



for **AQA, Edexcel** and **OCR**
two-tier GCSE mathematics

Resource sheets for *Foundation 2*

© The School Mathematics Project 2007

The resource sheets in this publication may, free of charge, be downloaded, copied or stored digitally or mechanically for use by an educational institution or private student that has purchased the textbook to which they relate. Digital and mechanically produced copies (or copies of any other kind whatever) of all or part of this publication remain in the copyright of The School Mathematics Project and may not be stored, distributed or used in any way whatever (other for the normal purposes of setting homework to the institution's students) outside the purchasing institution or, in the case of a private student, outside that student's residence.

www.smpmaths.org.uk

Elco uses a formula to work out electricity bills.

$$C = S + np$$

C is the total charge in £; S is a standing (fixed) charge in £;
 n is the number of units of electricity used; p is the cost in £ of 1 unit.

- (a) (i) For this bill for Mrs Smith, write down the values of S , n and p .

$S =$

$n =$

$p =$

- (ii) Use the formula above to fill in Mrs Smith's total charge.

- (b) Fill in the blanks in the bills below.

ELCO plc - the supplier it's a pleasure to pay

Mrs J Smith The Meadows Fingleton Bucks BB1 8NU	Current reading	1568	
	Previous reading	1212	
	Units used	356	
Standing charge £	15.00	Total charge £	
Cost per unit £	0.12		

P

ELCO plc - the supplier it's a pleasure to pay

S J Jones Ltd 21 The Flingge Postlethwaite Yorks YO3 9JG	Current reading	4780	
	Previous reading	4100	
	Units used		
Standing charge £	25.00	Total charge £	
Cost per unit £	0.10		

Q

ELCO plc - the supplier it's a pleasure to pay

Pet International Unit 653 Fido Ind Estate Barking BA2 8UU	Current reading	59850	
	Previous reading	41100	
	Units used		
Standing charge £	60.00	Total charge £	
Cost per unit £	0.07		

R

ELCO plc - the supplier it's a pleasure to pay

Garden Tools plc 7 Digworthy Road Weedon WE6 7OP	Current reading	42000	
	Previous reading	31200	
	Units used		
Standing charge £	50.00	Total charge £	
Cost per unit £	0.08		

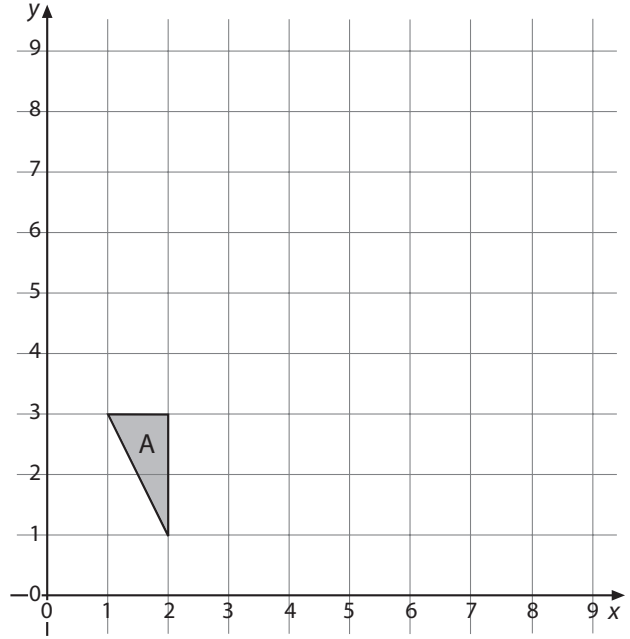
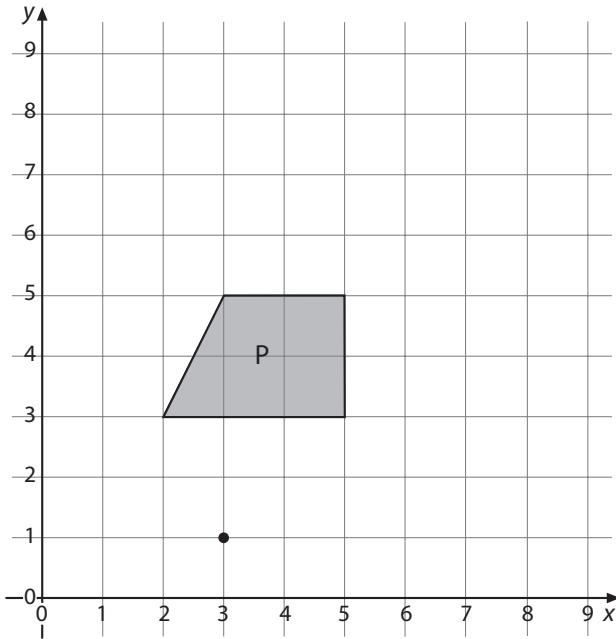
S

ELCO plc - the supplier it's a pleasure to pay

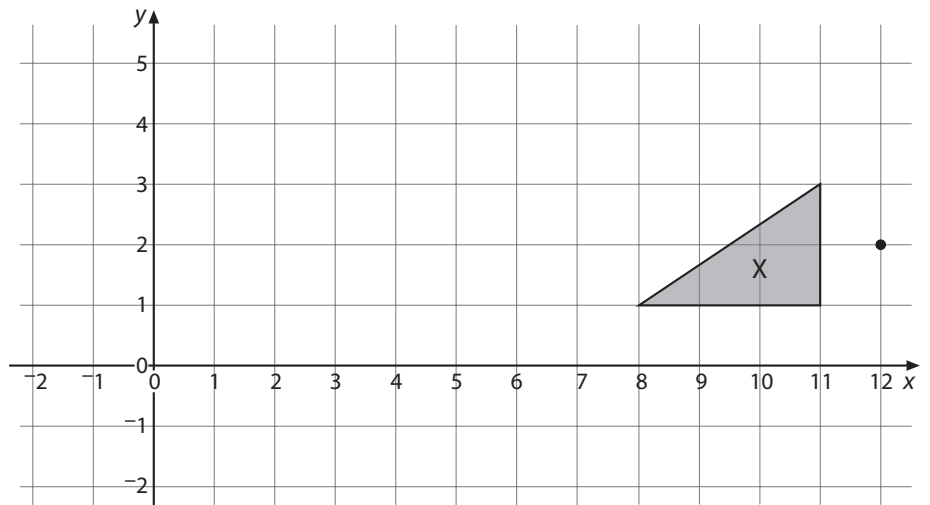
Ductile Metals Pullem House Thinly TH5 6YY	Current reading		
	Previous reading	3500	
	Units used		
Standing charge £	40.00	Total charge £	110.00
Cost per unit £	0.10		

- (a) Enlarge P by a scale factor of 2 with centre of enlargement (3, 1).
Label the image Q.

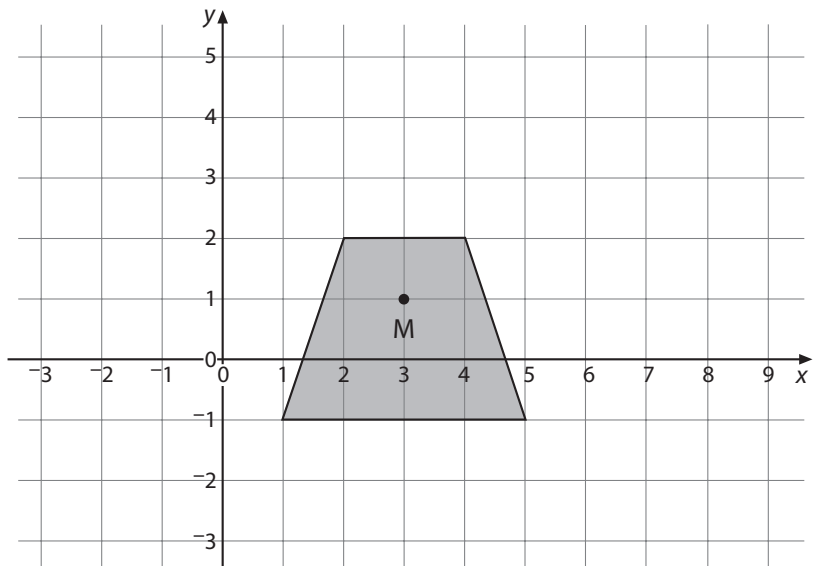
- (b) Enlarge A by a scale factor of 3 with centre of enlargement (0, 0).
Label the image B.



- (c) Enlarge X by a scale factor of 3 with centre of enlargement (12, 2).
Label the image Y.

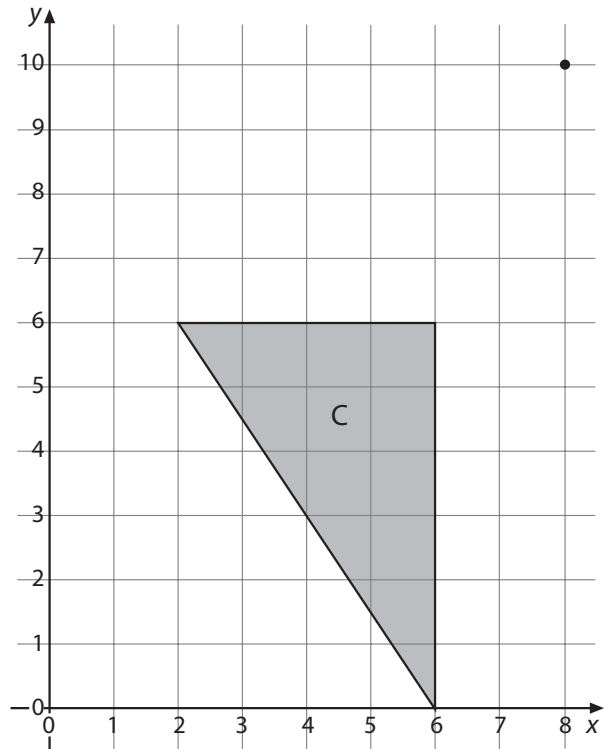
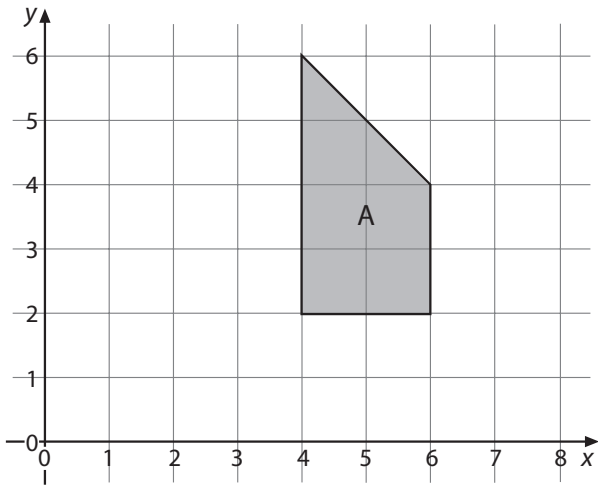


- (d) Enlarge M by a scale factor of 2 with centre of enlargement (3, 1).
Label the image N.

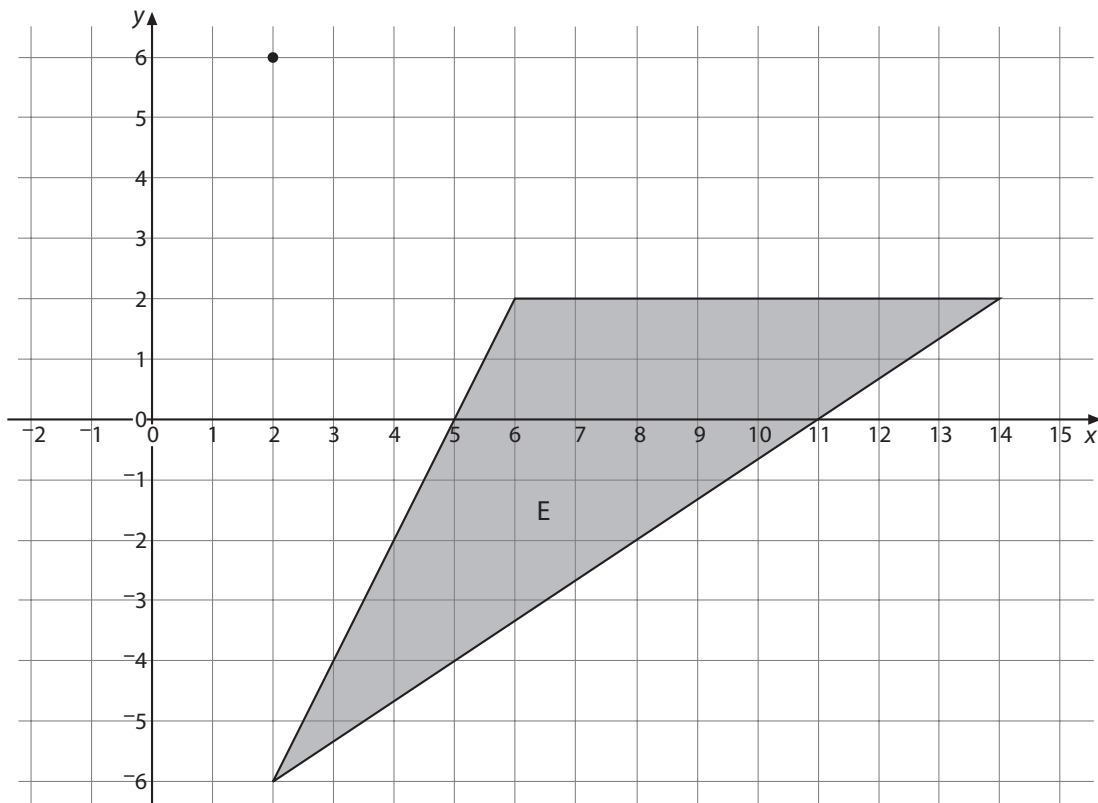


- (a) Enlarge A by a scale factor of $\frac{1}{2}$ with centre of enlargement (0, 0).
Label the image B.

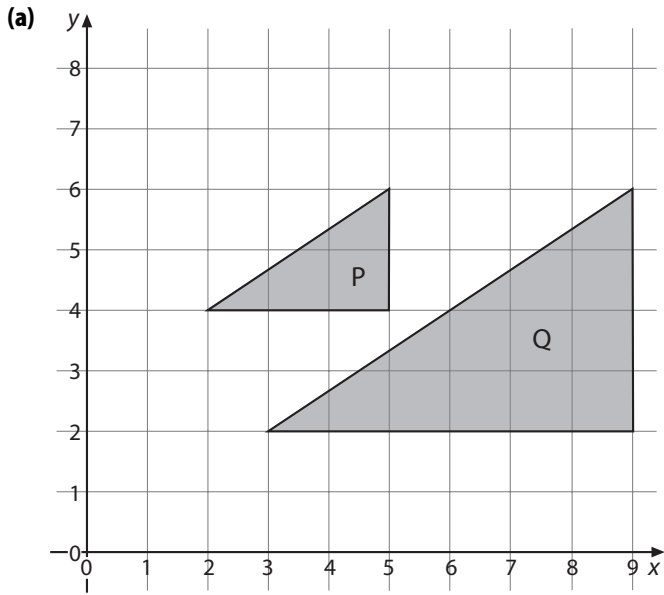
- (b) Enlarge C by a scale factor of $\frac{1}{2}$ with centre of enlargement (8, 10).
Label the image D.



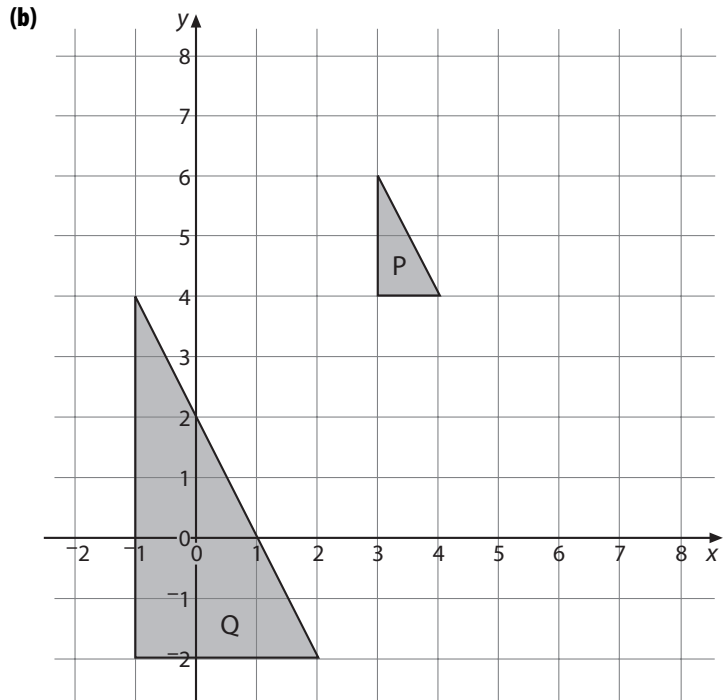
- (c) Enlarge E by a scale factor of $\frac{1}{4}$ with centre of enlargement (2, 6).
Label the image F.



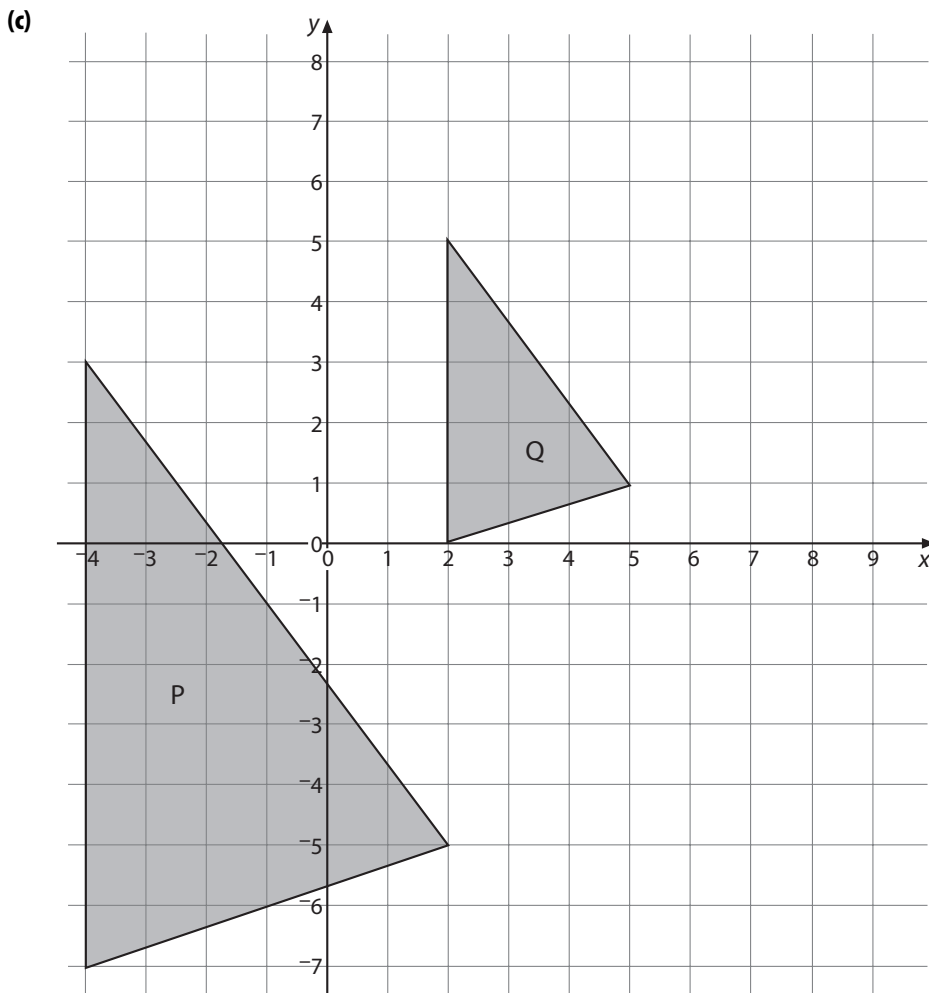
In each diagram, shape P has been enlarged to give shape Q.
Complete the description for each one.



Shape Q is an enlargement of shape P with
scale factor
and centre of enlargement (.....,

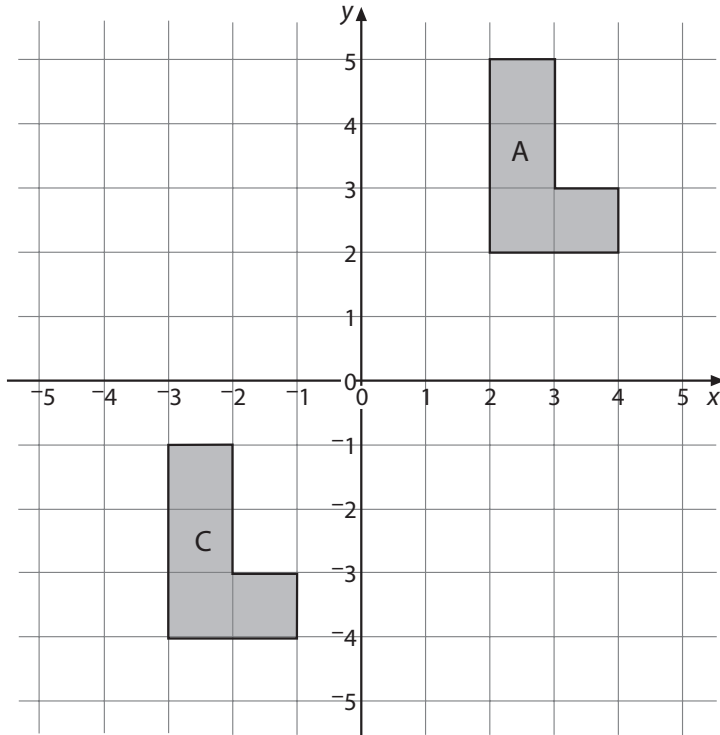


Shape Q is an enlargement of shape P with
scale factor
and centre of enlargement (.....,

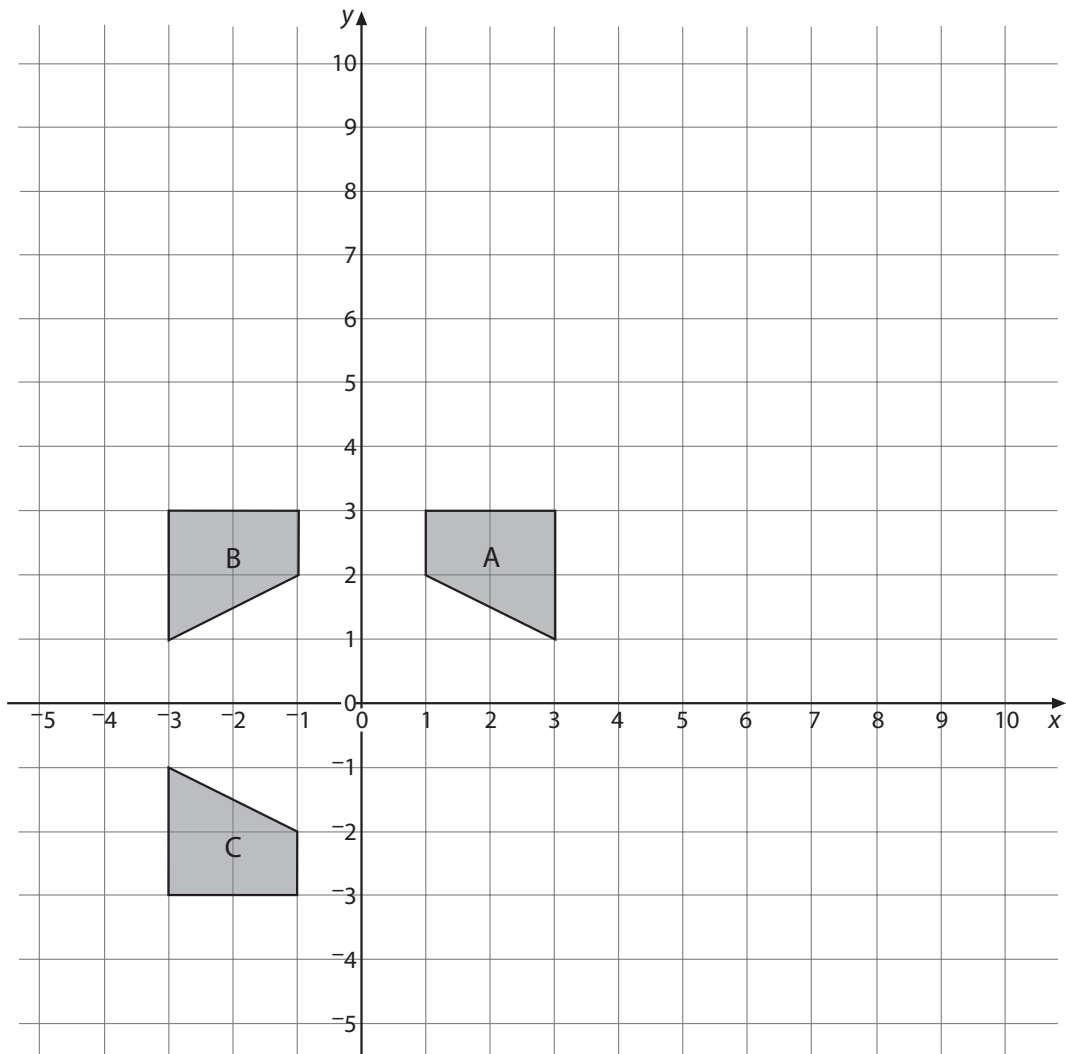


Shape Q is an enlargement of
shape P with
scale factor
and centre of enlargement
(.....,

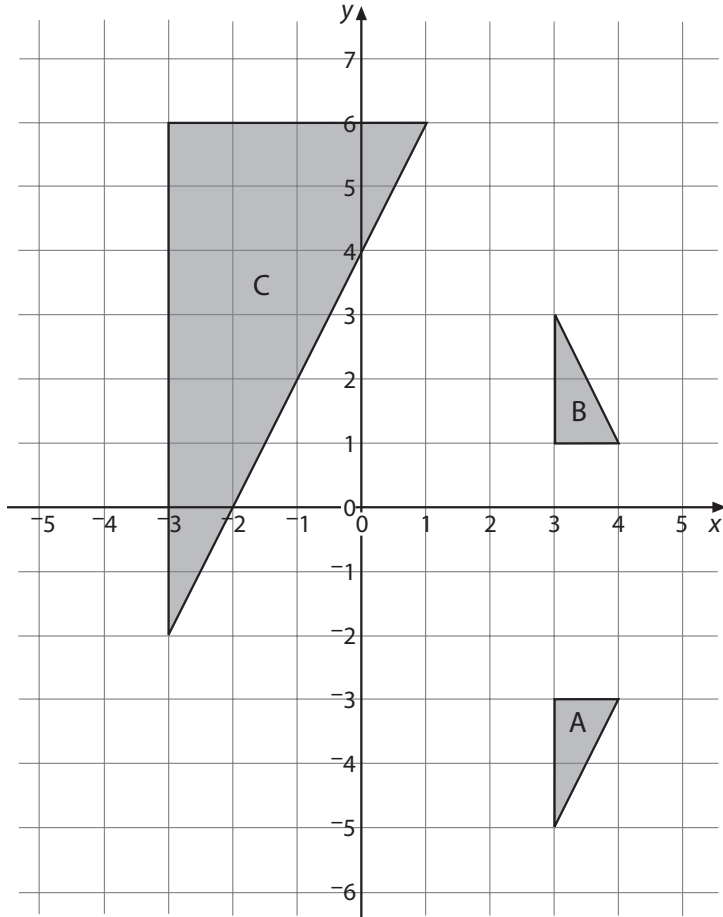
E2



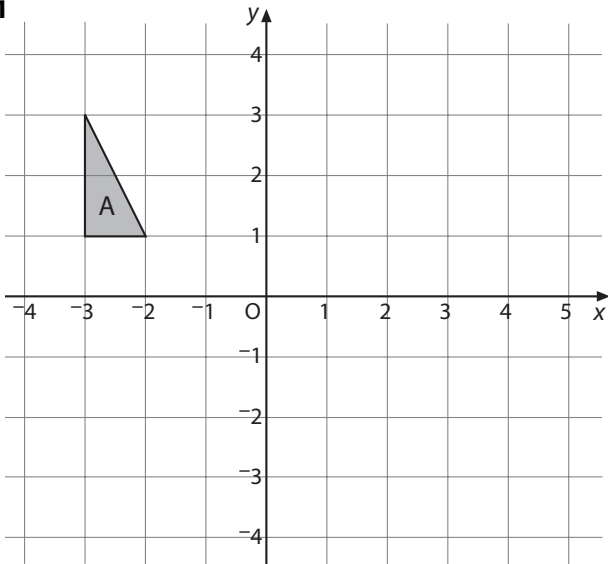
E3



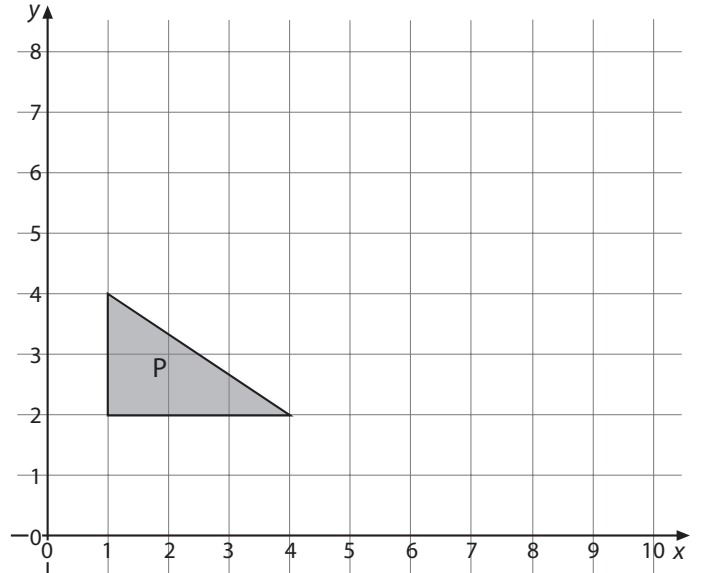
E4



T1



T2



For each puzzle...

- Do each calculation, showing any working clearly.
- Shade in your answers on the diagram on the right.
- Your answers should make a path across the board from S to F.

Puzzle 1
 $a = 2, b = -3$

A B

C D

E F

G

Puzzle 2
 $p = 3, q = 5$

A B

C D

E F

G

Puzzle 3
 $x = -2, y = 4$

A B

C D

E F

G

Cover-up

- Cut out the eight cover-up pieces below.
- On each board, put on the pieces so that each piece covers a pair of expressions which **multiply** to give the expression on the piece.

For example, 2^4 may cover 2^2 and 2^2 , or it may cover 2^3 and 2 .

The pieces can be put this way or this way .

- How many pieces can you put on each board?
- Can you find a way to completely cover each board?

Cover-up board 1

2^2	2^2	2^2	2^7
2^6	2	2^5	2^4
2	2	2^2	2
2^3	2^3	2^3	2

Cover-up board 2

2^2	2^2	2^5	2^6
2^3	2	2^3	2^2
2^3	2	2^3	2^2
2	2^2	2	2^7

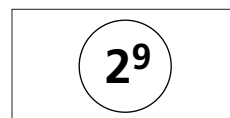
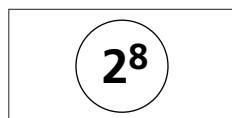
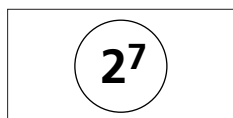
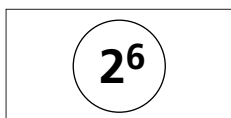
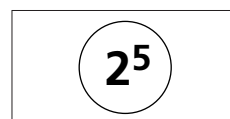
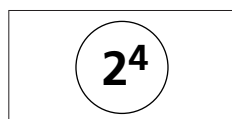
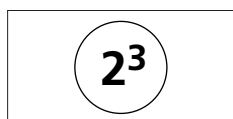
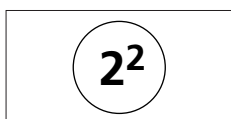
Cover-up board 3

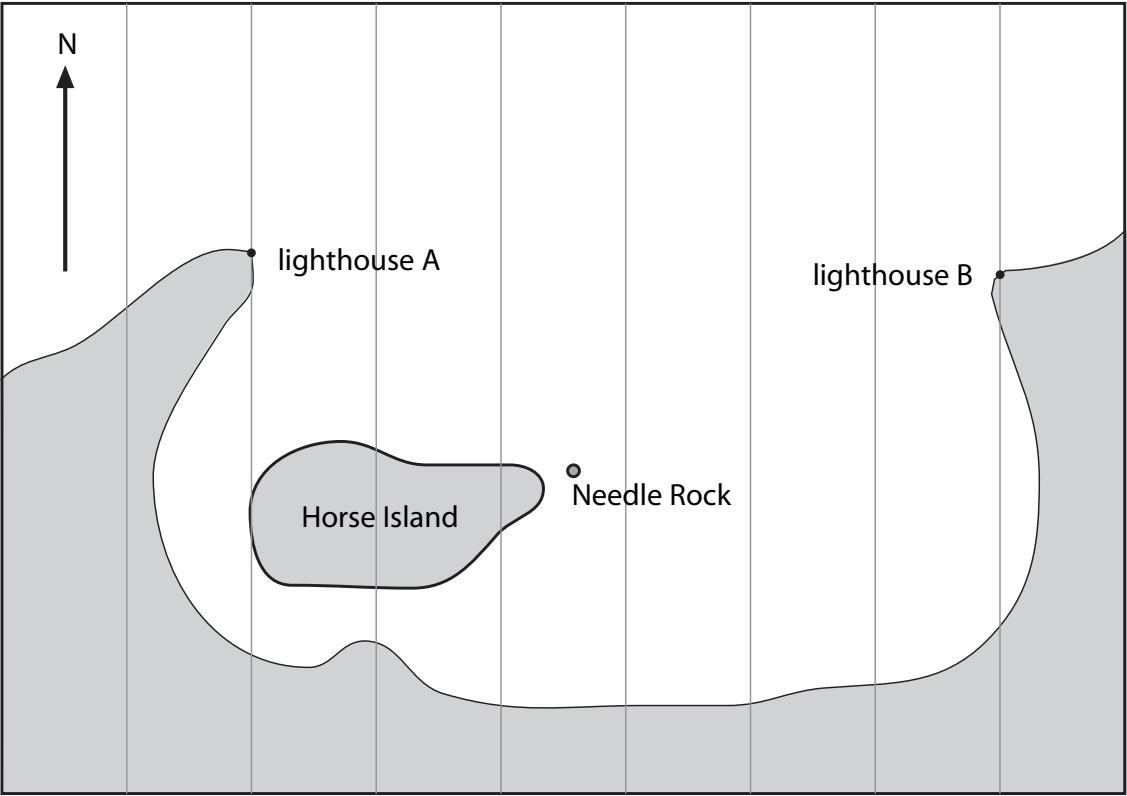
2^4	2	2	2
2^3	2^7	2^2	2^2
2^3	2^4	2^3	2^4
2	2^4	2^3	2

Cover-up board 4

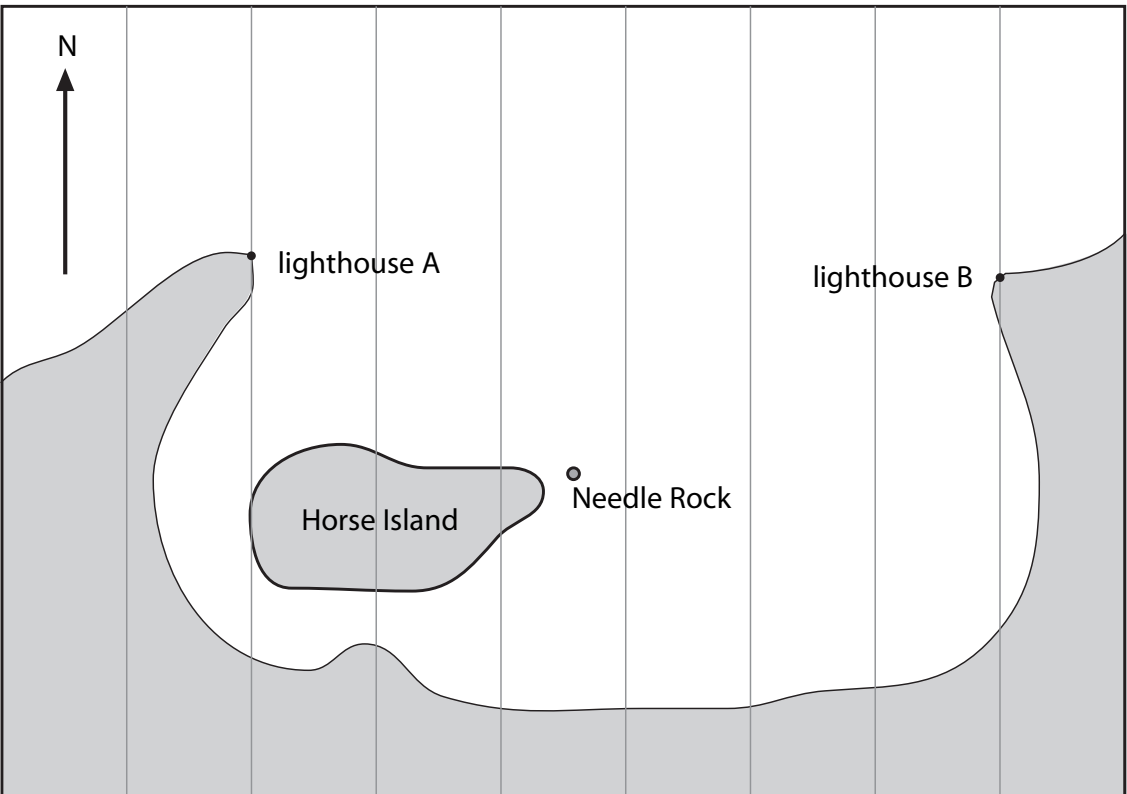
2^3	2^7	2^2	2^2
2^4	2	2^3	2
2^4	2	2^2	2^2
2^2	2^6	2^2	2^2

Cover-up pieces



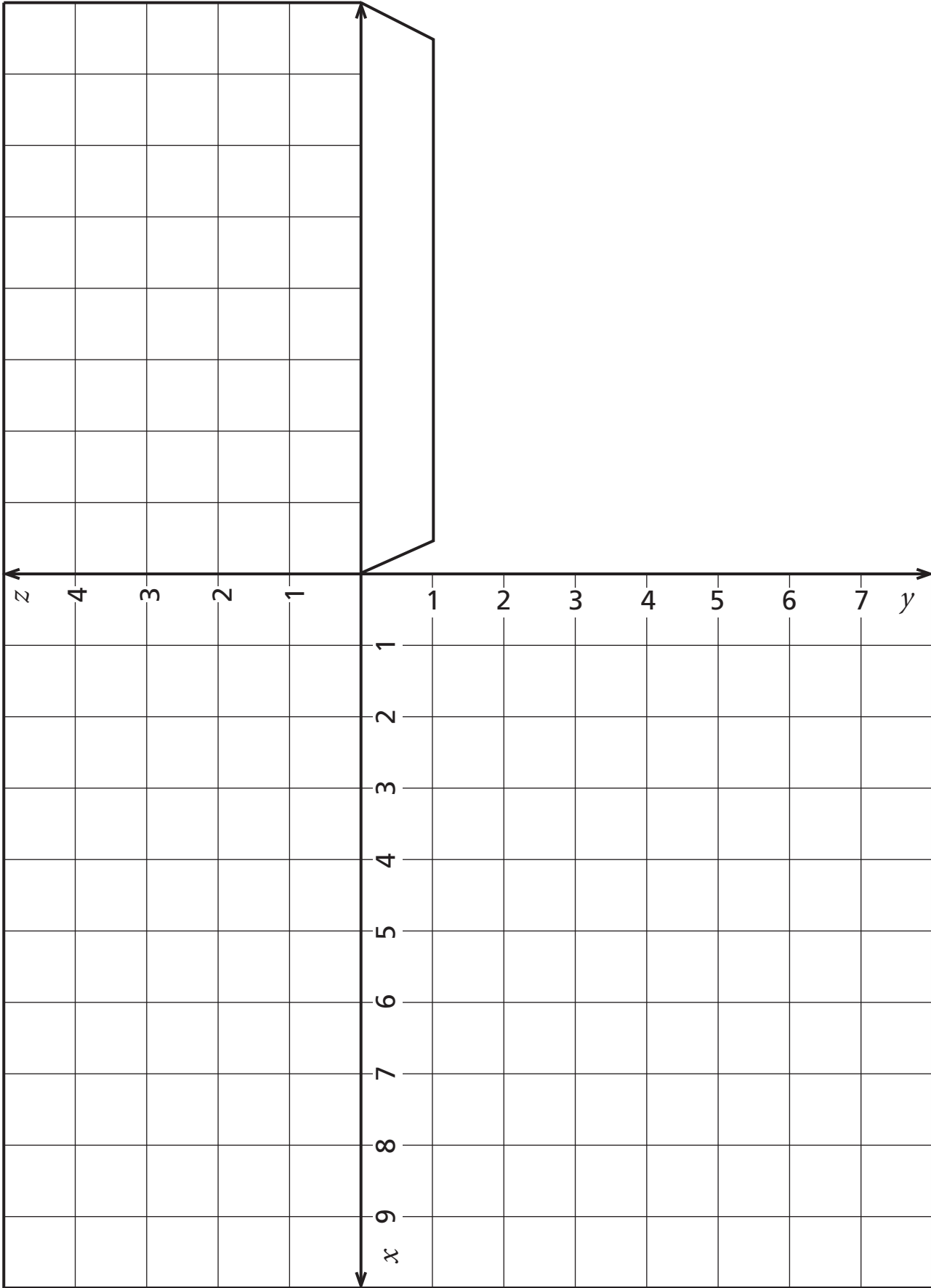


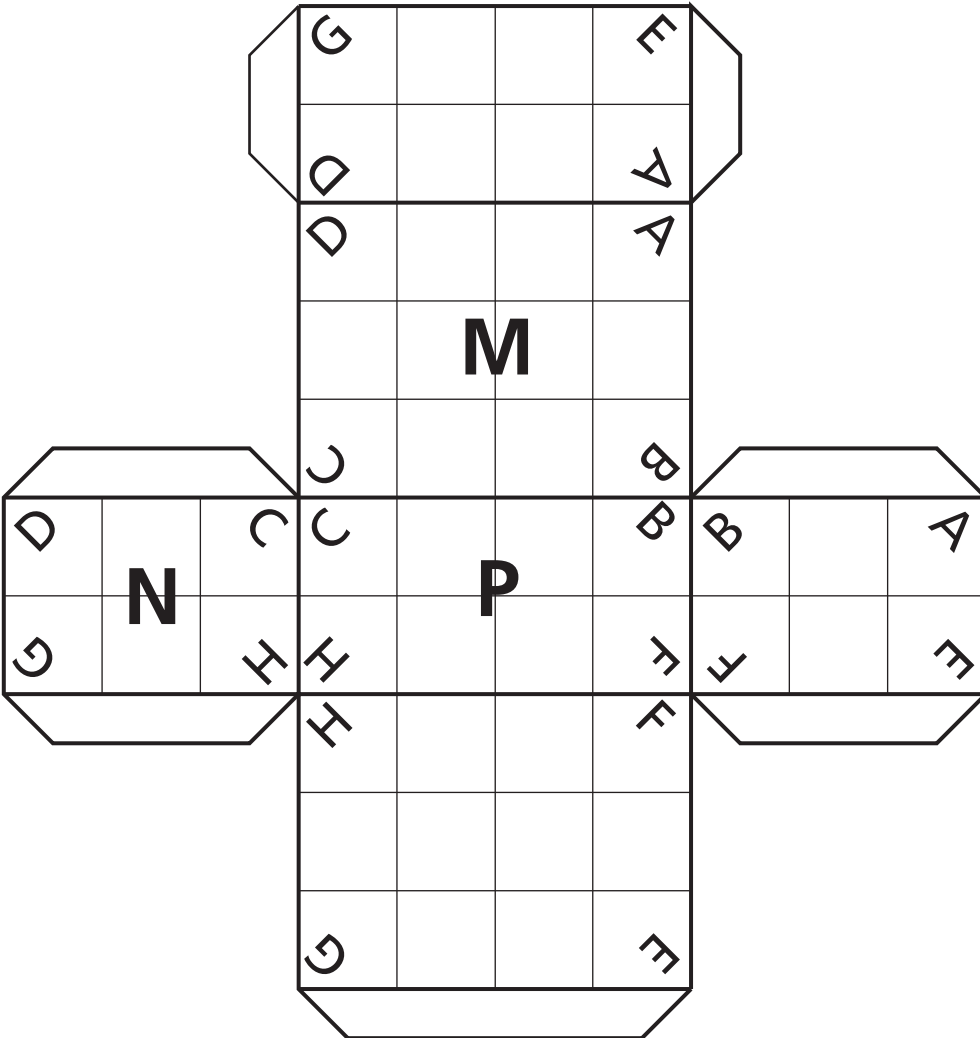
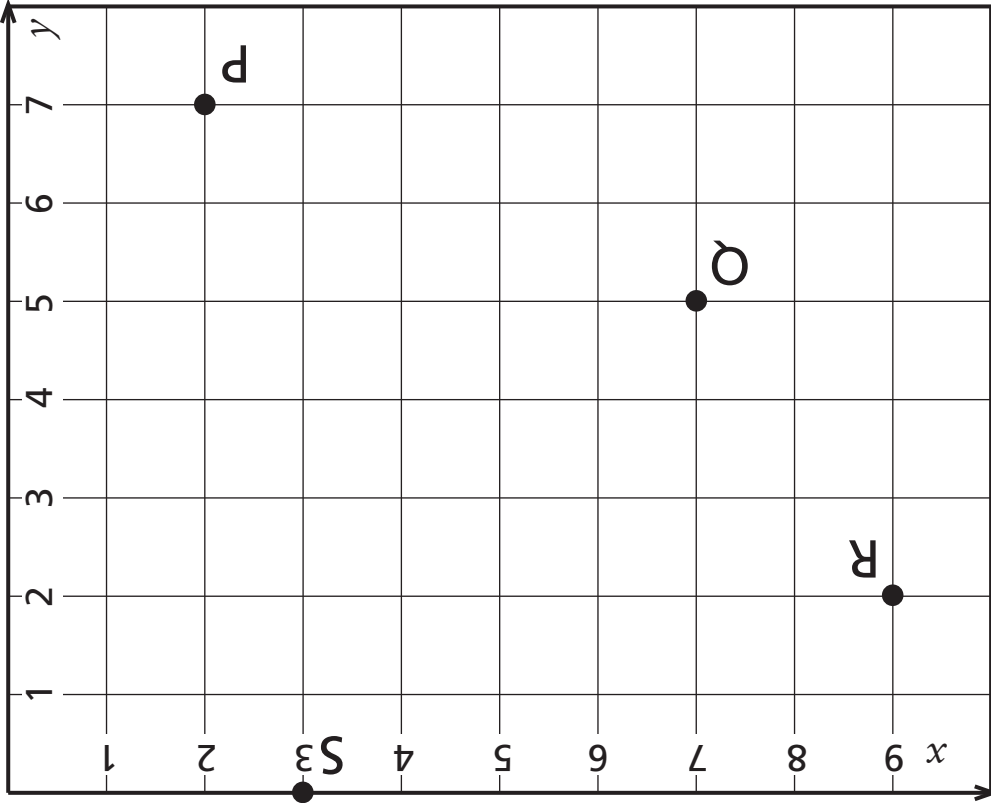
Scale is 1 cm to 1 km



Scale is 1 cm to 1 km

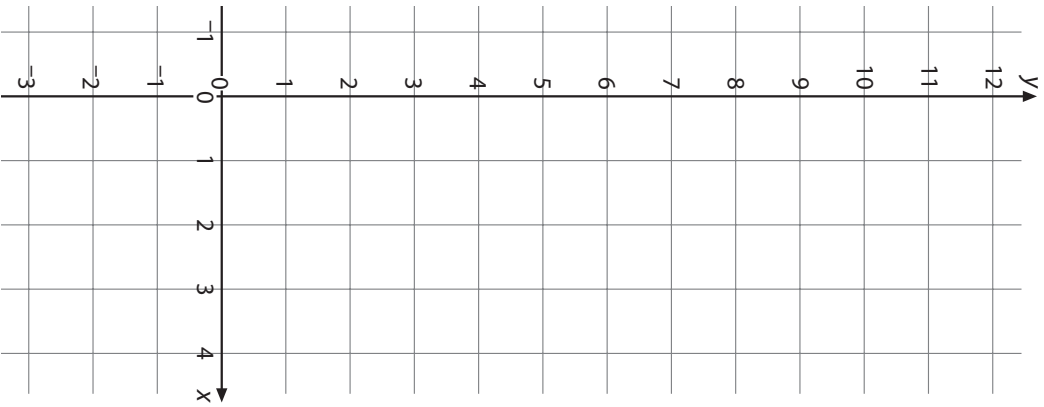
Check that this line is 100 mm long and if not adjust print scaling before using sheet.





A

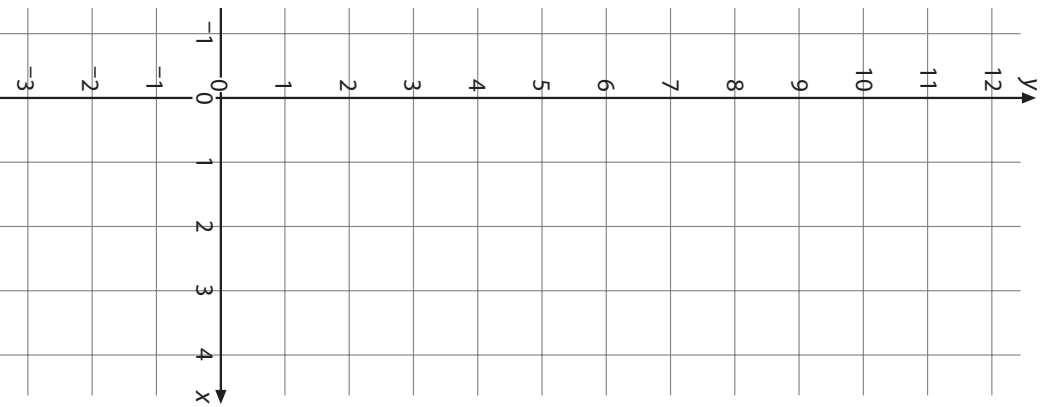
$y = 2x$



Gradient

B

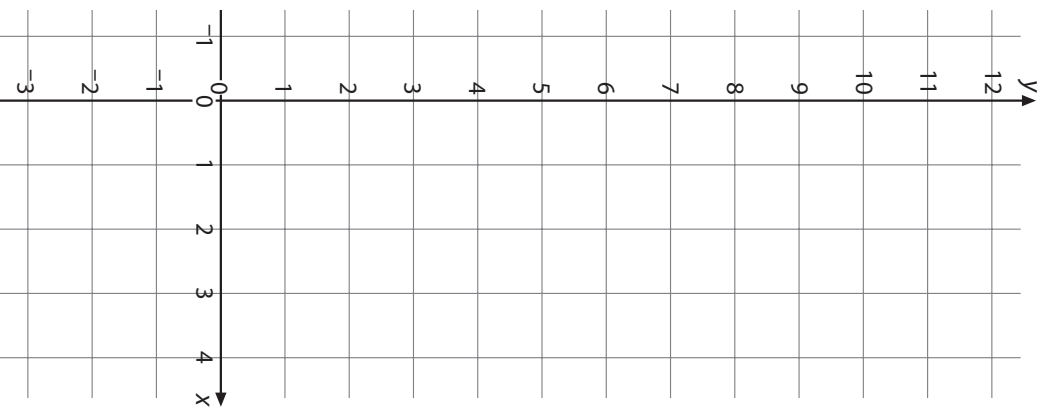
$y = 3x$



Gradient

C

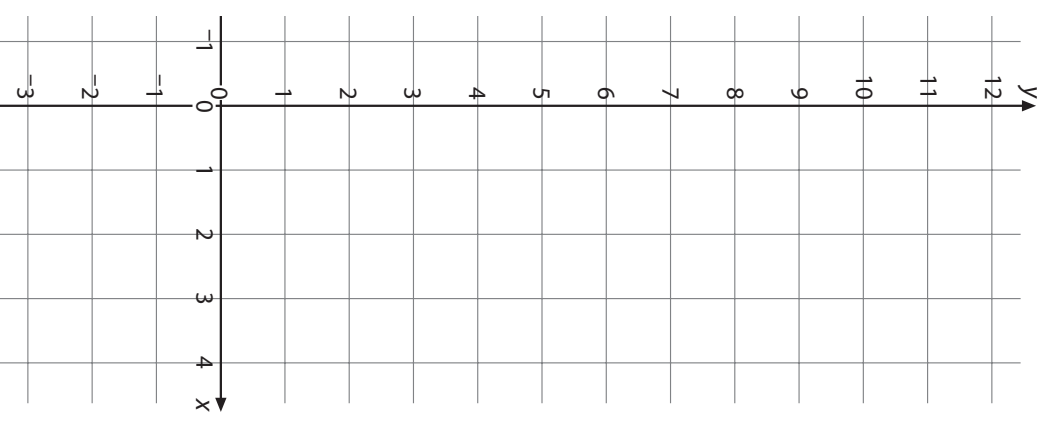
$y = x$



Gradient

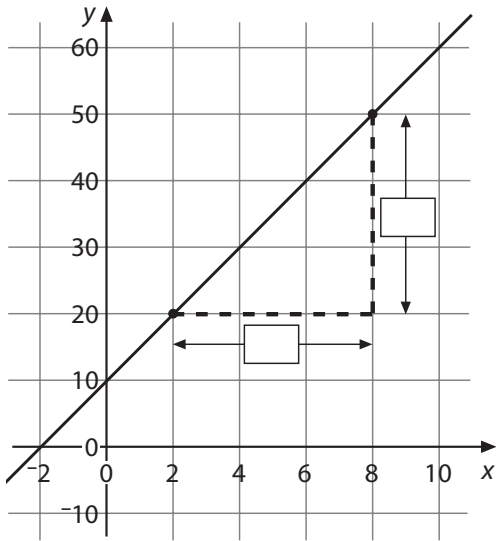
D

$y = \frac{1}{2}x$



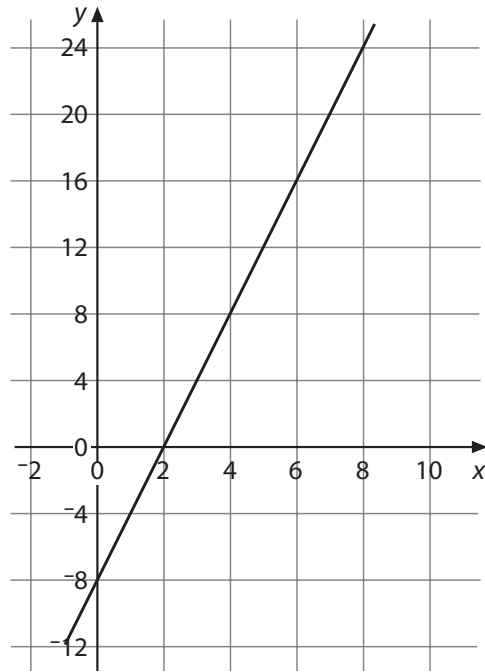
Gradient

(a) A triangle has been drawn under two points on this line.



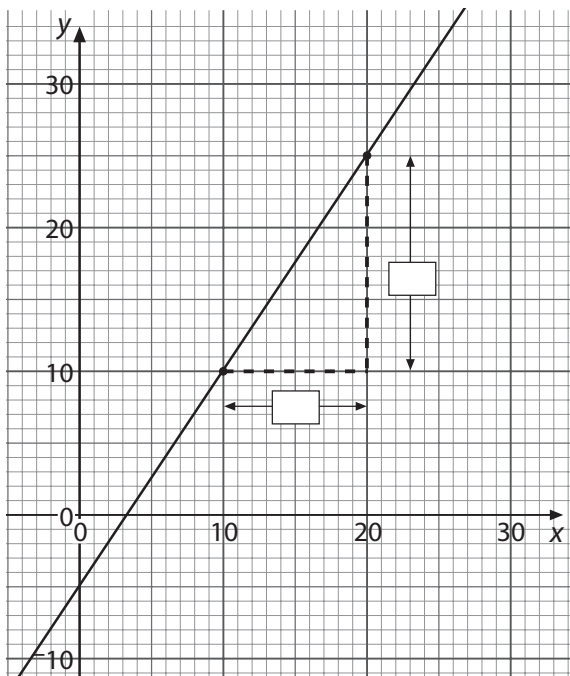
- (i) Fill in the boxes to show the height and length of the base.
- (ii) Work out the gradient of this line.
- (iii) Write down the equation of the line.

(b)



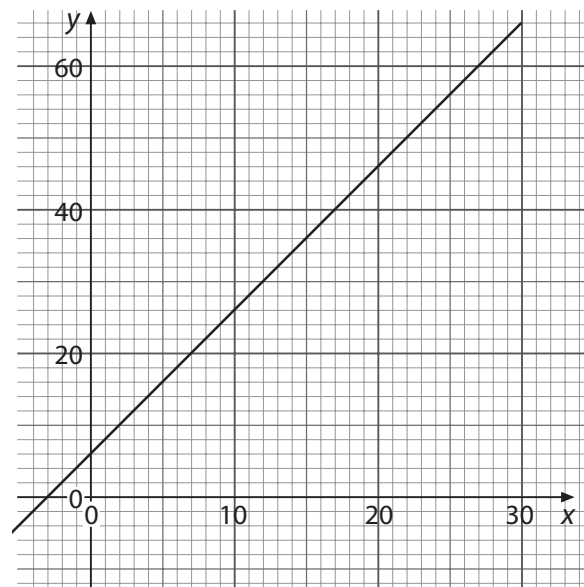
- (i) Pick two points on this line and draw your own triangle.
- (ii) Work out the gradient of this line.
- (iii) Write down the equation of the line.

(c) A triangle has been drawn under two points on this line.



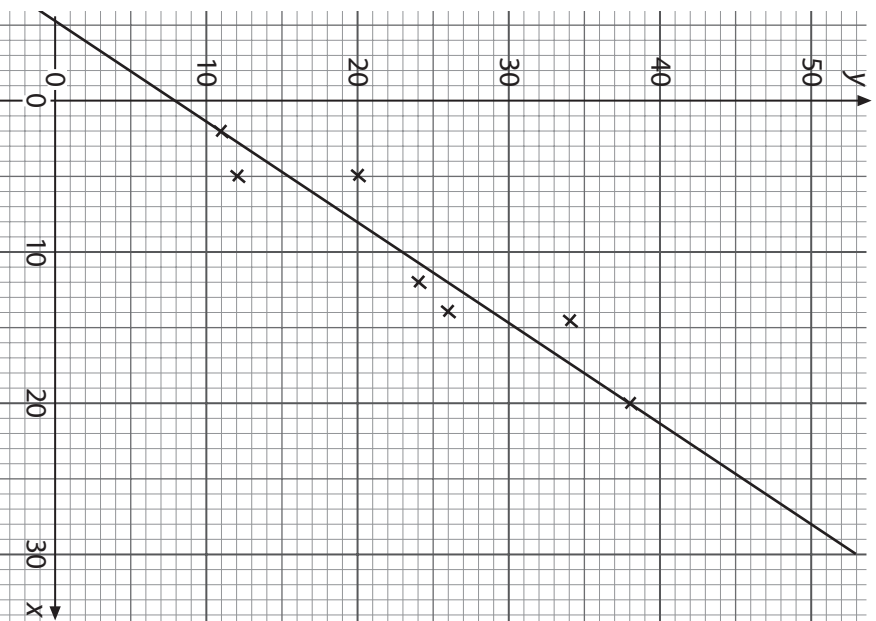
- (i) Fill in the boxes to show the height and length of the base.
- (ii) Work out the gradient of this line and write it as a decimal.
- (iii) Write down the equation of the line.

(d)



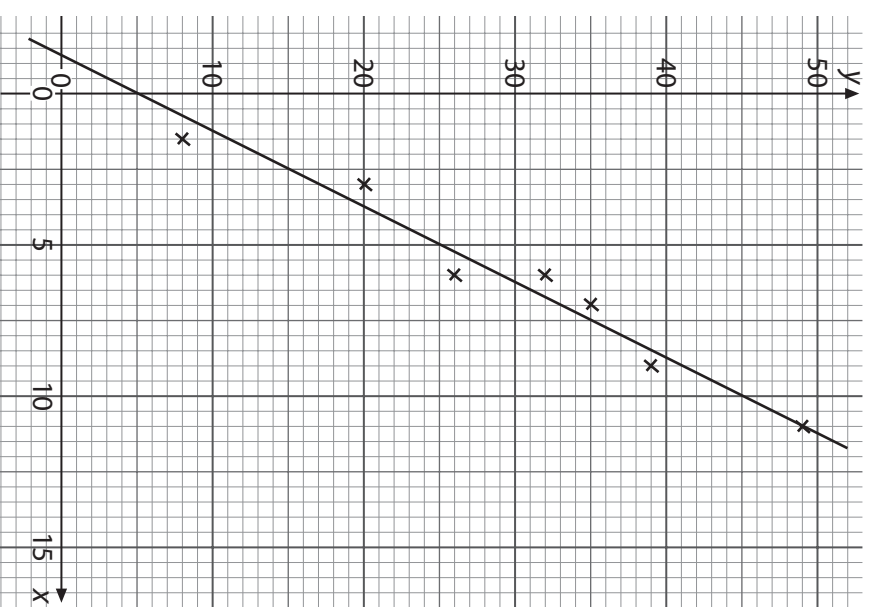
- (i) Pick two points on this line and draw your own triangle.
- (ii) Work out the gradient of this line.
- (iii) Write down the equation of the line.

(a) A line of best fit has been drawn on the diagram below.

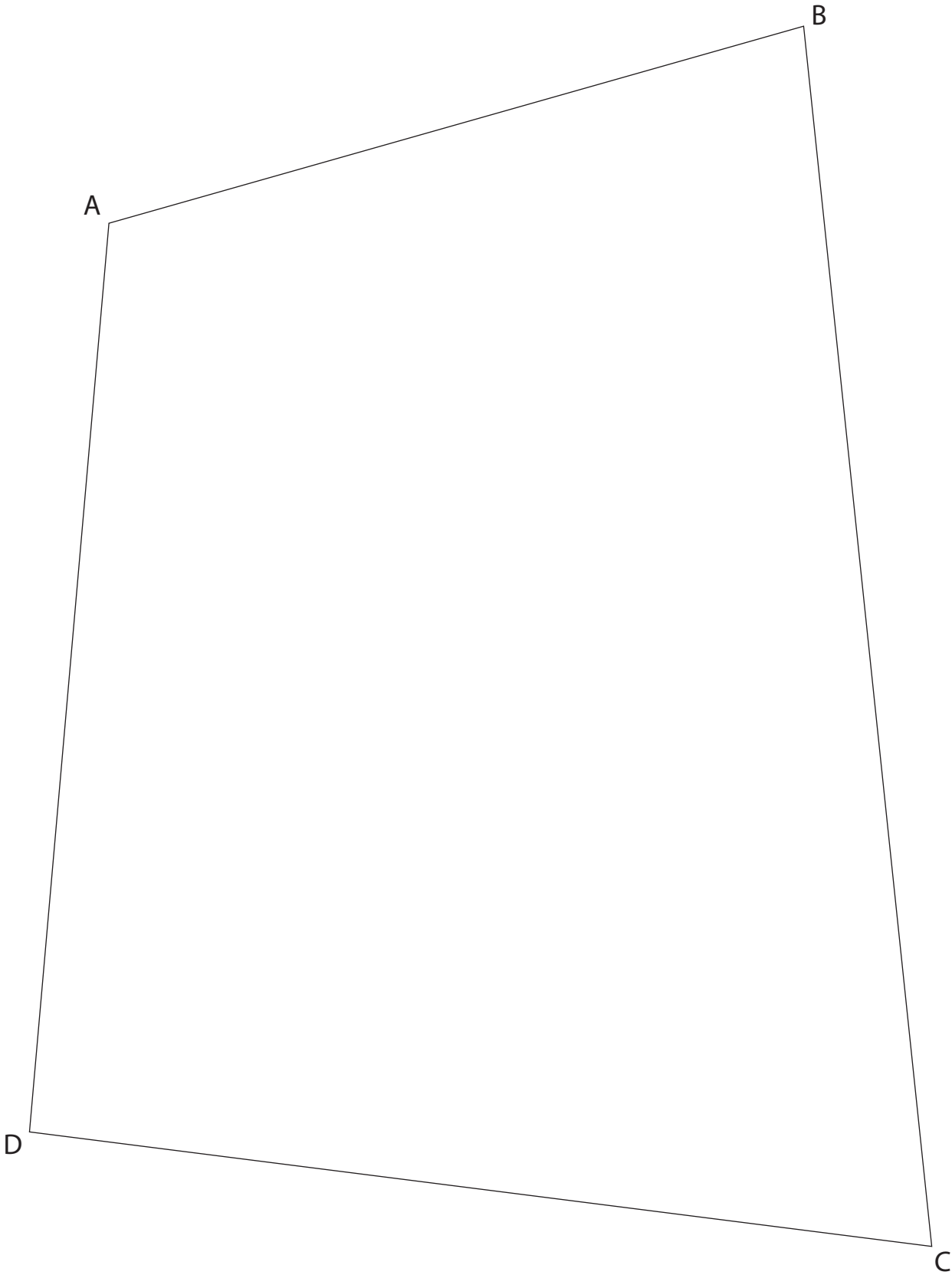


- (i) Use the line to estimate the value of y when $x = 10$.
- (ii) Find the gradient of the line.
- (iii) Where does the line cross the y -axis?
- (iv) Write down the equation of the line.

(b) A line of best fit has been drawn on the diagram below.



- (i) Use the line to estimate the value of x when $y = 25$.
- (ii) Find the equation of the line.



Scale: 1 cm represents 1 metre

Check that this line is 100 mm long and if not adjust print scaling before using sheet.



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220