Revision Test 2

Duration: 40 minutes

/20

1. Given that $\begin{pmatrix} 8 & -3 \end{pmatrix}\begin{pmatrix} h \\ k \end{pmatrix} = \begin{pmatrix} -2 \end{pmatrix}$ and $\begin{pmatrix} 2 \\ 3h \end{pmatrix} + 2\begin{pmatrix} -0.5 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$.

Find the value of

(a) h,

(b) k.

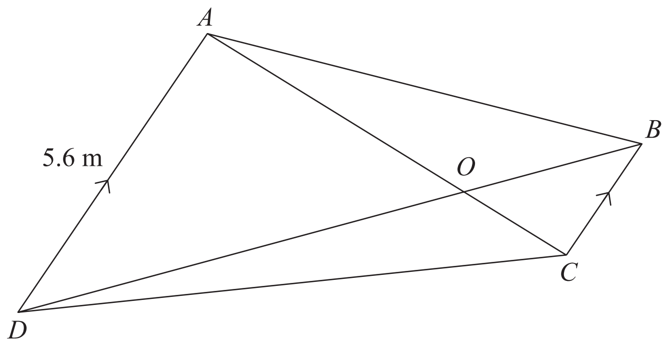
Answer **(a)** $h =$ _______________ [2]

(b) $k =$ _______________ [1]

Adapted:
Proficiency Tests Mathematics CA & SA Secondary 4

2. In the diagram, *ABCD* is a trapezium such that *AD* is parallel to *BC*.

AC and *BD* intersect at *O*, *AD* = 5.6 m and $\frac{OC}{OA} = \frac{2}{5}$.



(a) Giving your reasons clearly, identify two similar triangles.

(b) Calculate the length of *BC*.

(c) Write down in fraction, the value of $\frac{\text{area of } \triangle OBC}{\text{area of } \triangle ODA}$.

Given that the area of the trapezium is 58.8 m^2.

(d) Calculate the area of $\triangle AOD$.

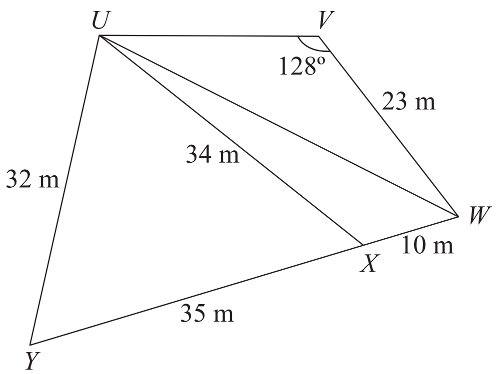
Answer **(a)** [2]

Answer **(b)** *BC* = ____________ m [2]

(c) ____________________ [1]

(d) ________________ m^2 [4]

3. In the diagram, the quadrilateral $UVWY$ represents a playground with two paths UX and UW. Given that $\angle UVW = 128^{\circ}$, $UY = 32$ m, $UX = 34$ m, $VW = 23$ m, $WX = 10$ m and $XY = 35$ m.



Calculate

(a) the value of cos $\angle UYX$, as a fraction in its simplest term,

(b) $\angle UXW$,

(c) the area of $\triangle UXY$,

A tree is planted vertically above X and the angle of elevation of the top of the tree from W is 19.4°.

(d) Calculate the height of the tree.

Answer **(a)** ____________________ [2]

(b) ____________________ ° [2]

(c) ____________________ m^2 [2]

(d) ____________________ m [2]

–End–

Solutions to Revision Test 2

1. **(a)** $\begin{pmatrix} 2 \\ 3h \end{pmatrix} + 2\begin{pmatrix} -0.5 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$

$\begin{pmatrix} 2-1 \\ 3h+2 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$ [1]

$3h + 2 = -1$

$h = -1$ [1]

(b) $(8 \ \ -3)\begin{pmatrix} h \\ k \end{pmatrix} = (-2)$

$(8h - 3k) = (-2)$

$8(-1) - 3k = -2$

$3k = -6$

$k = -2$ [1]

2. **(a)** $\angle OAD = \angle OCB$ (alt. $\angle$s, AD // BC)

$\angle ADO = \angle CBO$ (alt. $\angle$s, AD // BC)

$\angle AOD = \angle COD$ (vert. opp. $\angle$s) [2]

$\triangle AOD$ and $\triangle COB$ are similar. (AAA)

(b) $\dfrac{BC}{DA} = \dfrac{OC}{OA}$

$BC = \dfrac{2}{5} \times 5.6$ [1]

$BC = 2.24$ m [1]

(c) $\dfrac{\text{area of } \triangle OBC}{\text{area of } \triangle ODA} = \left(\dfrac{2}{5}\right)^2$

$= \dfrac{4}{25}$ [1]

(d) $\dfrac{\text{area of } \triangle ADC}{\text{area of } \triangle ABC} = \dfrac{\frac{1}{2} \times AD \times h}{\frac{1}{2} \times BC \times h} = \dfrac{AD}{BC}$

$= \dfrac{5}{2}$ [1]

Area of $\triangle ADC = \dfrac{5}{7} \times 58.8$

$= 42 \text{ m}^2$ [1]

$\dfrac{\text{area of } \triangle AOD}{\text{area of } \triangle ADC} = \dfrac{\frac{1}{2} \times AD \times h_1}{\frac{1}{2} \times AD \times h_2}$

$= \dfrac{OA}{AC}$

$= \dfrac{5}{7}$ [1]

Area of $\triangle AOD = \dfrac{5}{7} \times 42$

$= 30 \text{ m}^2$ [1]

3. **(a)** $\cos \angle UYX = \dfrac{32^2 + 35^2 - 34^2}{2(32)(35)}$ [1]

$= \dfrac{1093}{2240}$ [1]

(b) $\cos \angle UXW = -\cos \angle UXY$

$= -\dfrac{34^2 + 35^2 - 32^2}{2(34)(35)}$ [1]

$= -\dfrac{1357}{2380}$

$\angle UXW = 124.76°$

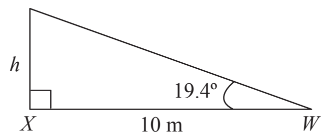
$= 124.8°$ (1 d.p.) [1]

(c) Area of $\triangle UXY$

$= \dfrac{1}{2} \times 34 \times 35 \times \sin(180° - 124.76°)$ [1]

$= 489 \text{ m}^2$ [1]

(d)



$\tan \theta = \dfrac{h}{WX}$

$\tan 19.4° = \dfrac{h}{10}$ [1]

$h = 3.52$ m [1]