Name:

Level 2 Further Maths

Midpoint of a Line Ratio

Corbettmaths

Ensure you have: Pencil or pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Revision for this topic

www.corbettmaths.com/more/further-maths/

1. AB is a straight line

The coordinates of A are $(-9, -4)$
The midpoint of AB is $(8, 1.5)$

Work out the coordinates of B

x

$\frac{-9 + a}{2} = 8$

$-9 + a = 16$

$a = 25$

y

$\frac{-4 + b}{2} = 1.5$

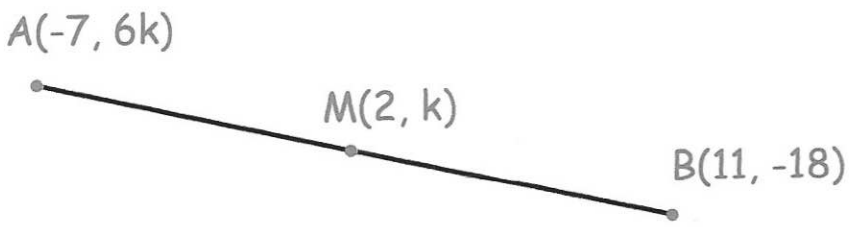
$-4 + b = 3$

$b = 7$

(25, 7)

(2)

2. M is the midpoint of AB



Work out the value of k

$\frac{6k + (-18)}{2} = k$

$6k - 18 = 2k$

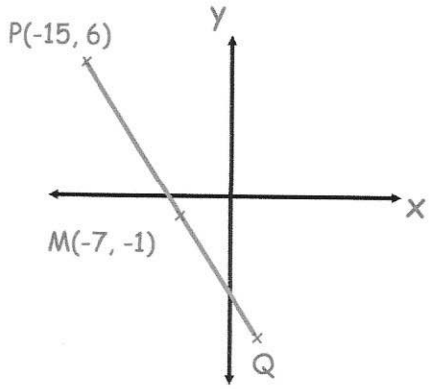
$4k = 18$

$k = 4.5$

4.5

(3)

3. M is the midpoint of PQ.



P is the point $(-15, 6)$
M is the point $(-7, -1)$

Work out the coordinates of point Q.

(1, -8)

(3)

4. M is the midpoint of the line AB.
The coordinates of the point M are (7, 2)
The coordinates of the point B are (11, 8)
The coordinates of the point C are (7, –4)

Find the area of triangle ACM.

B (11, 8)
M (7, 2)
A (3, -4)
4
6
C (7, -4)

$\frac{4 \times 6}{2} = 12$

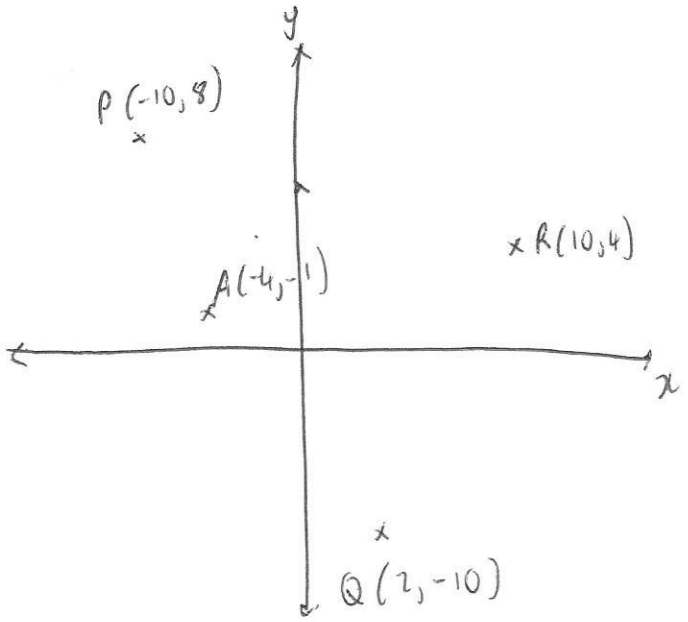
12

(3)

5. P is the point $(-10, 8)$
R is the point $(10, 4)$
Q is the point $(2, -10)$

A is the midpoint of the line PQ.
B is the midpoint of the line PR.
M is the midpoint of the line AB.

Find the coordinates of the point M



$A \left(\frac{2 + (-10)}{2}, \frac{8 + (-10)}{2} \right)$

$A = (-4, -1)$

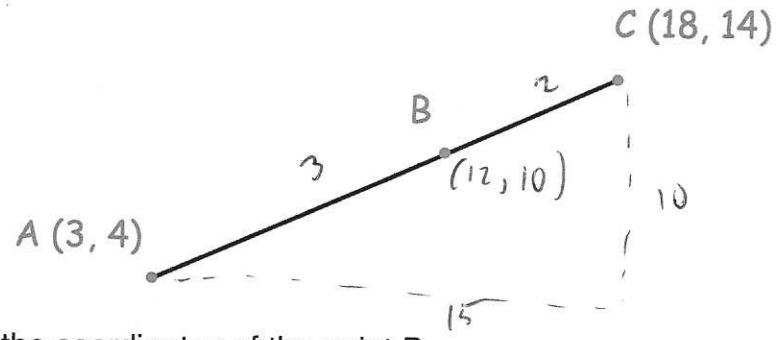
$B = (0, 6)$

$M (-2, 2.5)$

$(-2, 2.5)$

(4)

6. ABC is a straight line.
AB : BC = 3 : 2



Work out the coordinates of the point B

$3+2=5$

$15 \div 5 = 3$

$3 \times 3 = 9$

$3+9=12$

$10 \div 5 = 2$

$2 \times 3 = 6$

$4+6=10$

(12, 10)

(3)

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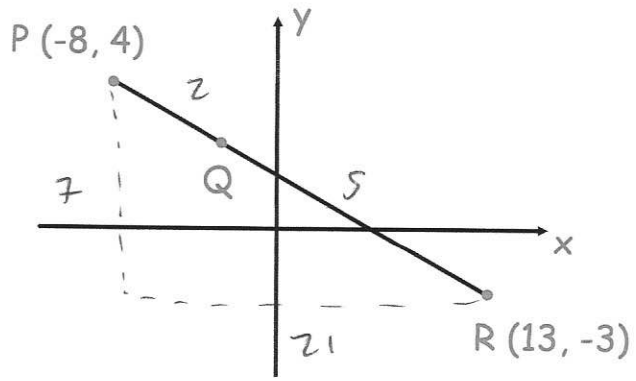
7. PQR is a straight line.
PQ : QR is 2 : 5



Work out the coordinates of the point Q

$2+5=7$

$21 \div 7 = 3$

$3 \times 2 = 6$

$-8+6=-2$

$7 \div 7 = 1$

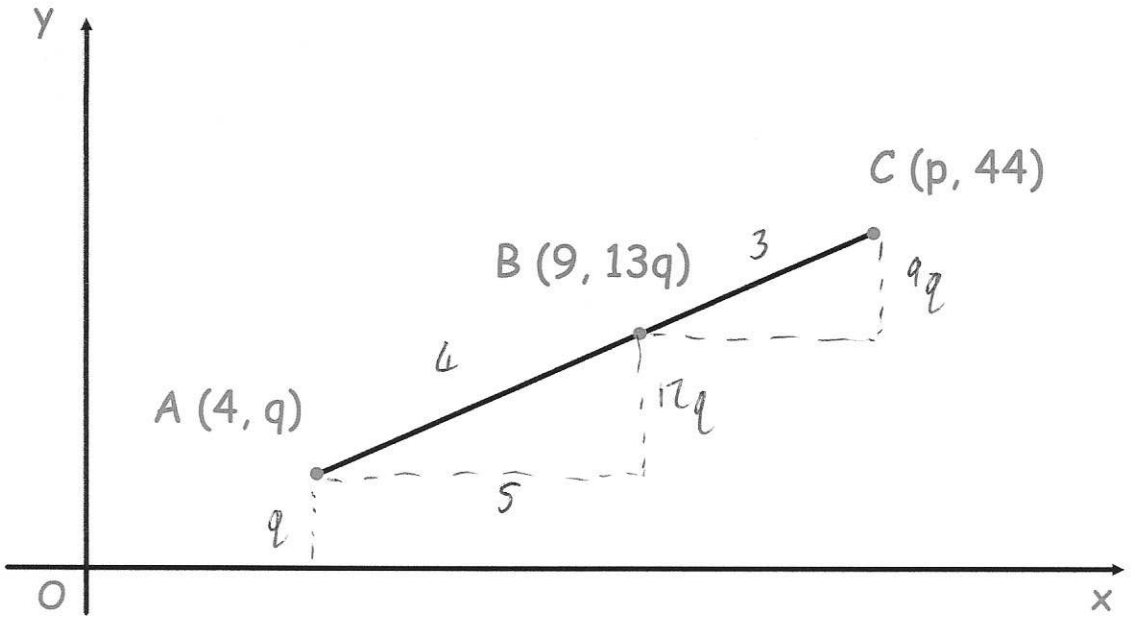
$1 \times 2 = 2$

$4-2=2$

(-2, 2)

(3)

8. ABC is a straight line.
AB : BC = 4 : 3



(a) Find the value of p

$5 \div 4 = 1.25$

$1.25 \times 3 = 3.75$

$q + 3.75$

12.75

.....

(2)

(b) Find the value of q

$q + 12q + 9q = 44$

$22q = 44$

$q = 2$

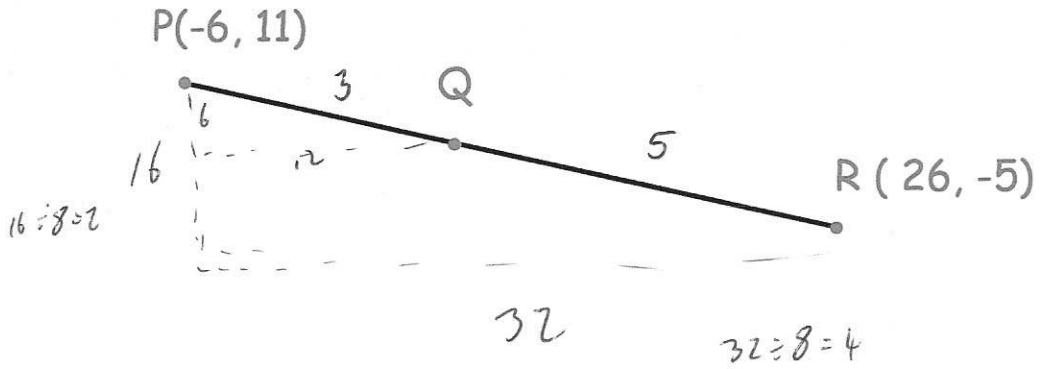
2

.....

(3)

9. PQR is a straight line.
P is the point (–6, 11)
R is the point (26, –5)

PQ : PR = 3 : 8



Work out the coordinates of the point Q

(6 , 5)

.....

(3)

10. $A(-5, -2)$ and $B(31, -20)$ are joined by a straight line.

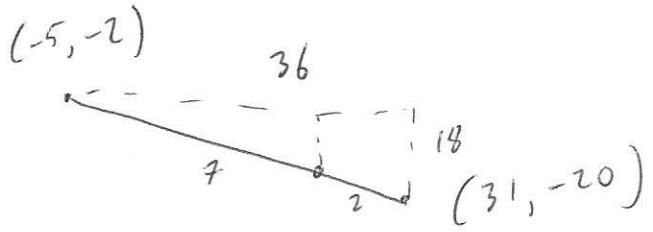
P is a point on AB.
AP : PB is 7 : 2

Work out the coordinates of the point P.

$7 + 2 = 9$

$18 \div 9 = 2$

$36 \div 9 = 4$



$4 \times 7 = 28$

$-5 + 28 = 23$

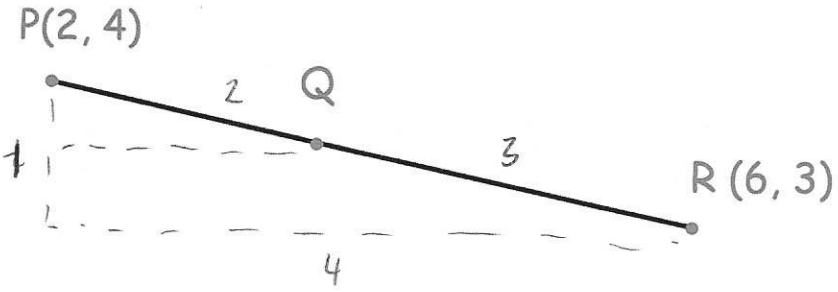
$7 \times 2 = 14$

$-2 - 14 = -16$

(23, -16)

(3)

11. PQR is a straight line.



QR is 50% longer than PQ
Work out the coordinates of Q.

$4 \div 5 = 0.8$

$0.8 \times 2 = 1.6$

$1 \div 5 = 0.2$

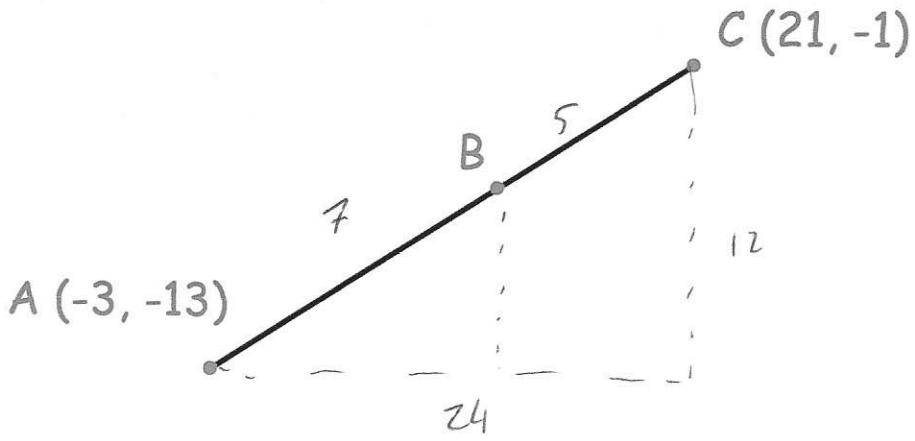
$0.2 \times 2 = 0.4$

$4 - 0.4 = 3.6$

(3.6, 3.6)

(4)

12. ABC is a straight line.
AB is 40% longer than BC.



Work out the coordinates of B.

$12 \div 12 = 1$

$1 \times 7 = 7$

$-13 + 7 = -6$

$24 \div 12 = 2$

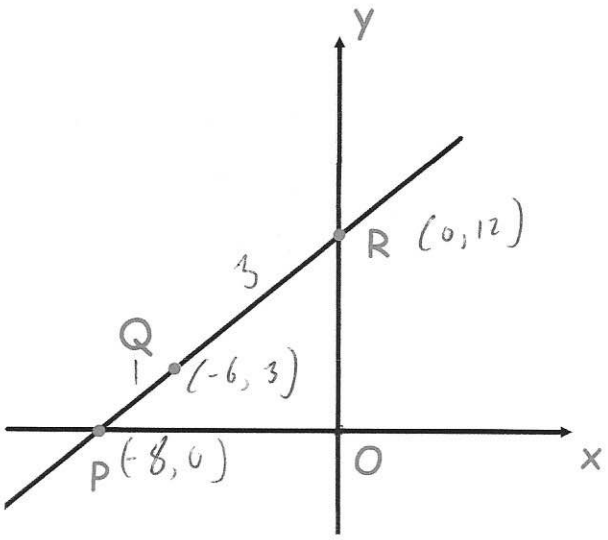
$2 \times 7 = 14$

$-3 + 14 = 11$

(11 , -6)

(4)

13. The line $3x - 2y + 24 = 0$ passes through P, Q and R.



PQ : QR = 1 : 3

Find the equation of the straight that passes through points Q and O.

x - axis intercept when $y = 0$

$3x + 24 = 0$

$3x = -24$

$x = -8$

y - axis intercept when $x = 0$

$-2y + 24 = 0$

$2y = 24$

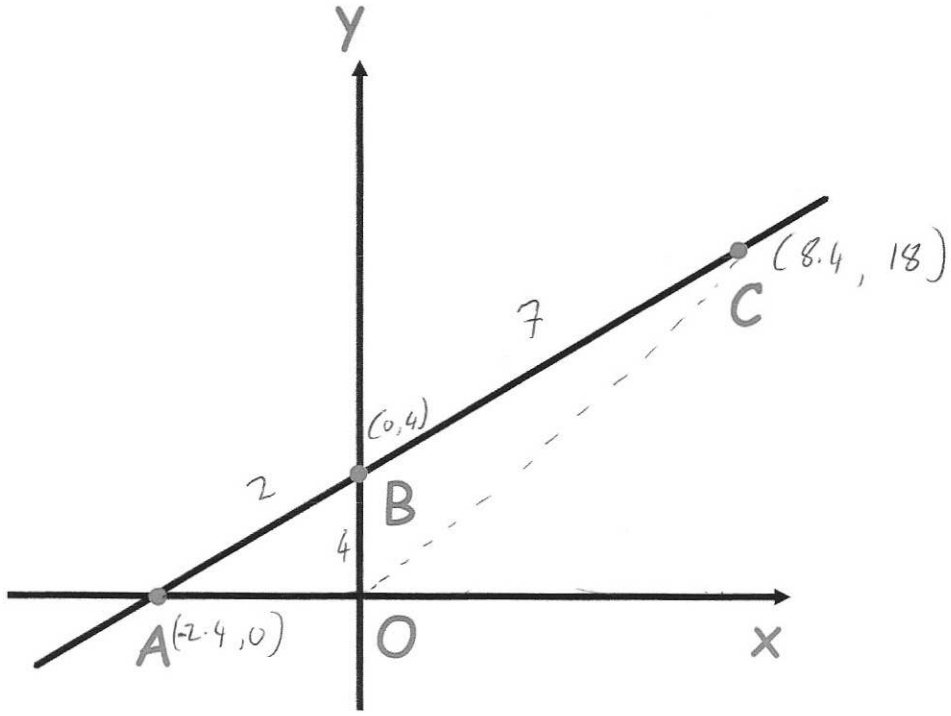
$y = 12$

$1 + 3 = 4$

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

(4)

14. A, B and C are points on the line $5x + 3y + 12 = 0$



AB : BC = 2 : 7

Work out the area of triangle OBC.

(A) $5x + 12 = 0$

$5x = -12$

$x = -2.4$

(0) $-3y + 12 = 0$

$y = 4$

Area $= \frac{1}{2} bh$

$= \frac{1}{2} \times 4 \times 8.4$

$= 16.8$

$2.4 \div 2 = 1.2$

$1.2 \times 7 = 8.4$

16.8

.....

(6)