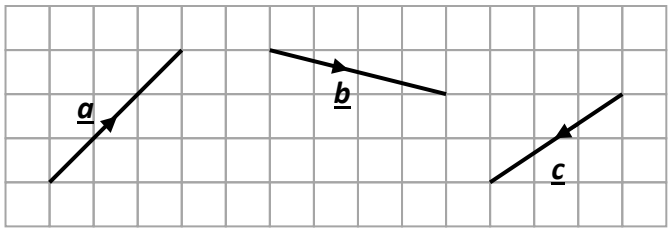
SPTA
N5 Homework
Vectors (A)

Show all working – Calculator required for 1(c) only.

Marks

1. The diagram shows 3 vectors $\underline{\boldsymbol{a}}$, $\underline{\boldsymbol{b}}$ and $\underline{\boldsymbol{c}}$.



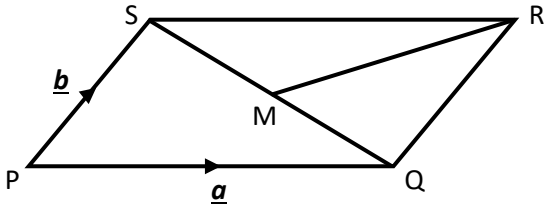
a) Write down the components of the vectors $\underline{\boldsymbol{a}}$, $\underline{\boldsymbol{b}}$ and $\underline{\boldsymbol{c}}$. **(3)**

b) Using squared paper, draw diagrams to represent:

i) $\underline{\boldsymbol{a}} + \underline{\boldsymbol{b}}$ **(ii)** $\underline{\boldsymbol{a}} - \underline{\boldsymbol{c}}$ **(iii)** $\underline{\boldsymbol{b}} + \underline{\boldsymbol{c}}$ **(iv)** $(\underline{\boldsymbol{a}} + \underline{\boldsymbol{b}}) + \underline{\boldsymbol{c}}$ **(8)**

c) For the resultant vectors in **(i)** and **(iii)** from part (b), state the components and calculate the magnitude for each one correct to one decimal place. **(4)**

2. PQRS is a parallelogram.



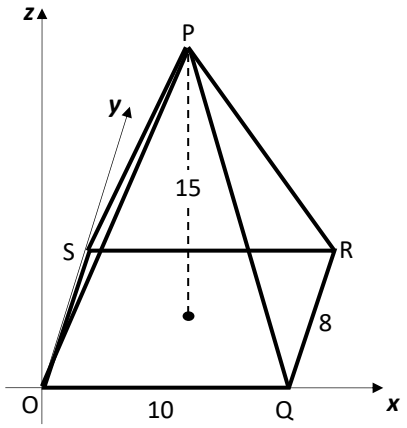
M is the mid–point of SQ.

$\overrightarrow{PQ}$ is represented by vector $\underline{\boldsymbol{a}}$ and $\overrightarrow{PS}$ is represented by vector $\underline{\boldsymbol{b}}$ as shown in the diagram.

Express the following in terms of $\underline{\boldsymbol{a}}$ and $\underline{\boldsymbol{b}}$:

a) $\overrightarrow{PR}$ **(b)** $\overrightarrow{SQ}$ **(c)** $\overrightarrow{SM}$ **(6)**

3. State the coordinates of each vertex of the rectangular based pyramid, *OPQRS*, with height 15, shown in the diagram.



(4)

4. Calculate the magnitude of each vector below, leaving your answer as a surd in its simplest form.

a) $\underline{\boldsymbol{u}} = \begin{pmatrix} 2 \\ 4 \\ 5 \end{pmatrix}$ **(b)** $\underline{\boldsymbol{v}} = \begin{pmatrix} \sqrt{7} \\ \sqrt{2} \\ 3\sqrt{2} \end{pmatrix}$

(5)

Total Marks: 30