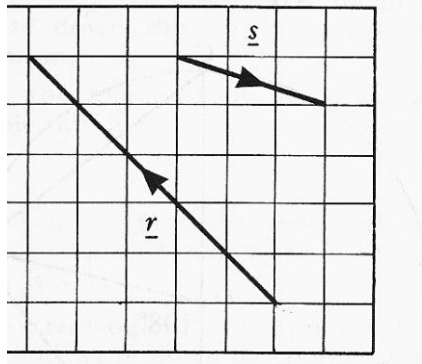
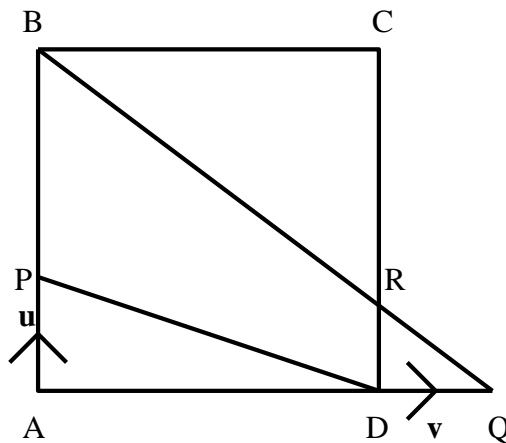


1. (a) The diagram below shows representatives of the vectors \mathbf{r} and \mathbf{s} .



Write down the components of

- (i) (1) \mathbf{r} (2) \mathbf{s} (3) $\mathbf{r} + \mathbf{s}$
- (ii) Express $|\mathbf{r}|$ as a surd in its simplest form.
2. In the diagram below ABCD is a square of side 3 units and P lies on AB such that $BP = 2$ units and AD is produced to Q so that $DQ = 1$ unit.
 \overrightarrow{AP} and \overrightarrow{DQ} are representatives of the vectors \mathbf{u} and \mathbf{v} respectively.



- (i) Express in terms of \mathbf{u} and/or \mathbf{v}
- (1) \overrightarrow{AD} (2) \overrightarrow{PD} (3) \overrightarrow{BQ}
- (ii) If BQ cuts CD at R and $\overrightarrow{RD} = k\mathbf{u}$, write down the value of k .
3. Solve each of these for $0 \leq x \leq 360$.
- (a) $\sin x^\circ = 0.5$ (b) $4 \tan x^\circ + 3 = 0$ (c) $2 \cos x^\circ = \tan 47^\circ$.

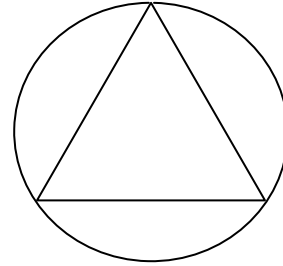
4. Sketch the graph of these functions for $0 \leq x \leq 360$.

(a) $y = 10 \cos 2x^\circ$ (b) $y = 5 + 10 \cos 2x^\circ$.

5. Change the subject of this formula to d : $F = \frac{GMm}{d^2}$.

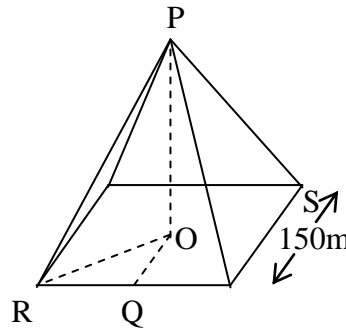
6. In triangle ABC, $BC = 6$ metres, $AC = 10$ metres and angle $ABC = 30^\circ$.
Given that $\sin 30^\circ = 0.5$, show that $\sin A = 0.3$ without using a calculator.

7. An equilateral triangle is inscribed in a circle.
If the triangle has sides of length 10cm, find
(a) the radius of the circle
(b) the area of the triangle expressed as
as a percentage of the area of the circle.



8. A square-based pyramid has edges of length 150cm.

- (a) If $\angle OQP = 70^\circ$, find the length of PQ.
(b) By finding the length of PO and RS, find the size of $\angle PRO$.



9. When $\pounds P$ is invested at $r\%$ compound interest, the amount, $\pounds A$, after n years, is given by

$$A = p \left(1 + \frac{r}{100} \right)^n.$$

Find A when $\pounds 300$ is invested at 8% compound interest for 3 years.

10. The cross-section of the prism sketched below is a regular pentagon of side 12 cm.
The length of the prism is 20cm.
Calculate the volume of the prism.

