Question	1	2	3	4	5	6	7	8	Total
Marks									
Max Marks	3	3	5	6	8	5	3	13	46

TRY IN EXAM CONDITIONS FIRST (60 MINUTES), THEN USE THE MARK SCHEME TO SCORE AND *HELP* CORRECT YOUR WORK.

ONCE YOU'VE SELF-ASSESSED YOUR UNDERSTANDING, MAKE USE OF SUBJECT SUPPORT TO HELP YOU COMPLETELY UNDERSTAND ALL QUESTIONS. BE HONEST WITH YOURSELF AND KEEP A GROWTH MINDSET!

1. Rearrange the formula $c = \sqrt{\dfrac{a + b}{2}}$ to make a the subject.

(3)

2.

Show that $\dfrac{5\sqrt{2} + 2}{3\sqrt{2} + 4}$ can be expressed in the form $m + n\sqrt{2}$, where m and n are integers.

[3 marks]

3. Express each of the following in the form 7^k :
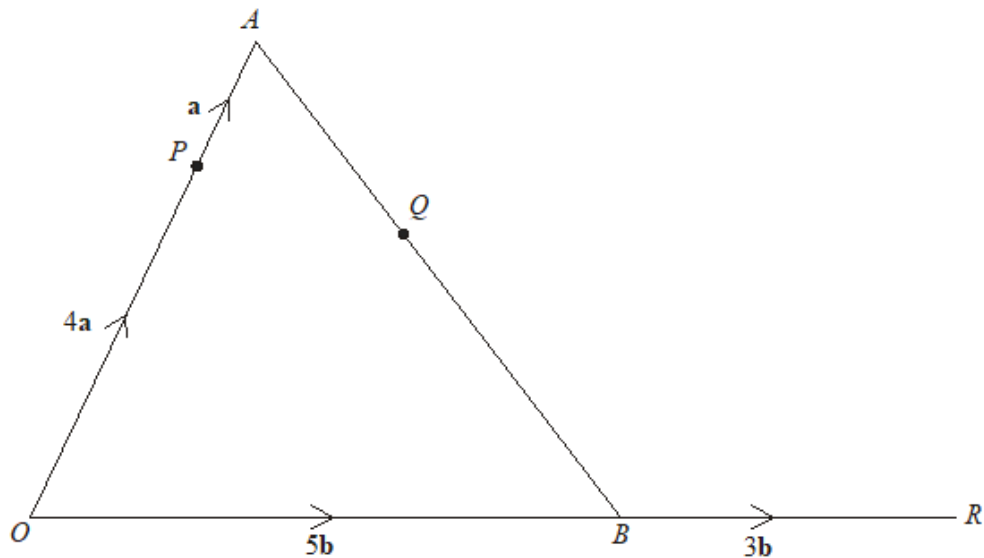
(a) $\sqrt[4]{7}$,

(1)

(b) $\dfrac{1}{7\sqrt{7}}$,

(2)

(c) $7^4 \times 49^{10}$.

(2)

4. In the diagram $\overrightarrow{OP} = 4\mathbf{a}$, $\overrightarrow{PA} = \mathbf{a}$, $\overrightarrow{OB} = 5\mathbf{b}$, $\overrightarrow{BR} = 3\mathbf{b}$ and $\overrightarrow{AQ} = \dfrac{2}{5}\overrightarrow{AB}$.
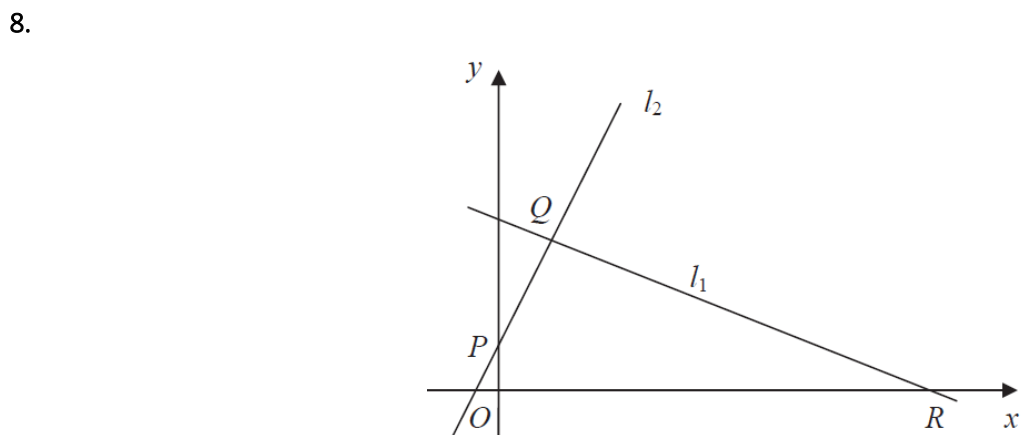

(a) Find, in terms of $\mathbf{a}$ and $\mathbf{b}$, simplifying your answers,

   (i) $\overrightarrow{AB}$

(1)

   (ii) $\overrightarrow{PQ}$

(2)

(b) Show clearly that points P, Q and R lie on a straight line.

(3)

5. Simplify

(a) $\dfrac{(4x)^2 \times 2x^3}{x}$,

(2)

(b) $\left(36x^{-2}\right)^{-\frac{1}{2}}$.

(3)

(c) $\dfrac{(4x^5y)^3}{(2xy^2) \times (8x^{10}y^4)}$.

(3)

6.

Point C has coordinates $(c, 2)$ and point D has coordinates $(6, d)$.

The line $y + 4x = 11$ is the perpendicular bisector of CD.

Find c and d.

[5 marks]

7. Simplify fully $\dfrac{8a}{3a+6} \times \dfrac{5a+10}{3a^2} \div \dfrac{4}{15a^3}$

(3)

8.

The points $Q(1,3)$ and $R(7.0)$ lie on the line l_1, as shown in Figure 2.

The length of QR is $a\sqrt{5}$.

(a)   Find the value of a.

(3)

The line l_2 is perpendicular to l_1, passes through Q and crosses the y-axis at the point P, as shown in Figure 2.

Find

(b)   an equation for l_2,

(5)

(c)   the coordinates of P,

(1)

(d)   the area of ΔPQR.

(4)