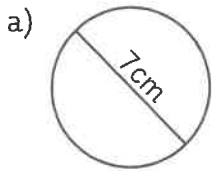
\_\_\_\_\_cm

4. A 2 pence coin has a diameter of 26mm. A 5 pence coin has a radius of 0.85cm. Calculate the total area, in centimetres squared, of 19 pence using only 5 pence and 2 pence coins. (You must use more 5p coins than 2p coins.) Leave your answer in terms of  $\pi$  and round the coefficient of  $\pi$  to three significant figures.

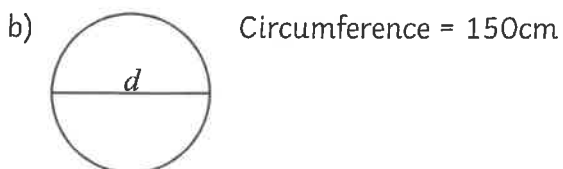
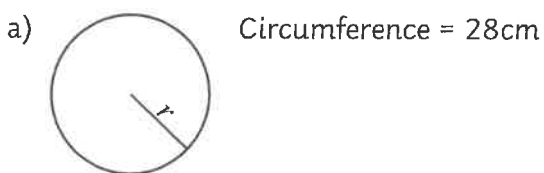


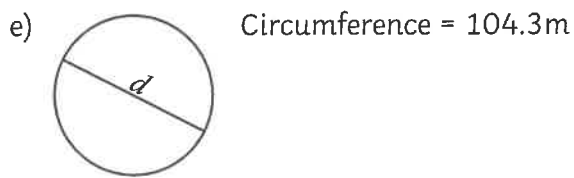
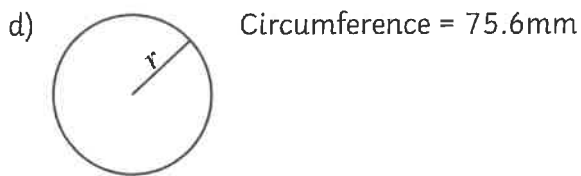
# Circles Circumference

1. Calculate the length of the circumference of each circle, rounding your answers to two decimal places:

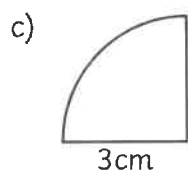
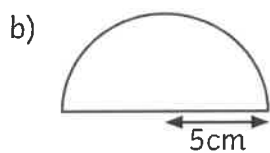
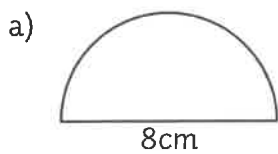


2. Calculate the length of the diameter or radius of each circle, rounding your answer to one decimal place:





3. Calculate the perimeter of each shape, rounding your answers to one decimal place.



4. A trundle wheel is a device used to measure distance. Each revolution of the wheel measures a distance of 1m. Calculate the diameter, in centimetres, of the wheel, rounding your answer to two decimal places.

\_\_\_\_\_ cm

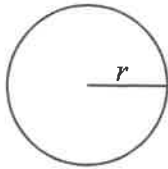




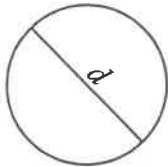
# Circles Circumference

1. Calculate the length of the diameter or radius of each circle, rounding your answers to two significant figures.

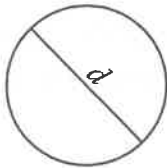
a) circumference = 29.4cm



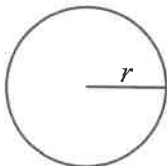
b) circumference = 155cm



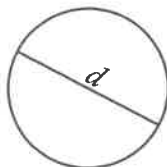
c) circumference = 265.4cm



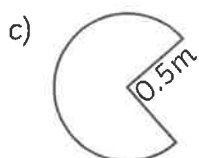
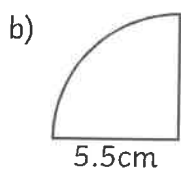
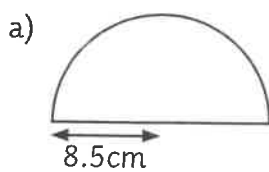
d) circumference = 15.6mm



e) circumference = 99.9m



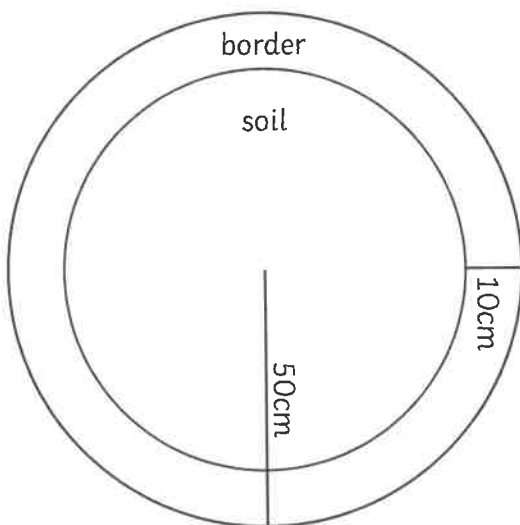
2. Calculate the perimeter of each shape, rounding your answers to one decimal place.



3. A trundle wheel is a device used to measure distance. Each revolution of the wheel measures a distance of 1m. Calculate the radius, in centimetres, of the wheel, rounding your answer to one decimal place.

\_\_\_\_\_ cm

4. A flower bed has a circular stone border. Joanna wants to plant a daffodil bulb every 200mm along the inside edge of the border. She says she can plant 15 bulbs. Prove that she is incorrect and state the maximum number of bulbs that she can plant.

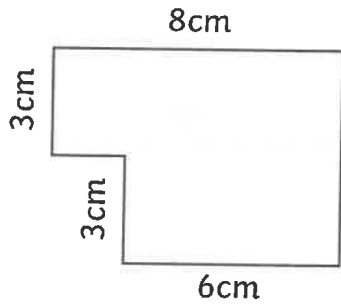


# Area of Compound Shapes

I can calculate the area of compound shapes.

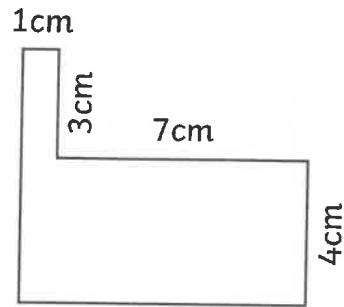
Identify the shapes where the area can be calculated. Calculate the area of each compound shape.

1.



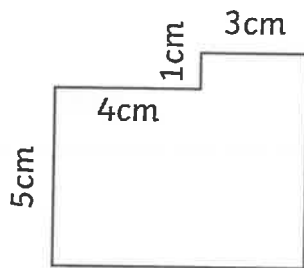
Total: \_\_\_\_\_

2.



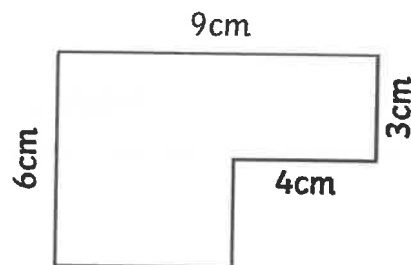
Total: \_\_\_\_\_

3.



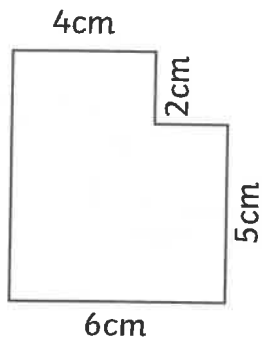
Total: \_\_\_\_\_

4.



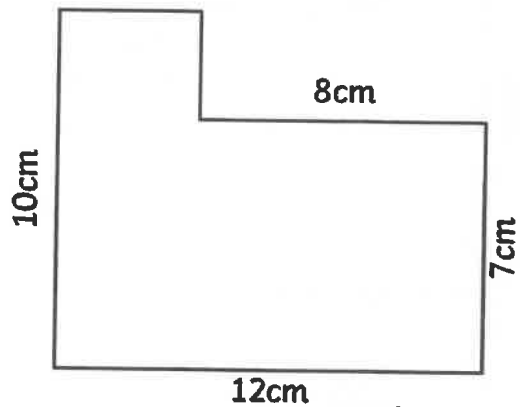
Total: \_\_\_\_\_

5.



Total: \_\_\_\_\_

6.



Total: \_\_\_\_\_

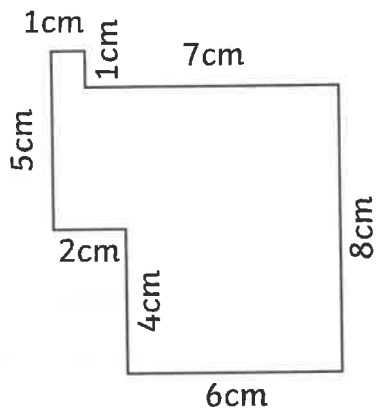
Note: Compound shapes are not to scale.

# Area of Compound Shapes

I can calculate the area of compound shapes.

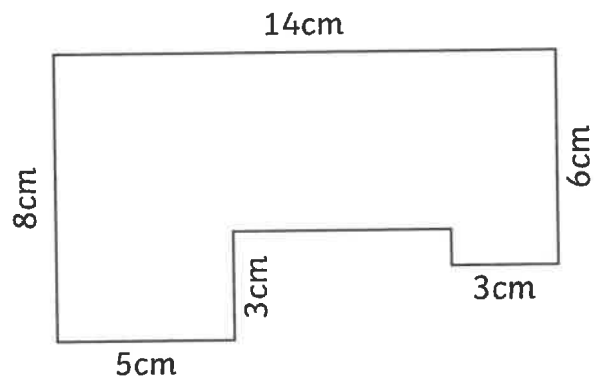
Identify the shapes where the area can be calculated. Calculate the area of each compound shape.

7.



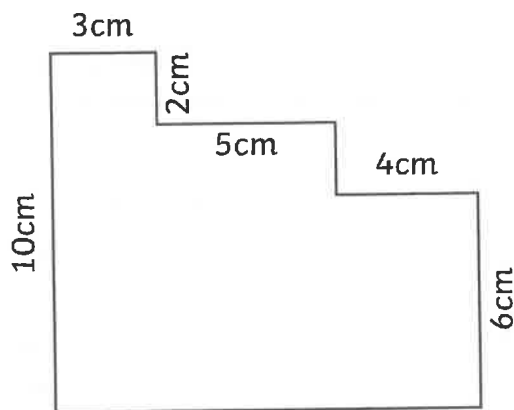
Total: \_\_\_\_\_

8.



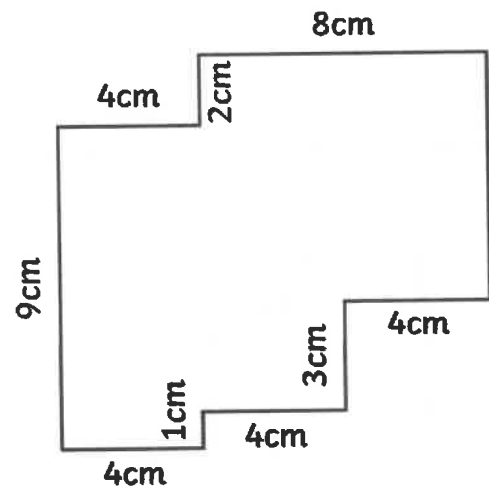
Total: \_\_\_\_\_

9.



Total: \_\_\_\_\_

10.



Total: \_\_\_\_\_

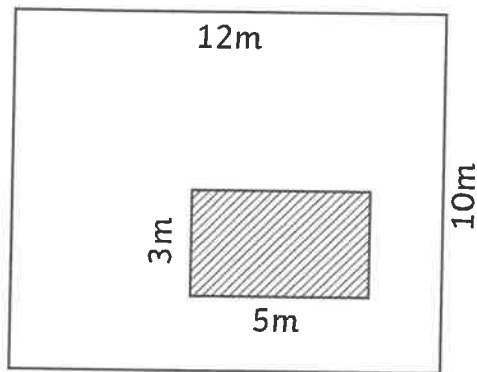
Note: Compound shapes are not to scale.

# Area of Compound Shapes

I can calculate the area of compound shapes.

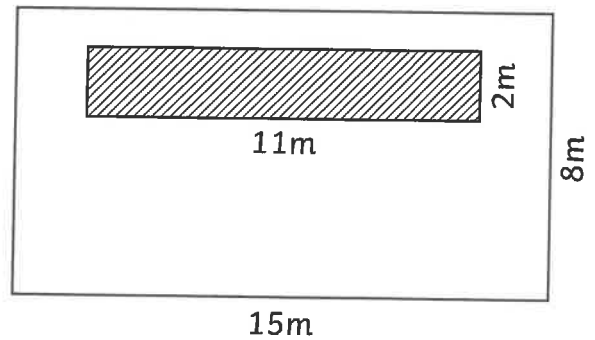
Identify the shapes where the area can be calculated. Calculate the area of each compound shape.

1.



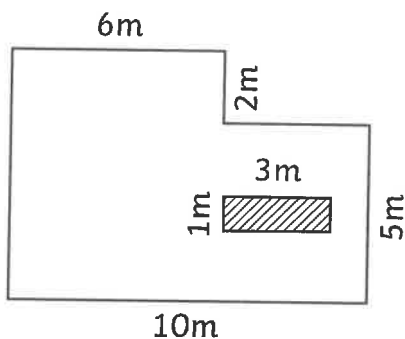
Total: \_\_\_\_\_

2.



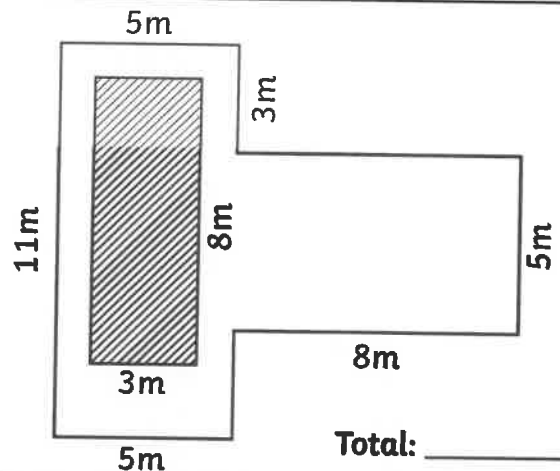
Total: \_\_\_\_\_

3.



Total: \_\_\_\_\_

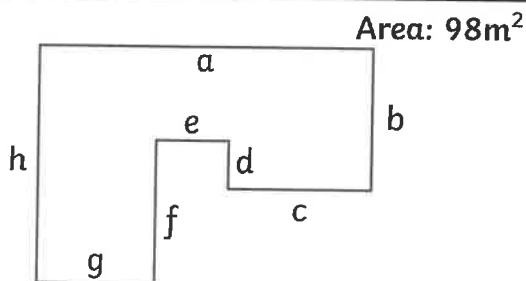
4.



Total: \_\_\_\_\_

Write possible measurements for these shapes based upon the area given.

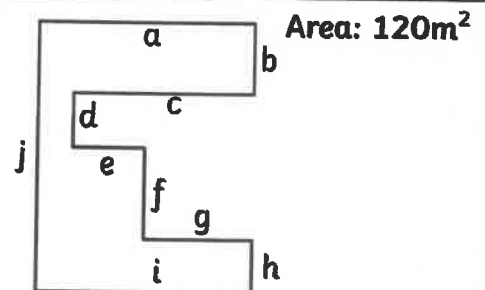
5.



a: \_\_\_\_\_ b: \_\_\_\_\_ c: \_\_\_\_\_ d: \_\_\_\_\_

e: \_\_\_\_\_ f: \_\_\_\_\_ g: \_\_\_\_\_ h: \_\_\_\_\_

6.



a: \_\_\_\_\_ b: \_\_\_\_\_ c: \_\_\_\_\_ d: \_\_\_\_\_ e: \_\_\_\_\_

f: \_\_\_\_\_ g: \_\_\_\_\_ h: \_\_\_\_\_ i: \_\_\_\_\_ j: \_\_\_\_\_

Note: Compound shapes are not to scale.



# Finding the $n^{\text{th}}$ Term Silver

## AO1)

Find the  $n^{\text{th}}$  term for the following sequences:

a) 13, 16, 19, 22 \_\_\_\_\_

b) 25, 30, 35, 40 \_\_\_\_\_

c) 40, 30, 20, 10 \_\_\_\_\_

d) 0.3, 0.5, 0.7, 0.9 \_\_\_\_\_

e) 17, 14, 11, 8 \_\_\_\_\_

f)  $\frac{1}{3}$ , 1,  $\frac{5}{3}$ ,  $\frac{7}{3}$  \_\_\_\_\_

g)  $\frac{2}{3}$ ,  $\frac{3}{5}$ ,  $\frac{4}{7}$ ,  $\frac{5}{9}$  \_\_\_\_\_

## AO2)

a) Explain why the sequence 5, 11, 17, 23 will not contain the term 131.

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b) Explain how to find the  $n^{\text{th}}$  term of the sequence that begins 4, 9, 14, 19, ...

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c) Is -15 a term in the sequence that begins 100, 97, 94, 91? Explain.

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d) A sequence begins 49, 45, 41, 37. Find the value of the first term that is negative.

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**A03)**

a) Find the 20th term of the sequence that begins 0.4, 0.7, 1, 1.3, ...

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b) Calculate the sum of the 10th and 12th term of the sequence that begins 11, 9, 7, 5, ...

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c) Write down two sequences that would contain the expression  $-2n$  in its  $n^{\text{th}}$  term.

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d) Write down two sequences that would contain the expression  $+\frac{1}{2}$  in its  $n^{\text{th}}$  term.

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# Equation of a Straight Line

Tables of Values, Gradient and Intercept Activity Sheet

1.

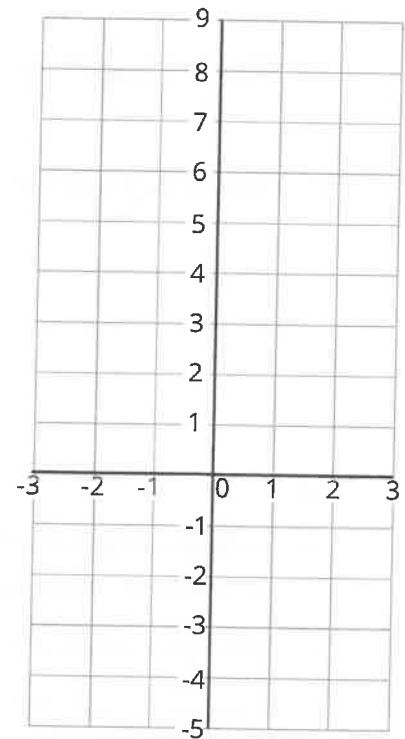
- a. Complete the table of values for the graph  $y = 3x + 2$ .

$x$	-2	-1	0	1	2
$y$					

- b. Use the axes below to draw the graph of  $y = 3x + 2$ .

- c. What is the gradient of the graph?

- d. What is its  $y$ -intercept?



2.

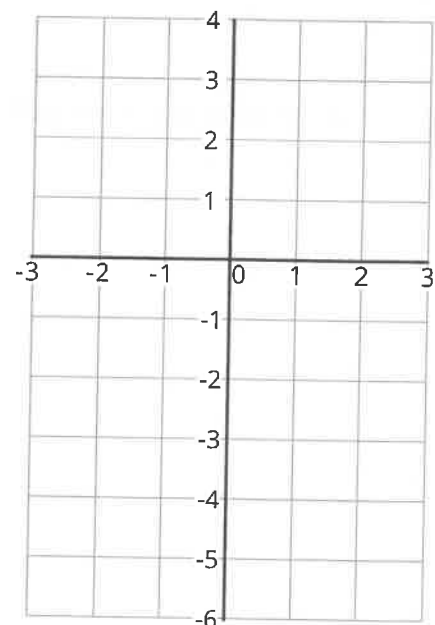
- a. Complete the table of values for the graph  $y = 2x - 1$ .

$x$	-2	-1	0	1	2
$y$					

- b. Use the axes below to draw the graph of  $y = 2x - 1$ .

- c. What is the gradient of the graph?

- d. What is its  $y$ -intercept?



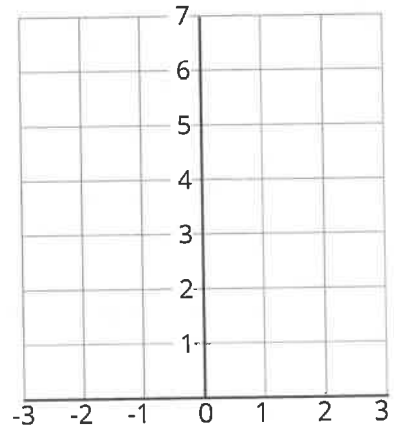


3.

a. Complete the table of values for the graph  $y = x + 4$ .

$x$	-2	-1	0	1	2
$y$					

b. Use the axes below to draw the graph of  $y = x + 4$ .



c. What is the gradient of the graph?

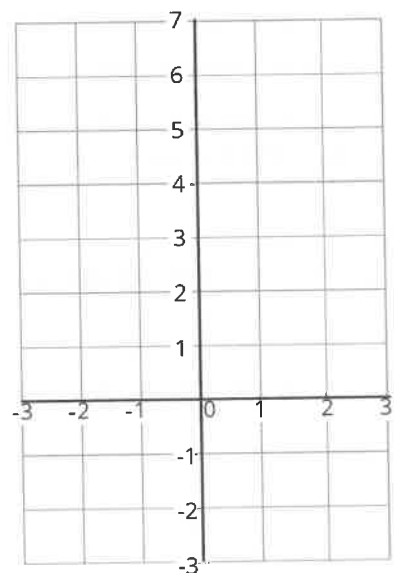
d. What is its  $y$ -intercept?

4.

a. Complete the table of values for the graph  $y = -2x + 2$ .

$x$	-2	-1	0	1	2
$y$					

b. Use the axes below to draw the graph of  $y = -2x + 2$ .



c. What is the gradient of the graph?

d. What is its  $y$ -intercept?



## Equation of a Straight line: Parallel and Perpendicular Lines

1. Give the equations of straight lines which are parallel to each of the following:

a.  $y = -2x$

b.  $y = -x + 4$

c.  $y = \frac{x}{2} + 9$

d.  $3x + y = 5$

e.  $-4x + y = 2$

2. Give the equations of straight lines which are perpendicular to each of the following:

a.  $y = -2x$

b.  $y = -x + 4$

c.  $y = \frac{x}{2} + 9$

d.  $3x + y = 5$

e.  $-4x + y = 2$

3. Give the equations of the straight lines which pass through the point (2, 1) and are:

a. parallel to  $y = -7x + 5$

b. perpendicular to  $y = 4x + 1$

c. parallel to  $x = -7 - y$

d. perpendicular to  $2x + 3y = -2$



## Equation of a Straight line: Gradient and Intercept from Equations

Without drawing the graphs, write down i) the gradient and ii) the  $y$ -intercept of the graphs with the following equations:

a.  $y = -7x + 5$

b.  $y = 4x + 1$

c.  $y = 3x - 2$

d.  $y = -2x$

e.  $y = -x + 4$

f.  $y = \frac{x}{2} + 9$

g.  $3x + y = 5$

h.  $-4x + y = 2$

i.  $3x + y = 5 + 2x$

j.  $x = -7 - y$

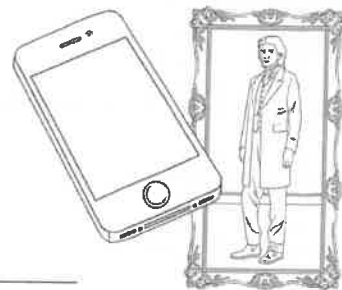
k.  $2x + 3y = -2$

l.  $-3x + y = 5 + 2y$

m.  $-4x = 7 + y$

n.  $3x + 4y = 4$

# Percentage Change Activity Sheet



1. In January, a mobile phone shop sold 100 phones. In February, they sold 92 phones. Represent this difference as a percentage change.

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2. A piece is cut from a 130cm length of wood so that the remaining length is 104cm. What percentage of the wood has been cut off?

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3. There are now 30 boys in a class that originally had 24 boys in it. What was the percentage increase in the number of boys in the class?

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4. Last year, there were 300 students in Year 7. This year there are 315 students. Show that this is a 5% increase.

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5. A piece of art was bought for £600. Six months later, it was sold for £675. What percentage profit did the seller make?

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6. In a sale, trainers originally costing £70 are reduced to £49. Calculate the percentage change.

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7. Josh invests £3500. When his investment matures, he receives £4200. Work out the percentage increase in his investment.

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8. A car company bought a car for £8000. Two years later they sold the car for £7200. Calculate their percentage loss.

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# Finding the Original Value

1. A shop offers a 25% discount in a sale. A dress has a sale price of £33.75. What was the original price?

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2. The price of a laptop is £345 after 20% VAT is added. What was the price before VAT was added?

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3. Charlotte works in a local pet shop. She was told to increase all prices by 5%. She increased a price to £42. What was the original price?

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4. A car depreciates in value by 20% during its first year. Its value now is £7850. What was its original price?

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5. The price of a bike increases by 12% to £168. What was the price of the bike before the increase?

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6. The total price for a holiday, including a 15% discount, was £799. What was the price of the holiday before the discount?

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7. A DVD player sells for £87 after a 20% increase in the store price. What was the original store price?

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8. The price of a train journey increased by 4%. The new fare was £23.40. What was the price of the train fare before the increase?

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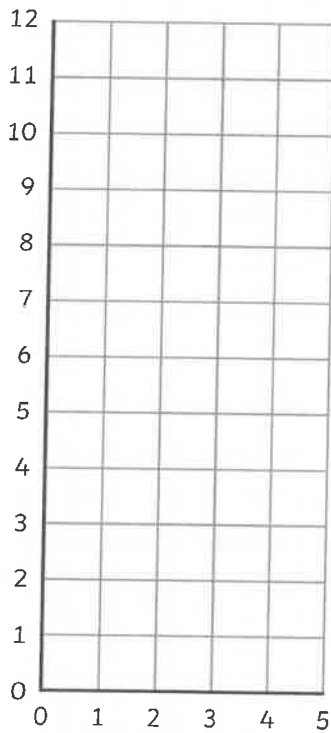


# Using Tables to Plot Straight Line Graphs

Complete each table, then plot each graph on the axes given.

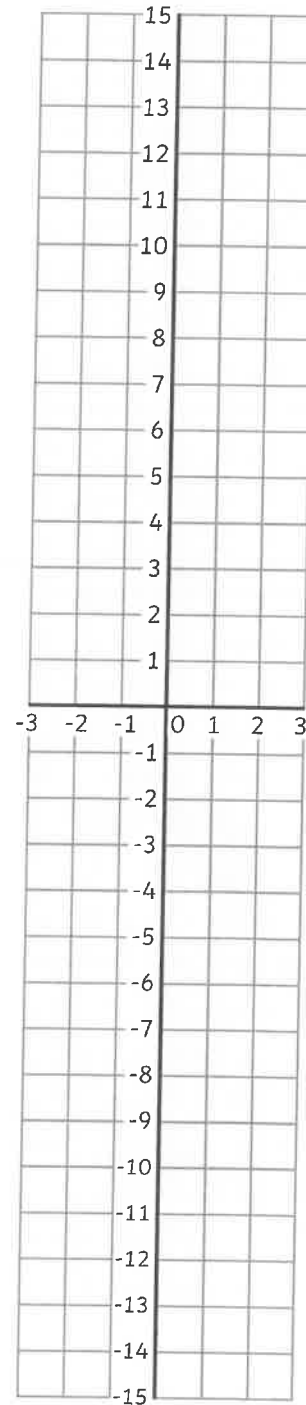
a)  $y = x + 5$

$x$	0	1	2	3	4	5
$y$		6		8		



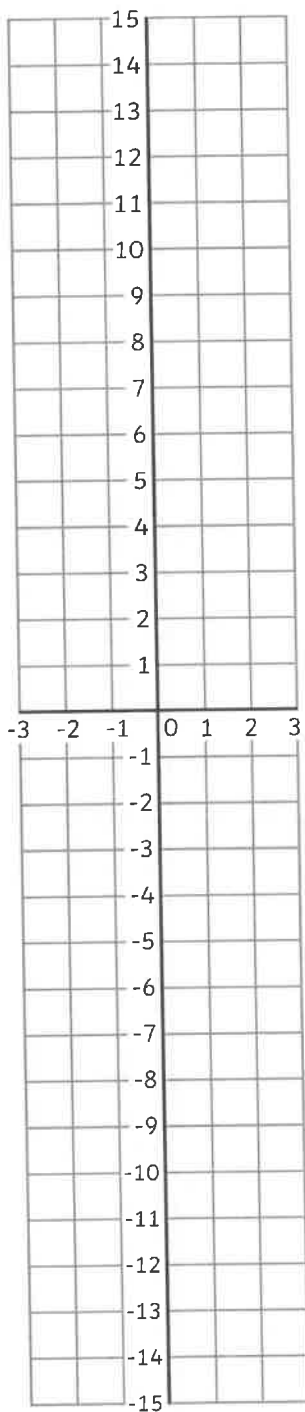
b)  $y = 2x$

$x$	-3	-2	-1	0	1	2	3
$y$			-2			4	



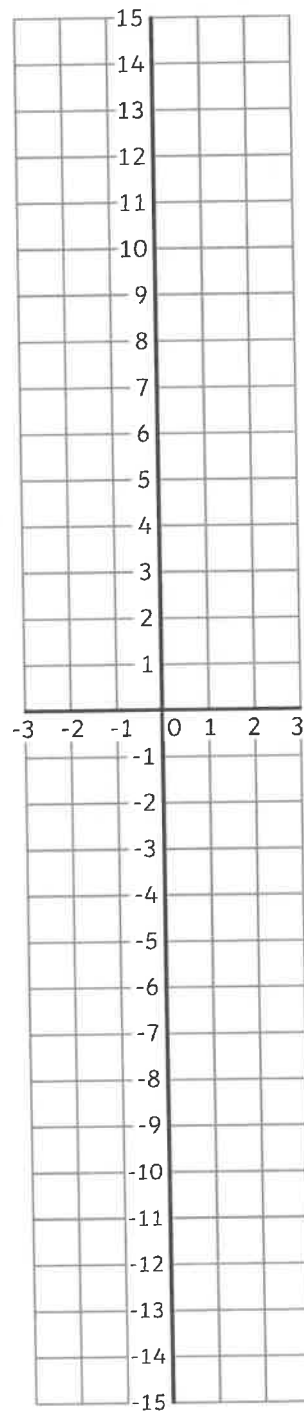
c)  $y = 3x - 2$

x	-3	-2	-1	0	1	2	3
y		-8			1		



d)  $2y = 8x + 2$

x	-3	-2	-1	0	1	2	3
y							



e)  $x + y = 5$

$x$	-3	-2	-1	0	1	2	3
$y$							

