NAME:_____ DATE: 09/20B-21A/2017

ASSIGNMENT: Vectors Create Polygons

[SL-calc]

Magnitude of a vector	$\lvert \boldsymbol{v} \rvert = \sqrt{v_1^2 + v_2^2 + v_3^2}$
Scalar product	$\boldsymbol{v} \cdot \boldsymbol{w} = \lvert \boldsymbol{v} \rvert \lvert \boldsymbol{w} \rvert \cos\theta$
	$\boldsymbol{v} \cdot \boldsymbol{w} = v_1 w_1 + v_2 w_2 + v_3 w_3$
Angle between two vectors	$\cos\theta = \dfrac{\boldsymbol{v} \cdot \boldsymbol{w}}{\lvert \boldsymbol{v} \rvert \lvert \boldsymbol{w} \rvert}$
Vector equation of a line	$\boldsymbol{r} = \boldsymbol{a} + t\boldsymbol{b}$

21.) The diagram shows a parallelogram ABCD.

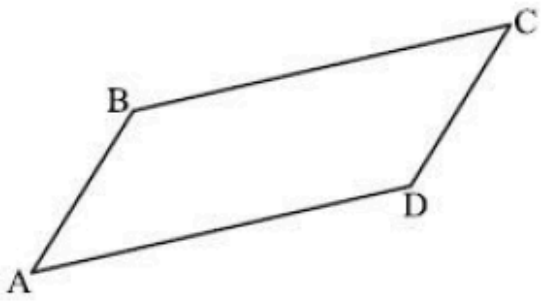

diagram not to scale

The coordinates of A, B and D are A(1, 2, 3), B(6, 4, 4) and D(2, 5, 5).

(a) (i) Show that $\overrightarrow{AB} = \begin{pmatrix} 5 \\ 2 \\ 1 \end{pmatrix}$.

(ii) Find $\overrightarrow{AD}$.

(iii) **Hence** show that $\overrightarrow{AC} = \begin{pmatrix} 6 \\ 5 \\ 3 \end{pmatrix}$.

(b) Find the coordinates of point C.

(c) (i) Find $\overrightarrow{AB} \bullet \overrightarrow{AD}$.

(ii) **Hence** find angle *A*.

(d) Hence, or otherwise, find the area of the parallelogram.

NAME:_____ **DATE: 09/20B-21A/2017**

Answer key (show all calculations for full marks)

$AD = \frac{1}{2}(3)$

Point C = (7, 7, 6)

$$\frac{13}{\sqrt{30} * \sqrt{14}}$$

Arccosine will find the angle

*Area = 15.8 = 0.5(a*b*sin C)*