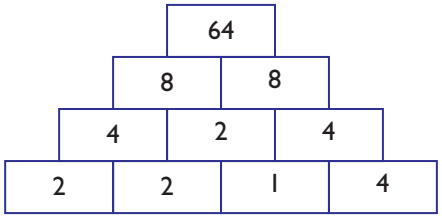
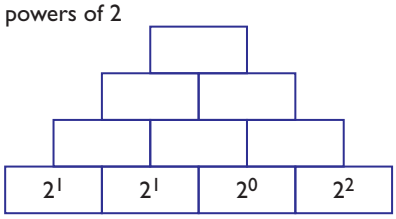
Strand 7 • Unit 7 • Fractional indices • Band i

5 Here is a product pyramid. To work out the number in a box you multiply the numbers in the two boxes below it.

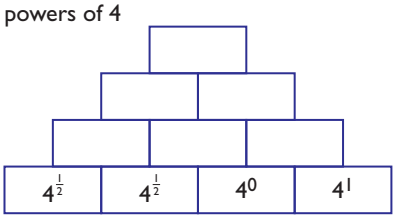


All of the pyramids below are equivalent to the one above.

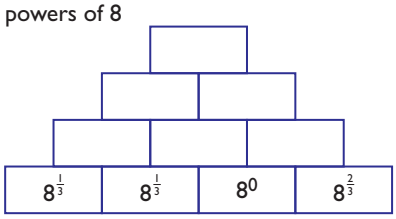
powers of 2



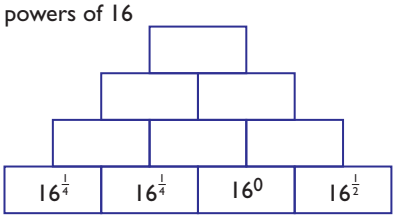
powers of 4



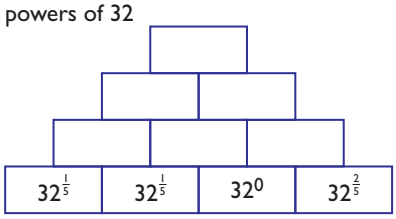
powers of 8



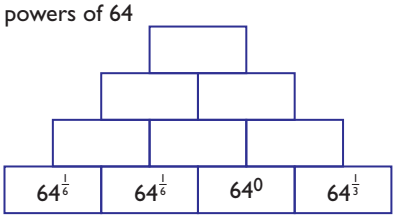
powers of 16



powers of 32



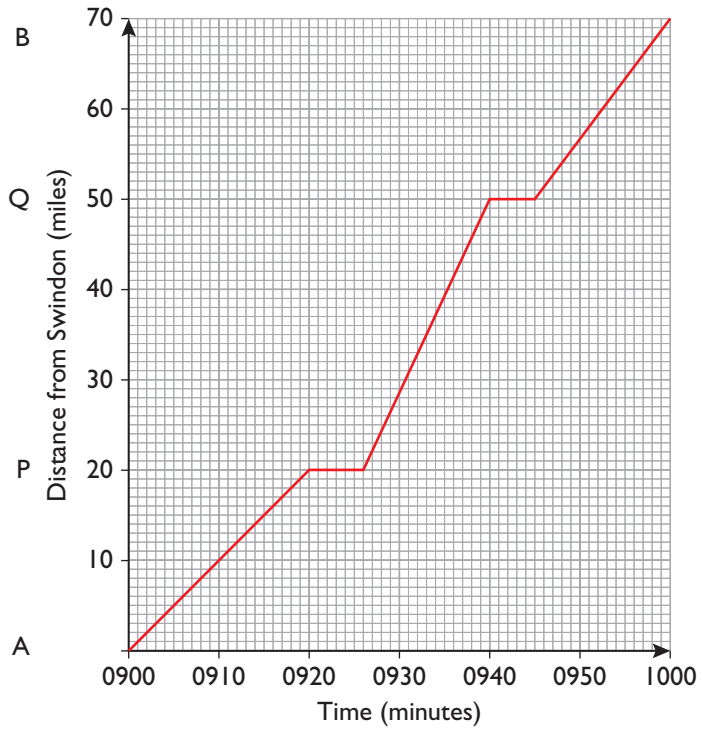
powers of 64



Complete them, giving each one as a power of the same number.
Check that all of the top numbers are equivalent to 64.

Strand 3 • Units 1–7 • Moving On

1 Here is a distance time graph showing the journey Tom took by train between two railway stations A and B, The train stopped twice on the journey, once at P and once at Q.



a For how long did the train stop on the journey?

b Work out the average speed in miles per hour for the whole journey.

c Between which two points was the train travelling the fastest and what was this speed?

A second train left station B 10 minutes after the first train left station A.

The train travelled at an average speed of 100 mph and did not stop between B and A.

d Copy the graph above and draw the graph for the second train on your graph.

e At what time did the two trains pass each other and how far were they from B?

f How long did the second train take to complete the journey?

Strand 5 • Unit 7 • Solving quadratic inequalities • Band j

4 Here is the graph of $y = (x + 2)(x - 4)$.

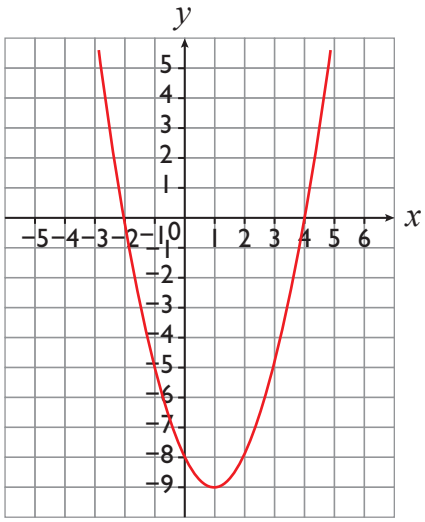
The graph can help you tell whether $(x + 2)(x - 4)$ is greater than zero, equal to zero, or less than zero for different values of x.

On a copy of the graph, mark the x-axis:

a blue for values of x where $(x + 2)(x - 4)$ is positive

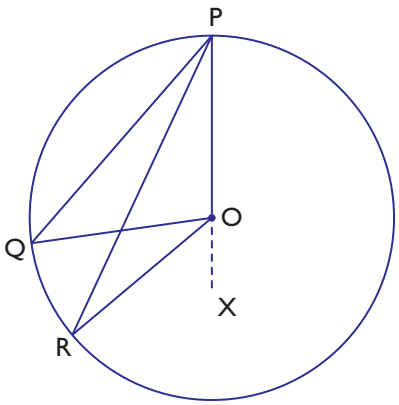
b red for values of x where $(x + 2)(x - 4)$ is negative

c black for values of x where $(x + 2)(x - 4)$ is zero.



Strand 2 • Unit 11 • Circle theorems • Band j

8 Complete this proof to show that angle QOR = 2 × angle QPR.



A Show that angle OPQ = angle OQP.

Label these two angles a on a copy of the diagram.

Find the size of angle POQ and mark it on your diagram.

B Show that angle ORP = angle OQR.

Label these two angles γ.

Find the size of angle POR and mark it on your diagram.

C Hence write down expressions for the sizes of angles QPR and QOR, giving your reasons.

D Hence show that angle QOR = 2 × angle QPR.

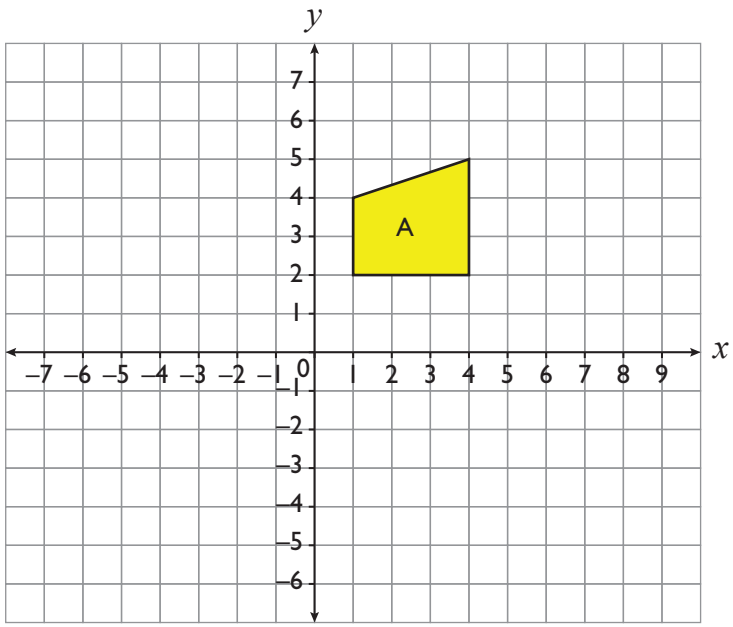
Strand 5 • Unit 11 • Combining transformations • Band i

1 **a** Reflect trapezium A in the y-axis. Label the image B.

b Reflect trapezium B in the x-axis. Label the image C.

c What single transformation maps A onto C?

d Describe any invariant points resulting from this transformation.

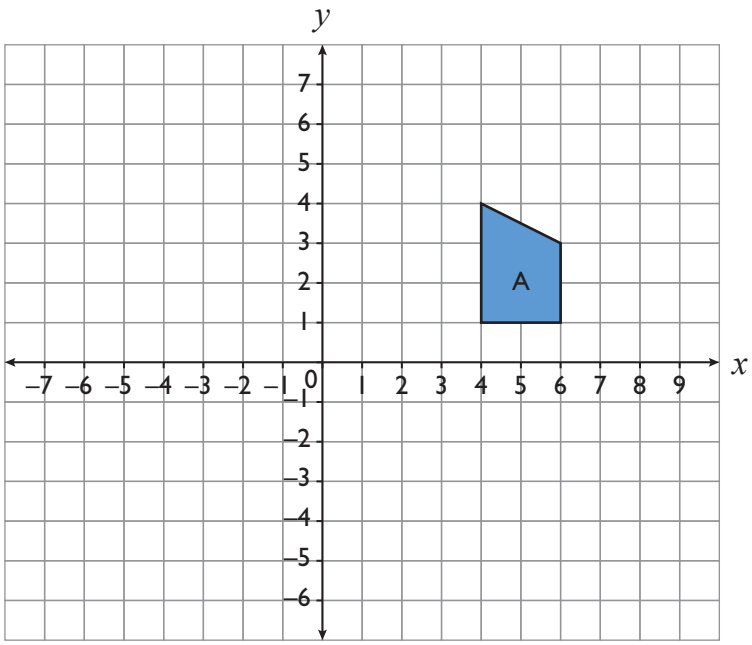


2 **a** Enlarge shape A with a scale factor of 2, centre (10, 3). Label the image B.

b Translate B through $\begin{pmatrix} 5 \\ -4 \end{pmatrix}$. Label the image C.

c Describe the single transformation that maps A onto C.

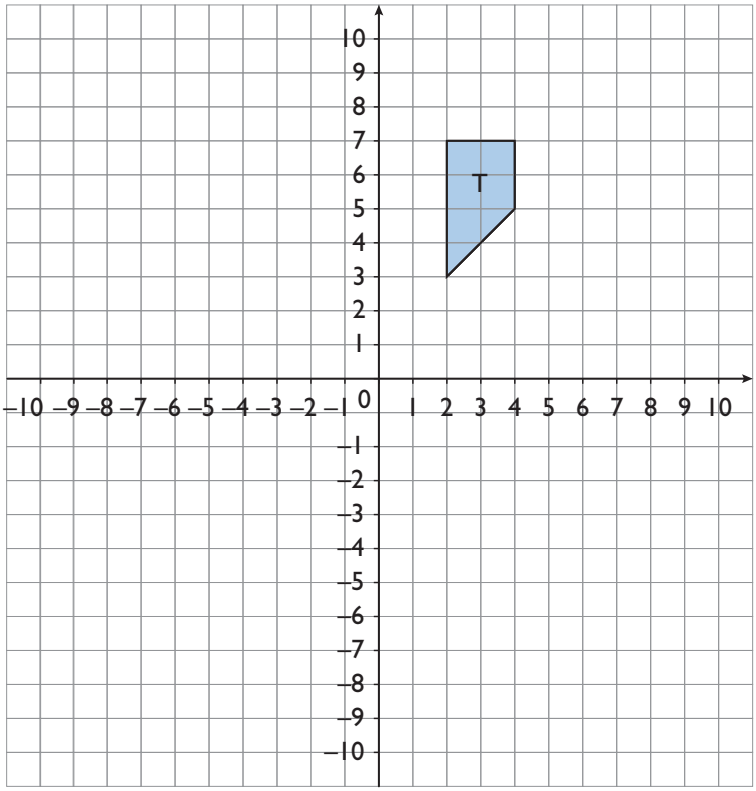
d Describe any invariant points resulting from this transformation.



Strand 5 • Unit 11 • Combining transformations • Band i

Exam-style

1 The diagram shows a trapezium, T.



a Rotate shape T 90° clockwise about the point (3, 0).
Label the image A.

b Translate shape A through the vector $\begin{pmatrix} -9 \\ -3 \end{pmatrix}$
Label the image B.

c Describe fully the single transformation that maps T onto B.