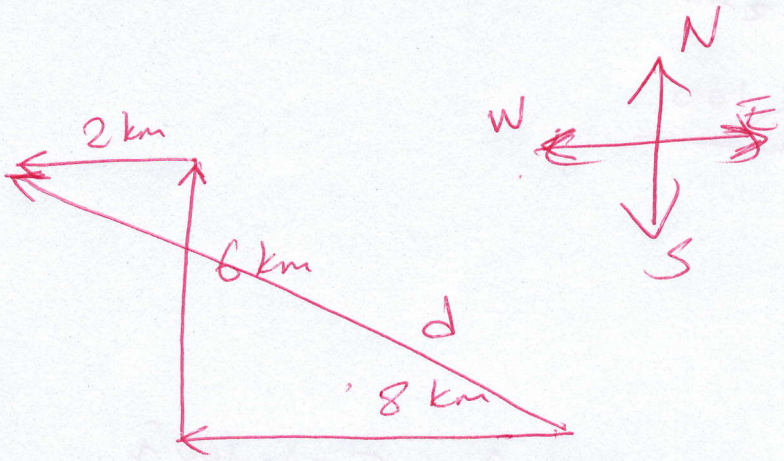
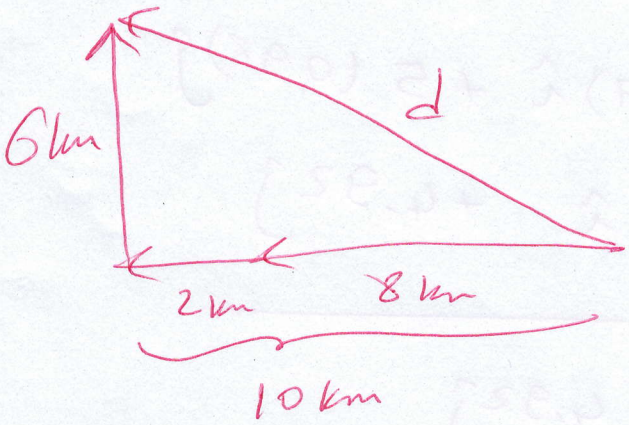
Mechanics I – Quiz 2 - Group D

2019-2020

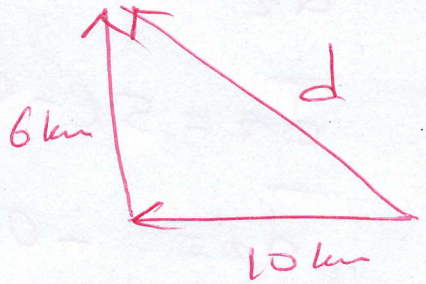
Full Name:..... KEY .....

1. A driver moves his car 8 km due West then 6 km to the North. Finally, he makes a left turn and travels another 2 km to the West. What is the magnitude of the displacement of the driver? Answer the question by vector addition method.





$d^2 = 6^2 + 10^2$

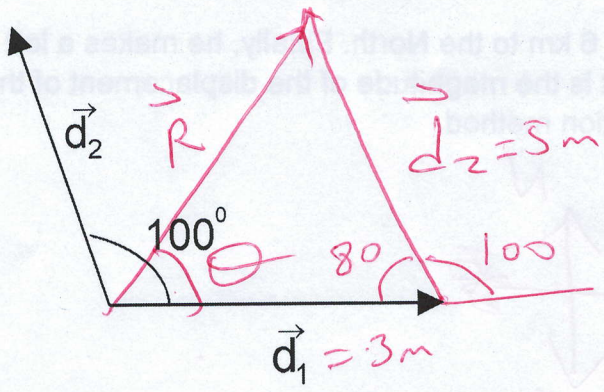


$\sqrt{d^2} = \sqrt{6^2 + 10^2}$

$d = \sqrt{136}$

$\boxed{d = 11.7 \text{ km}}$

2. Find the sum of the vectors shown in the figure. Show the angle of the the resultant vector. $d_1 = 3$ m and $d_2 = 5$ m



$\vec{d}_1 = 3\hat{i}$

$\vec{d}_2 = 5\cos 100\,\hat{i} + 5\sin 100\,\hat{j}$

$\vec{d}_2 = 5(-0.17)\hat{i} + 5(0.98)\hat{j}$

$\vec{d}_2 = -0.85\hat{i} + 4.92\hat{j}$

$\vec{R} = \vec{d}_1 + \vec{d}_2 = 2.15\hat{i} + 4.92\hat{j}$

$\tan\theta = \frac{y}{x}$ $\quad \tan\theta = \frac{4.92}{2.15}$

$\theta = \tan^{-1}\left(\frac{4.92}{2.15}\right)$

$\theta = 66.4°$