

GCSE Mathematics

H

Vectors

GCSE Maths Practice

Total Marks	Time	Questions
41	41 min	20

Instructions:

- Do not use a calculator when you see: 
- Answer all questions in the spaces provided.
- Show all your working - marks are awarded for method as well as final answers.
- Cross through any work you do not want to be marked.
- Check your answers if you have time at the end.

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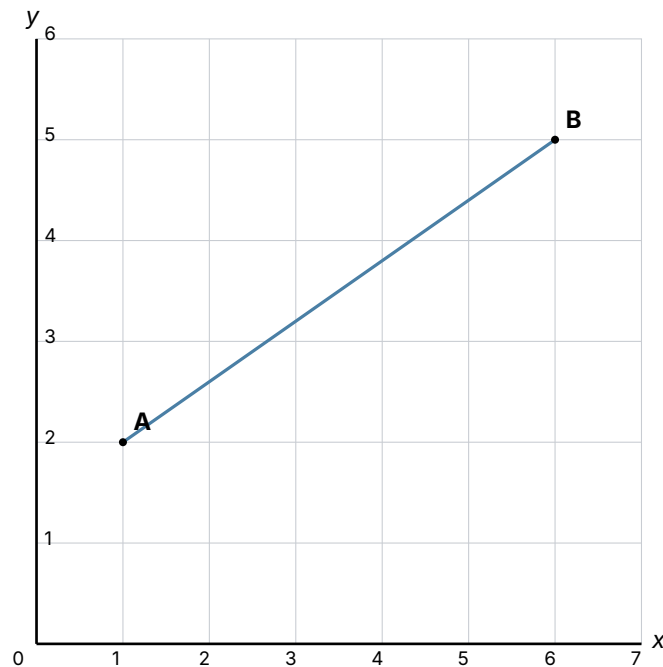
Edexcel-style questions

Q1

Grade 7

Edexcel style

The points $A(1, 2)$ and $B(6, 5)$ are shown on the grid. Write down the column vector $\overrightarrow{AB}$.



Answer _____

teachably

[2 marks]

Q2

Grade 7

Edexcel style

$\mathbf{a} = (6, 8)$. Find the magnitude of $\mathbf{a}$, $|\mathbf{a}|$.

Answer _____

teachably

[2 marks]

Q3

Grade 8

Edexcel style

In triangle OAB, $OA = a$ and $OB = b$, as shown. Find the vector AB in terms of a and b .

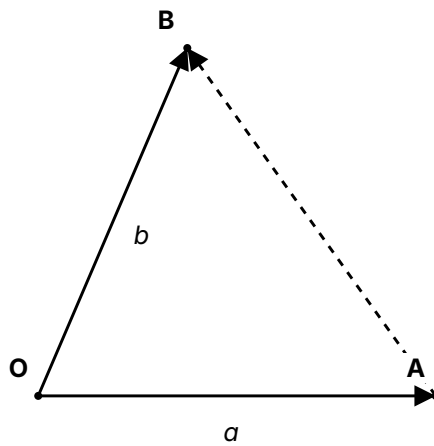


Diagram NOT accurately drawn

Answer _____

Q4

Grade 8

Edexcel style

In triangle OAB, $OA = a$ and $OB = b$. P is the point on AB such that $AP : PB = 2 : 1$, as shown. Find the vector OP in terms of a and b .

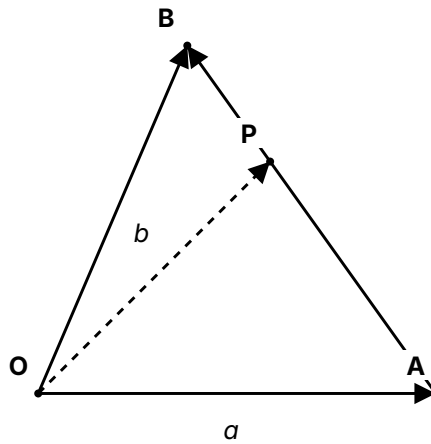


Diagram NOT accurately drawn

Answer _____

Q5

Grade 9

Edexcel style

In triangle OAB, $OA = a$ and $OB = b$. M is the midpoint of AB. G is the point such that $OG = \frac{1}{3}(a + b)$, as shown. Show that O, G and M are collinear, and find the ratio $OG : GM$.

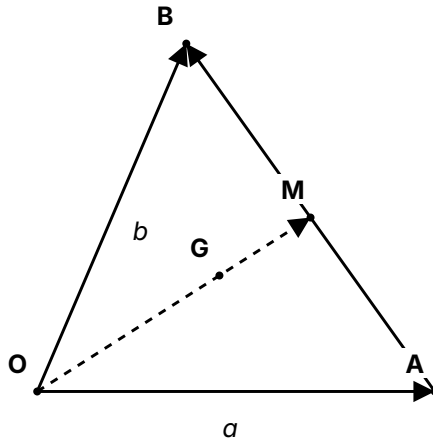


Diagram NOT accurately drawn

Answer _____

AQA-style questions**Q6** 

Grade 7

AQA style

$a = (3, -2)$ and $b = (-1, 4)$. Find $a + b$ as a column vector.

Answer

teachably

[2 marks]**Q7** 

Grade 7

AQA style

$a = (-5, 12)$. Find the magnitude of a , $|a|$.

Answer

teachably

[2 marks]

Q8

Grade 8

AQA style

OABC is a parallelogram, with $OA = a$ and $OC = b$, as shown. Find the vector OB in terms of a and b .

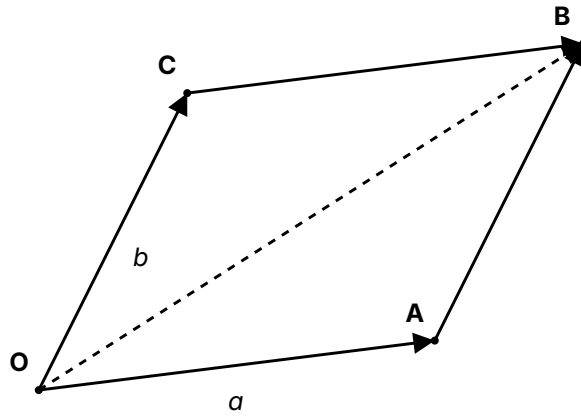


Diagram NOT accurately drawn

Answer _____

Q9

Grade 9

AQA style

$OA = a$ and $OB = b$. C is the point on OA extended such that $OC = 1.5a$, as shown. Find the vector BC in terms of a and b .

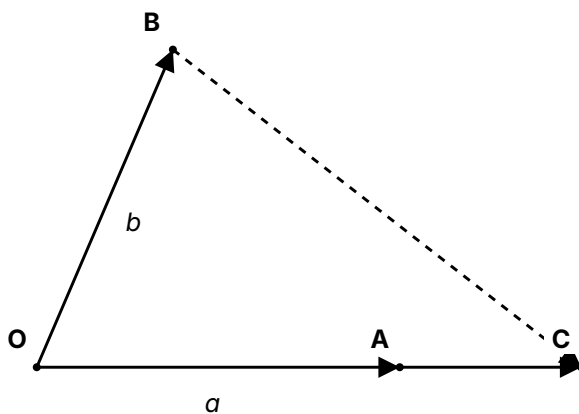


Diagram NOT accurately drawn

Answer _____

Q10

Grade 9

AQA style

In triangle OPQ , $OP = p$ and $OQ = q$. R is the midpoint of PQ . S is the point on OR extended such that $OS = 2 \times OR$, as shown. Show that $OPSQ$ is a parallelogram.

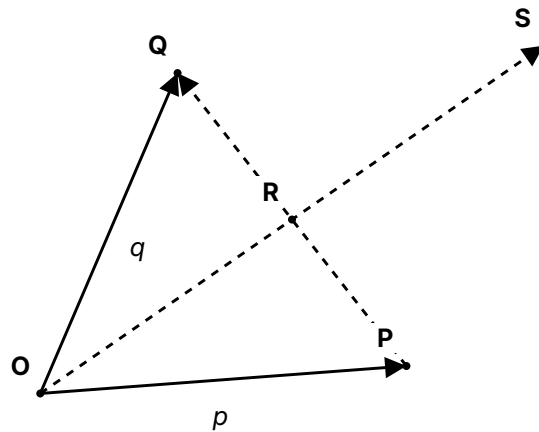


Diagram NOT accurately drawn

Answer _____

OCR-style questions**Q11** 

Grade 7

OCR style

$a = (4, 1)$. Find $-3a$ as a column vector.

Answer

teachably

[2 marks]**Q12** 

Grade 8

OCR style

$b = (k, 4)$, where $k > 0$. The magnitude of b is 5. Find the value of k .

Answer

teachably

[3 marks]

Q13

Grade 8

OCR style

In triangle OAB , $OA = a$ and $OB = b$. M is the midpoint of AB , as shown. Find the vector OM in terms of a and b .

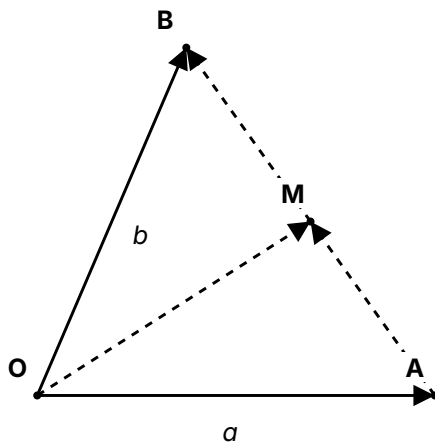


Diagram NOT accurately drawn

Answer _____

Q14

Grade 9

OCR style

$OA = a$ and $OB = b$. P is the point on OA with $OP : PA = 3 : 1$. Q is the point on OB with $OQ : QB = 3 : 1$, as shown. Find the vector PQ in terms of a and b .

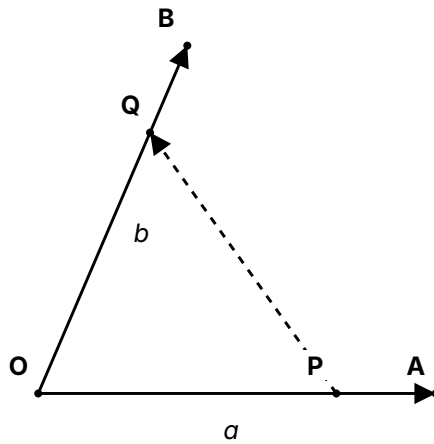


Diagram NOT accurately drawn

Answer _____

Q15

Grade 9

OCR style

$OA = a$ and $OB = b$. C is the point on OA with $OC : CA = 3 : 2$. D is the point on OB with $OD : DB = 3 : 2$, as shown. Show that CD is parallel to AB , and find the ratio $CD : AB$.

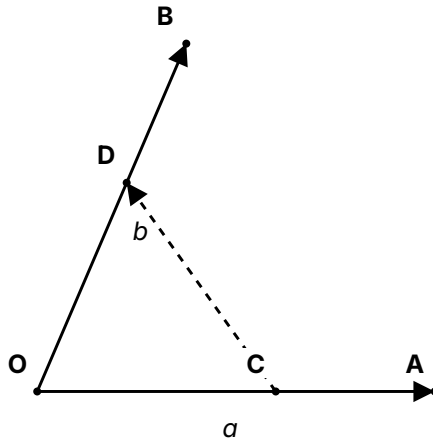


Diagram NOT accurately drawn

Answer _____

Teachably-style questions

Q16 

Grade 7

Teachably style

$a = (2, 5)$ and $b = (-3, 1)$. Find $2a - b$ as a column vector.

Answer _____

teachably

[2 marks]

Q17 

Grade 8

Teachably style

$a = (1, 2)$ and $b = (3, -6)$. Find the magnitude of $a + b$, giving your answer as a simplified surd.

Answer _____

teachably

[3 marks]

Q18

Grade 8

Teachably style

OABC is a parallelogram, with $OA = a$ and $OC = b$, as shown. Find the vector CA in terms of a and b .

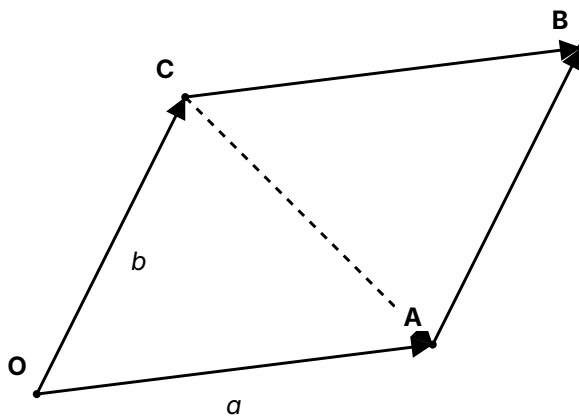


Diagram NOT accurately drawn

Answer _____

teachably

[1 mark]

Q19

Grade 8

Teachably style

$OA = a$ and $OB = b$. M is the midpoint of OA , and N is the midpoint of OB , as shown. Find the vector MN in terms of a and b , and describe the relationship between MN and AB .

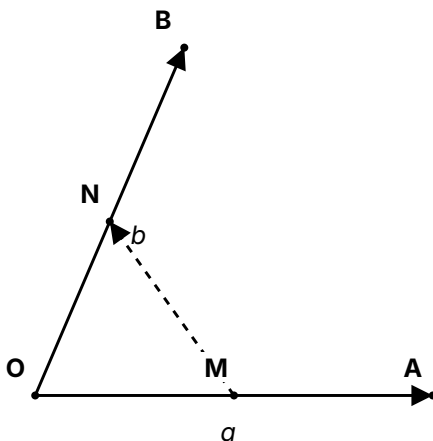


Diagram NOT accurately drawn

Answer _____

teachably

[2 marks]

Q20

Grade 9

Teachably style

Point A has position vector $2i + 3j$. Point B has position vector $5i - j$. Find the vector AB , and its magnitude.

Answer _____

teachably

[3 marks]

END OF PAPER

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