Math 51 (7:30am – 8:20am)
Quiz 8
Fri Jun 19, 2009

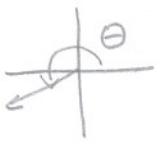
SCORE: ___ / 20 POINTS

What month is your birthday ? ___ ___
What are the first 2 digits of your address ? ___ ___
What are the last 2 digits of your zip code ? ___ ___
What are the last 2 digits of your social security number ? ___ ___
[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER, USE YOUR STUDENT ID NUMBER]

SHOW SUPPORTING WORK FOR FULL CREDIT

Let **u** = –4**i** – **j** and **w** = –**i** + 5**j**. $\vec{u} = \langle -4, -1 \rangle$ $\vec{w} = \langle -1, 5 \rangle$ **SCORE: ___ / 6 POINTS**

[a] Find the magnitude and direction angle of vector **u**.



$|\vec{u}| = \sqrt{(-4)^2 + (-1)^2} = \sqrt{17}$

$\tan\theta = \frac{-1}{-4}$

$\tan^{-1}\frac{1}{4} = 14^\circ$

$\theta_u = 14^\circ + 180^\circ = 194^\circ$

[b] Find the dot product of the vectors **u** and **w**.

$(-4)(-1) + (-1)(5) = -1$

[c] Find the angle between the vectors **u** and **w**.

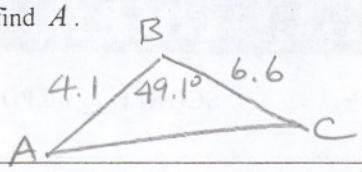
$\cos^{-1}\frac{\vec{u}\cdot\vec{w}}{|\vec{u}||\vec{w}|} = \cos^{-1}\frac{-1}{\sqrt{17}\sqrt{26}} = 92.73^\circ$

Find the component form of the vector with magnitude 5 and direction angle 311°. **SCORE: ___ / 2 POINTS**

$\langle 5\cos 311^\circ, 5\sin 311^\circ \rangle = \langle 3.28, -3.77 \rangle$

Solve for the requested part of $\triangle ABC$ in each case below. **Round all final answers to 1 decimal place.** **SCORE: ___ / 12 POINTS**
If no such triangle exists, write NO TRIANGLE.
If more than 1 possible answer exists, find all possible answers.

[a] If $B = 49.1°$, $c = 4.1$ and $a = 6.6$, find A.



$b^2 = 4.1^2 + 6.6^2 - 2(4.1)(6.6)\cos 49.1° = 24.9354$

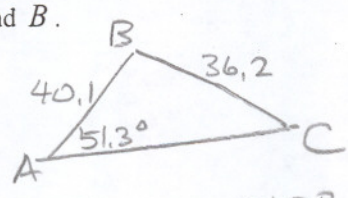
$b = 4.99$

$\frac{\sin C}{4.1} = \frac{\sin 49.1°}{4.99}$

$\sin C = \frac{4.1 \sin 49.1°}{4.99} = 0.6206$

$C = \sin^{-1} 0.6206 = 38.36°$ $A = 180° - (49.1° + 38.36°)$
$= 92.5°$

[b] If $A = 51.3°$, $c = 40.1$ and $a = 36.2$, find B.



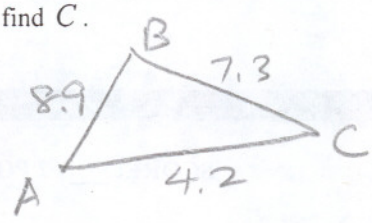
$\frac{\sin C}{40.1} = \frac{\sin 51.3°}{36.2}$

$\sin C = \frac{40.1 \sin 51.3°}{36.2} = 0.8645$

$C = \sin^{-1} 0.8645 = 59.83° \longrightarrow B = 180° - (51.3° + 59.83°) = 68.9°$

OR $C = 180° - 59.83° = 120.17° \longrightarrow B = 180° - (51.3° + 120.17°) = 8.5°$

[c] If $a = 7.3$, $b = 4.2$ and $c = 8.9$, find C.



$8.9^2 = 4.2^2 + 7.3^2 - 2(4.2)(7.3)\cos C$

$\cos C = \frac{4.2^2 + 7.3^2 - 8.9^2}{2(4.2)(7.3)} = -0.135$

$C = \cos^{-1}(-0.135) = 97.8°$