Name	
Form	
Teacher	

Maths
Homework Booklet
Year 9e Spring

Section	Hand in by	Score
Numbers		
Percentages		
Maths and Money		
Rotation and Translation		
Pythagoras' Theorem		
Year 9 Numbers		
Year 9 Using percentages		
Year 9 Maths and Money		
Year 9 Deduction		
Year 9 Rotation and Translation		
Year 9 Pythagoras' Theorem		
Mixed H		
Mixed I		
Mixed J		
Mixed K		
Mixed L		

Numbers

1) a) 4 + (-2) = b) 6 + (-7) = c) 9 + (-12) = d) (-3) + 7 = e) (-2) + (-4) =

2) a) 6 – (-2) = b) 5 – (-6) = c) (-4) – 2 = d) (-2) – (-4) =

   e) (-2) – (-2) =

3) a) 3 x (-2) = b) 5 x (-4) = c) (-5) x 6 = d) (-4) x (-8) =

   e) (-5) x (-7) =

4) Find the Highest Common Factor of 12 and 15.

5) Find the Highest Common Factor of 48 and 72.

6) Find the Lowest Common Multiple of 3 and 5.

7) Find the Lowest Common Multiple of 8 and 12.

8) a) $\frac{2}{5} + \frac{2}{5} =$ b) $\frac{1}{4} + \frac{1}{8} =$ c) $\frac{2}{3} + \frac{5}{8} =$

9) a) $\frac{3}{7} - \frac{2}{7} =$ b) $\frac{8}{9} - \frac{2}{18} =$ c) $\frac{7}{8} - \frac{1}{5} =$

10) a) $\frac{2}{3} \times \frac{1}{5} =$ b) $\frac{3}{8} \times \frac{2}{9} =$ c) $\frac{1}{3} \div \frac{1}{9} =$ d) $\frac{9}{10} \div \frac{3}{5} =$

11) Write 3×10^4 as an ordinary number.

12) Write 600,000,000 in standard form.

13) $2 \times 10^3 \times 5 \times 10^7 =$

14) Sort this list into groups; integers, real numbers, rational numbers. Some numbers may need to go in more than one group. Some numbers may not fit in any group.

$\frac{1}{2}$ $\sqrt{4}$ **5** **172** $\sqrt{3}$ $\frac{5}{4}$ $\sqrt{-9}$ **π**

Integers	Real	Rational

Percentages

1. Converting

Convert the following percentages into fractions in their simplest form

a) 70%

b) 14%

c) 48%

d) 35%

2. Percentage increase and decrease

a) Increase £60 by 15%

b) Increase 35kg by 12%

c) Decrease £40 by 20%

d) Decrease 15m by 17%

3. Change as a percentage

a) Conor's hourly pay increases from £4.50 to £5.40. Calculate the percentage increase.

b) Clare has £520 in her bank account. She takes out some money and has £442 left in her account. What is the percentage decrease?

c) Caroline is weighing some flour for a recipe. She has 520g of flour but needs 436.8g. What is the percentage decrease?

4. Reverse percentage problems

a) After a 20% pay rise, Danielle earns £45,600 a year. What was her initial pay per year?

b) Michael earns £45,600 after a 20% pay cut. What was his initial pay per year?

c) A school increases the number of pupils by 15%. There are now 1012 pupils.
How many were there before the increase?

d) In a sale where items are 27% off the initial price, a computer cost £350.40. What was the original price?

Maths and Money

1a) £10 + £3 = b) £1.50 + £3.20 = c)£11.23 + £5.49 =

d) £5 - £2.50 = e) £11 - £4.50 = f) £13.29 - £4.12 =

2) You have £10 in your pocket and decide to buy a drink which costs £1.50. How much money will you have left?

3) Sam has a £5 note and buys two bottles of milk. One milk bottle cost £1.20. How much change will Sam receive?

4) You have £3 and you buy chocolate from the shop for four friends and yourself. This comes to £2.50. How much is one chocolate and how much change will you receive?

5) Michael has a £20 note and buys three magazines which each cost £3.50. How much change will Michael receive?

6) At a swimming pool the entry price for adults is £5 and for children £2.50. How much would it cost for:

A. 3 adults and 2 children
B. 1 adult and 4 children

7)

Burger Meal	£3.20
Hotdog Meal	£2.65
Family Meal	£10
Kids Meal	£1.50
Sides	£2.30

a) If you have a £20 note, how many Hotdog Meals can you buy?

b) If Kate buys two Burger Meals and one Kids Meal with a £10 note, how much change will Kate receive?

c) How much money will I need to buy four sides, three Burger Meals and two Family Meals?

d) How many friends can have a Hotdog Meal each with £30? Will there be any change?

8) You have £100 which you received in birthday money. You decide to buy a top for £22, a cap for £25 and headphones for £45.50. How much change will you receive?

9) I buy a sandwich for 80p, I buy two chocolates at 50p each and I buy three cans of drink. If I pay with a £10 note and get £3.40 change, how much was each can of drink?

10) You have a £20 note to pay for yourself and one friend at the Cinema. The tickets cost £4.50 and you also buy a drink each for £2.00. How much do you spend at the Cinema? How much change do you receive from your £20?

Rotation and Translation

A shape is translated by the vector $\begin{pmatrix}0\\4\end{pmatrix}$

In which direction does the shape move?

Circle your answer.

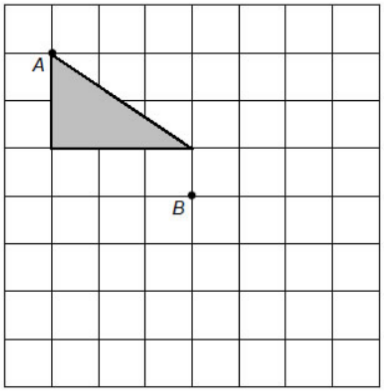
up down left right

The vector $\begin{pmatrix}-2\\3\end{pmatrix}$ translates A to B.

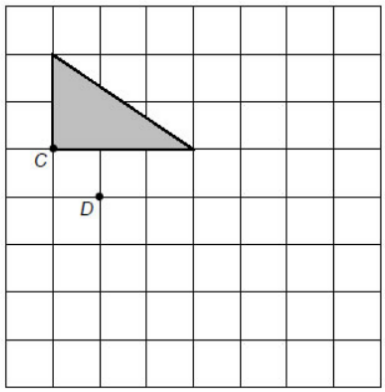
Circle the vector that translates B to A.

$\begin{pmatrix}-2\\3\end{pmatrix}$ $\begin{pmatrix}-3\\2\end{pmatrix}$ $\begin{pmatrix}3\\-2\end{pmatrix}$ $\begin{pmatrix}2\\-3\end{pmatrix}$

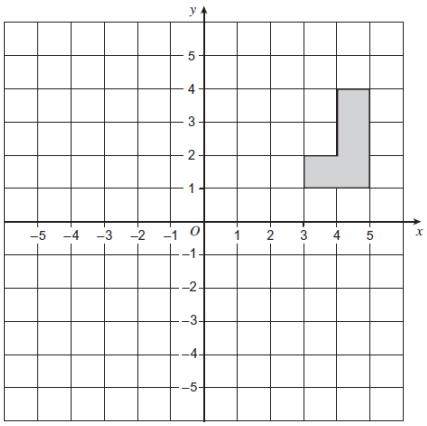
(a) Translate the triangle so that point *A* moves to point *B*.



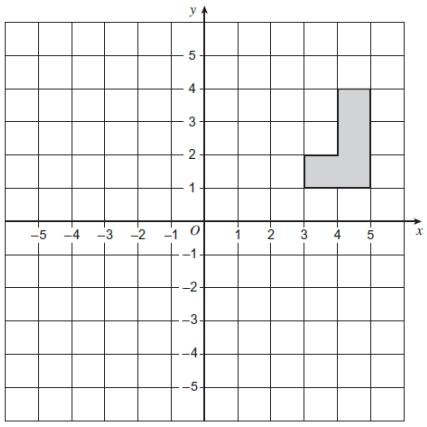
(b) Rotate the triangle **90° clockwise** so that point *C* moves to point *D*.



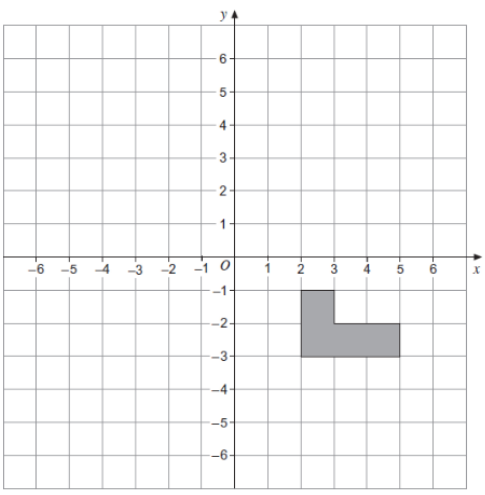
(a) Reflect the shape in the y-axis.



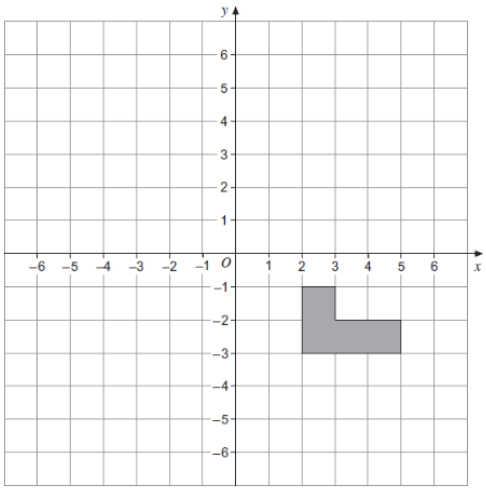
(b) Translate the shape 4 left and 2 down.



(a) Reflect the shape in the line $x = 2$



(b) Translate the shape by the vector $\begin{pmatrix}-5\\6\end{pmatrix}$.



Pythagoras' Theorem

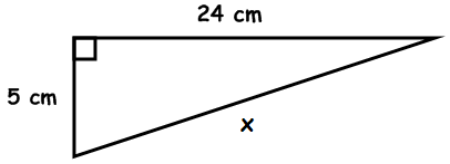
1a) Calculate $2^2 + 4^2$

b) Evaluate $12^2 + 11^2$

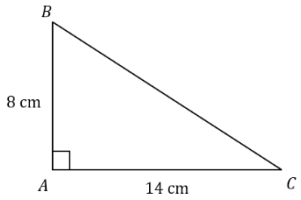
2a) Calculate $13^2 - 10^2$

b) Evaluate $16^2 - 5^2$

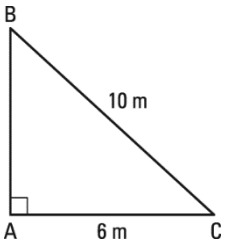
3) Evaluate the length of x



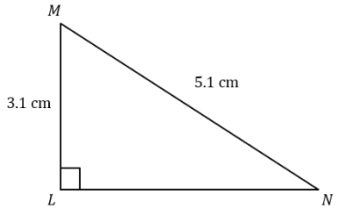
4) Calculate the length BC

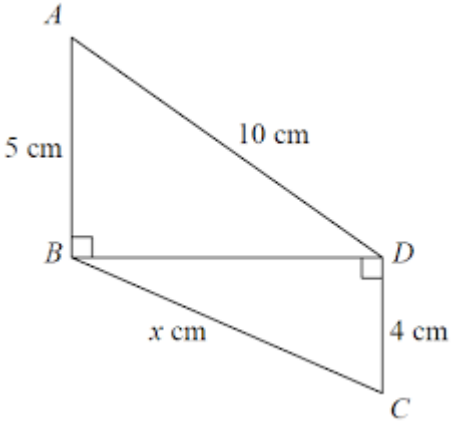


5) Evaluate BA



6) Evaluate LN





Year 9
Numbers

Name _____

1 Which number is an integer? Circle your answer.

6 4.2 $\frac{3}{4}$ $5\frac{1}{2}$

1 mark

2 Work out 196×5

_____

2 marks

3 Calculate $\frac{5}{9} + \frac{1}{3}$

_____

2 marks

4 Work out the following.

$-5 + -1$

_____

1 mark

$2 - -7$

_____

1 mark

5 $126 = 2 \times 3 \times 3 \times 7$
$420 = 2 \times 2 \times 3 \times 5 \times 7$

Annie says the highest common factor of 126 and 420 is 7
Explain why Annie is incorrect.

1 mark

Find the highest common factor of 126 and 420

_____

2 marks

6 23 451 people attend a rugby match.
8376 of these people are season ticket holders.
How many of these people are not season ticket holders?

_____

2 marks

7 Eva has 4 m of ribbon for wrapping gifts.
She needs $\frac{2}{3}$ m for each gift.
How many gifts can Eva wrap?

_____

3 marks

8 $p = 8 \times 10^6$ and $q = 4 \times 10^5$

Work out the value of each expression.

$p - q$

_____

2 marks

$\frac{p}{q}$

_____

2 marks

9 Which surd is equal to $2\sqrt{3}$? Justify your answer.

H

$\sqrt{6}$ $\sqrt{12}$ $\sqrt{18}$

1 mark

Total marks

Year 9

Using percentages

Name _____

1 Write $\frac{3}{4}$ as a percentage.

_____%

1 mark

2 Match each statement to the correct calculation.

Increase 20 by 15%	20 × 0.15
Decrease 20 by 15%	20 × 1.15
Find 15% of 20	20 × 0.85

2 marks

3 Huan's wage is £10.40 per hour
He receives a 10% pay rise.
What is his new hourly wage?

£_____

2 marks

4 Tom and Lorna sat the same test.
Tom scored 70% on the test.
Lorna scored 29 out of 40 marks.
Who got the higher score?
Justify your answer.

_____

2 marks

5 Mo spends £15 on ingredients to make 40 cookies.
He sells all 40 cookies for 50p each.
Work out Mo's percentage profit.

_____%

2 marks

6 Rosie jumps 32 cm in the air.
Annie jumps 8% higher than Rosie.
How high does Annie jump?

_____

2 marks

7 Dora purchases a kitchen mixer for £425
She pays a 40% deposit and then the remaining amount is paid in monthly instalments of £17
How many monthly instalments will Dora need to pay?

_____

3 marks

8 The cost of a laptop increased by 25% between 2015 and 2019
In 2019, the laptop cost £1000
How much did the laptop cost in 2015?

£_____

2 marks

9 The average house price in 2007 was 5% lower than in 2006
The average house price in 2008 was 5% greater than in 2007
Explain why the average price of house in 2008 Is not the same as the average house price in 2006

1 mark

10 (H) A car is purchased for £11 500
In its first year, the value of the car will depreciate by 15%.
Each year after that, the value of the car will depreciate by 10%.
What is the value of the car at the end of 3 years?

£_____

3 marks

Total marks

Year 9

Maths and money

Name _____

1 Here is part of Annie's bank statement.

Date	Description	Credit (£)	Debit (£)	Balance (£)
May 1st	Opening balance			80.50
May 7th	Phone bill		40.30	40.20
May 11th	Cash deposit	22.50		62.70
May 23rd	Jumpers 'R' Us		17.99	44.71
May 30th	Bank Transfer	50.00		94.71

What did Annie spend the most on?

_____ 1 mark

Find the total amount of money paid into Annie's account.

£_____ 1 mark

Work out the difference between Annie's opening and closing balance.

£_____ 1 mark

2 In the UK, the rate of VAT is 20%
The price of a camera excluding VAT is £96
Calculate the price of the camera including VAT.

£_____ 2 marks

3 Scott earns £7.50 per hour.
He works 8 hours per day, 4 days per week.
How much does Scott earn in a week?

£_____ 2 marks

4 The exchange rate for British pounds (£) to Indian rupees (₹) is £1 = ₹98

Convert £40 to Indian rupees.

₹_____ 1 mark

Convert ₹5194 to British pounds.

£_____ 1 mark

5 Two shops sell the same pens.

Tip Top Pens	**On Point Pens**
£1.68 for 10	£1.98 for 12

Which shop offers better value for money?
Show working to support your answer.

_____ 2 marks

6 An account pays 4% compound interest per year.
Eric invests £1500 into the account for 2 years.
How much interest will he earn?

£_____ 3 marks

7 Brett buys a drum kit for £1250
He pays a 20% deposit
He is charged 15% interest on the remaining balance and pays this in 10 equal monthly instalments.
How much does Brett pay per month for the drum kit?

£_____ 3 marks

8 The table shows how much tax is applied to income.

Taxable Income	Tax Rate
£12 501 to £50 000	20%
£50 001 to £150 000	40%
Over £150 000	45%

Huan says, "Somebody who earns £40 000 pays £8000 in tax".
Explain why Huan is incorrect.

1 mark

Work out the total amount of income tax payable on a salary of £75 000

£_____ 2 marks

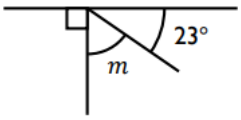
Total marks

Year 9

Deduction

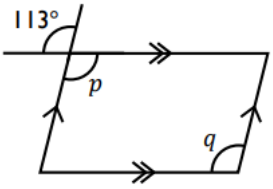
Name _____

1 Work out the size of the angles marked with letters.
Give a reason for each answer.



$m =$ _____ °

2 marks



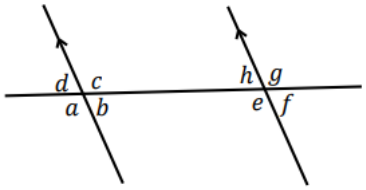
$p =$ _____ °

2 marks

$q =$ _____ °

2 marks

2

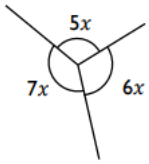


Match each statement to the correct reason.

$b = d$	alternate angles are equal
$b = f$	corresponding angles are equal
$b = h$	vertically opposite angles are equal

2 marks

3



Explain why $18x = 360°$

1 mark

Find the size of the smallest of the 3 angles.

_____ °

1 mark

4 Decide whether each statement is always, sometimes or never true. Circle your answers.

Opposite angles in a rhombus are equal.

Always **Sometimes** **Never**

1 mark

A quadrilateral with a pair of parallel sides has at least one line of symmetry.

Always **Sometimes** **Never**

1 mark

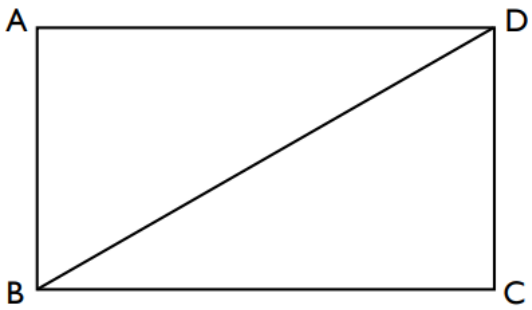
5 The angles in a triangle are $(5x - 3)°$, $(9x)°$ and $(3x + 13)°$. Show that the triangle is right-angled.

3 marks

6 Mo says, "a pentagon cannot contain 4 right-angles."
Is Mo's conjecture correct? Justify your answer.

2 marks

7 ABCD is a rectangle.
H The perpendicular bisector of BD meets AD at X and BC at Y.
Construct this bisector and label points X and Y.



2 marks

What is the mathematical name of shape BXDY?

_____

1 mark

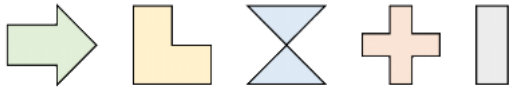
Total marks

Year 9

Rotation and translation

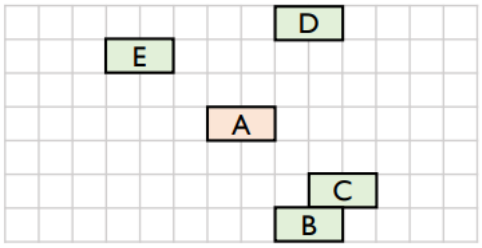
Name _____

1 Which shapes have rotational symmetry of order 2? Tick your answers.



2 marks

2 B, C, D and E are translations of A.



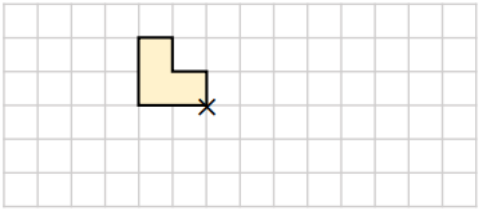
Use B, C, D or E to complete the sentences.

Shape ___ is a translation of A by the vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$.

Shape ___ is a translation of A by the vector $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$.

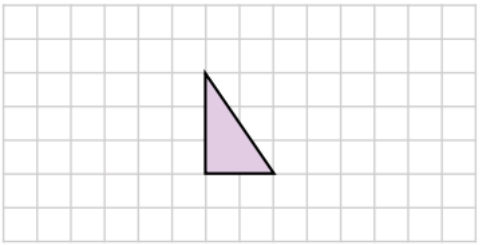
2 marks

3 Rotate the shape 90° anti-clockwise about point ×.



2 marks

4 Translate the shape by the vector $\begin{pmatrix} 4 \\ -1 \end{pmatrix}$.



2 marks

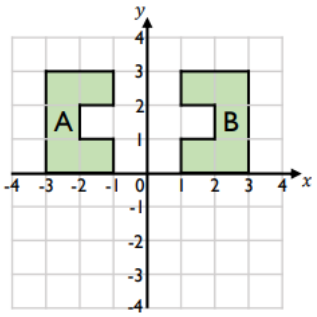
5 *The order of rotational symmetry of a shape is equal to the number of lines of symmetry.*

Draw one example that supports this conjecture, and one example to disprove this conjecture.

Support	Disprove

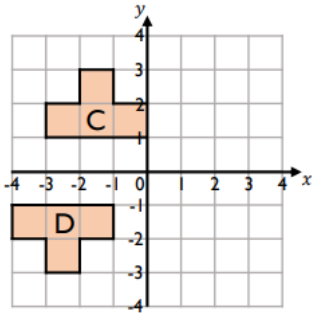
2 marks

6 Describe the transformation that maps shape A onto shape B.



2 marks

7 Describe the transformation that maps shape C onto shape D.



3 marks

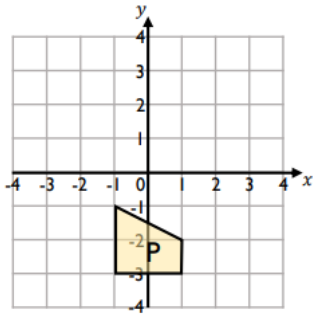
8 The coordinates of point F after a translation by the vector $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$ are (5, 8)

Find the coordinates of point F before the translation.

_____

2 marks

9 (H) Shape P is translated by the vector $\begin{pmatrix} -3 \\ 3 \end{pmatrix}$ and then rotated 180° about the origin to give shape Q. Draw to show the position of shape Q.



3 marks

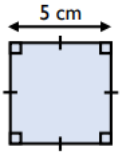
Total marks

Year 9

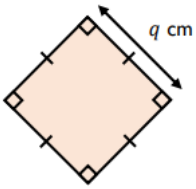
Pythagoras' Theorem

Name _____

1 Work out the values of p and q.



Area = p cm^2

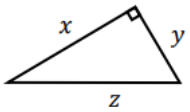


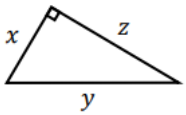
Area = 64 cm^2

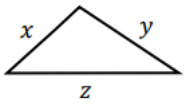
$p =$ _____ $q =$ _____

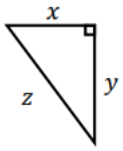
2 marks

2 Tick the triangles for which $x^2 + y^2 = z^2$



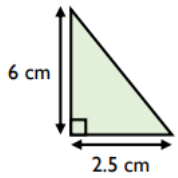






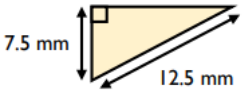
2 marks

3 Calculate the length of the unknown side in each triangle.



_____ cm

2 marks



_____ mm

2 marks

4 The perimeter of the square is 36 m.
Work out the length of its diagonal.

_____ m

3 marks

5 A triangle has sides of length 48 mm, 5 cm and 1.4 cm.
Is the triangle right-angled?
Show working to justify your answer.

3 marks

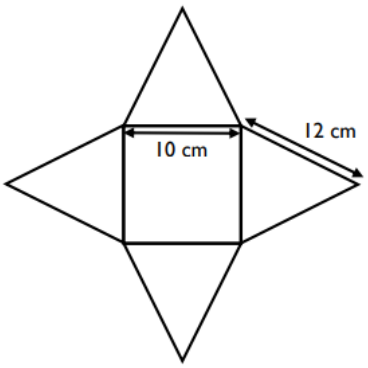
6 The point P has coordinates (5, 7)
The point Q has coordinates $(-1, -1)$
Find the length of the line segment PQ.

_____ units

3 marks

7 Here is the net of a square-based pyramid.

H



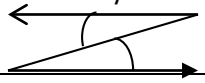
Calculate the height of the square-based pyramid.

_____ m

3 marks

Total marks

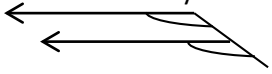
Mixed H

6.1 1. Which is bigger: $\frac{7}{8}$ or $\frac{3}{4}$?		*6.6* 11. If x = 2, calculate the value of: $x^2 + 2x$	
6.1 2. Which is bigger: 12.5% or $\frac{3}{20}$?		*6.6* 12. If x = -2, calculate the value of: $x^2 + 2x$	
6.2 3. Increase 44 by 10%		*6.7* 14. Solve: 3(x - 3) = 0	
6.2 4. Decrease £680 by 10%		*6.7* 14. Solve: 5x + 1 = 3	
6.3 5. Divide 132kg in a ratio of 3:3:5		*6.8* 15. Find the nth term of this sequence 7 12 17 22 27 ...	
6.3 6. Divide £32 in a ratio of 3:7		21. Work out the height of a parallelogram of base 5cm and area 45cm^2.	
6.4 7. If 70% is £14, what is the full cost?		*6.9* 17. If y=4x + 3, find the value of y when x = -2	
6.4 8. 4bags of cement do 18m^2, how many m^2 can be done with 7bags?		23. Work out the height of a triangle with a base 10m and area 20m^2.	
6.5 9. Work out: $\frac{2}{3} + \frac{3}{4}$		22. These angles are equal. What are they called? 	
6.5 10. Work out: $5 \times \frac{3}{4}$		25. Work out the volume of a cuboid of edge 4cm by 4cm by 7cm?	

Mixed I

6.1 1. Which is bigger: $\frac{5}{8}$ or $\frac{2}{3}$?		*6.6* 11. If x = 4, calculate the value of: $x^2 + 2x$	
6.1 2. Which is bigger: 17.5% or $\frac{1}{6}$?		*6.6* 12. If x = -4, calculate the value of: $x^2 + 2x$	
6.2 3. Increase 1200 by 2%		*6.7* 14. Solve: 3x - 13 = 2	
6.2 4. Decrease £1200 by 2%		*6.7* 14. Solve: 3x + 1 = 3	
6.3 5. Fruit : Sugar in 2 : 3. If 15kg of sugar is used, how much fruit?		*6.8* 15. Find the nth term of this sequence 3 13 23 33 43 ...	
6.3 6. Fruit : Sugar in 2 : 3. If 8kg of fruit is used, how much sugar?		21. Work out the height of a parallelogram of base 4cm and area 32cm^2.	
6.4 7. If 75% is £45, what is the full cost?		*6.9* 17. If x + y = 10, find the value of y when x = 3	
6.4 8. 6bags of plaster do 33m^2, how many m^2 can be done with 5bags?		22. These angles are equal. What are they called? 	
6.5 9. Work out: $\frac{2}{3} \times 2$		23. Work out the height of a triangle with a base 8m and area 12m^2.	
6.5 10. Work out: $8 \div \frac{4}{5}$		25. Work out the **volume** of a cube of edge 3m?	

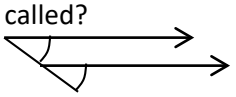
Mixed J

6.1 1. Which is bigger: $\frac{3}{10}$ or $\frac{3}{5}$?		*6.6* 11. If x = 3, calculate the value of: $2x^2 + x$	
6.1 2. Which is bigger: 0.96 or $\frac{19}{20}$?		*6.6* 12. If x = -3, calculate the value of: $2x^2 + x$	
6.2 3. Increase 1500 by 50%		*6.7* 14. Solve: 5x - 3 = 5	
6.2 4. Decrease £1200 by 25%		*6.7* 14. Solve: 5x + 4 = 3	
6.3 5. Paint is Red : Blue in a ratio 2 : 4. If 5 litres of red is used, how much blue?		*6.8* 15. Find the nth term of this sequence 12 22 32 42 52 ...	
6.3 6. Paint is Red : Blue in a ratio 2 : 4. If 6 litres of blue is used, how much red?		21. Work out the height of a parallelogram of base 5cm and area 60cm^2.	
6.4 7. If 75% is £60, what is the full cost?		*6.9* 17. If x + y = 6, find the value of y when x = -2	
6.4 8. 12bags of plaster do 54m^2, how many bags are needed for 36m^2?		22. These angles are equal. What are they called? 	
6.5 9. Work out: $\frac{5}{8} \times 2$		23. Work out the height of a triangle with a base 5m and area 20m^2.	
6.5 10. Work out: $6 \div \frac{3}{5}$		25. Work out the **volume** of a cube of edge 2m?	

Mixed K

6.1 1. Which is bigger: $\frac{1}{8}$ or $\frac{1}{7}$		*6.6* 11. If x = 3, calculate the value of: $x^3 - x^2$	
6.1 2. Which is bigger: 45% or $\frac{5}{11}$?		*6.6* 12. If x = -3, calculate the value of: $x^3 - x^2$	
6.2 3. Increase 48m by 20 %		*6.7* 14. Solve: 3(x - 1) = 6	
6.2 4. Decrease 680 by 25%		*6.7* 14. Solve: $\frac{2x}{3} = 4$	
6.3 5. A TV has height:width in ratio 3:4. In a scale drawing the width is 10cm. What would the height be?		*6.8* 15. Find the nth term of this sequence -2 3 8 13 18 ...	
6.3 6. A & B share the cost in a ratio of 3:2. A pays £126, how much does B pay?		21. Work out the area of a parallelogram with a base of 9cm and a height of 10cm	
6.4 7. The exchange rate is: £1 = €1.12 How many £ would I get for €336		*6.9* 17. If y = 2x + 5, find the value of y when x = -4	
6.4 8. 1kg = 2.2pounds. How many kg in 22pounds?		22. Three of the angles of a quadrilateral add up to 260^0. What is the size of the fourth one?	
6.5 9. Work out: $\frac{5}{6} - \frac{1}{2}$		23. Work out the area of a triangle with a height of 5.6cm and a base length of 3cm	
6.5 10. Work out: $\frac{3}{4} \div \frac{2}{7}$		25. Work out the **volume** of a cuboid 7cm by 3cm by 10cm?	

Mixed L

6.1 1. Which is bigger: $\frac{1}{8}$ or 12%?		*6.6* 11. If x = 2, calculate the value of: $2x^2 - x$	
6.1 2. Which is bigger: $\frac{3}{5}$ or $\frac{2}{3}$?		*6.6* 12. If x = -2, calculate the value of: $2x^2 - x$	
6.2 3. Increase 160km by 30%		*6.7* 14. Solve: 3 = 2x + 9	
6.2 4. Decrease £840 by 5%		*6.7* 14. Solve: 7x - 4 = 2	
6.3 5. Boys : Girls are in a ratio 2 : 4. If there are 12 boys, how many girls?		*6.8* 15. Find the nth term of this sequence -1 3 7 11 15 ...	
6.3 6. A, B & C share the rent in a ratio of 4:3:2. The rent is £216. How much does A pay?		21. Work out the height of a parallelogram of base 6cm and area 27cm^2.	
6.4 7. If 120% is £48, what is 100%?		*6.9* 17. If x + y = 8, find the value of y when x = -1	
6.4 8. 5miles = 8km. How many km in 40 miles?		22. These angles are equal. What are they called? 	
6.5 9. Work out: $\frac{3}{4}$ of 7kg		23. Work out the height of a triangle with a base 6m and area 27m^2.	
6.5 10. Work out: $8 \div \frac{2}{3}$		25. Work out the **volume** of a cuboid 2cm by 5cm by 3cm?	