

Name: _____ Date: _____

MCV4U – Test #3 Review

Test #3 will be on **Wednesday, March 29th, 2017**. Today will be review and you can work on your Choice Assignments. Tomorrow we will do an example on 3D word problems and **extra help** will be available at lunch. If you are done your Choice Assignment and have nothing to do today, please try **p. 422 #7, 9, 13, 15, 16, 18, 19, 27, 28**. Below is a list of the topics that you will be responsible for.

Cartesian Vectors

- adding
- distance between two points
- components and 3D word problems

The Dot Product

$$a \cdot b = |a||b|\cos \theta$$

or

$$a = [a_x, a_y, a_z], b = [b_x, b_y, b_z], \text{ then}$$

$$a \cdot b = a_x b_x + a_y b_y + a_z b_z$$

$$\cos \theta = \frac{a \cdot b}{|a||b|} \quad \text{proj}_u v = \left(\frac{u \cdot v}{v \cdot v} \right) \vec{u} \quad \text{Work} = \text{force} \cdot \text{displacement}$$

The Cross Product

$$a \times b = |a||b|\sin \theta \hat{n}$$

or

$$\begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ a_x & a_y & a_z \\ b_x & b_y & b_z \end{vmatrix} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ a_x & a_y & a_z \\ b_x & b_y & b_z \end{vmatrix}$$

so

$$a \times b = (a_y b_z - a_z b_y)\mathbf{i} + (a_z b_x - a_x b_z)\mathbf{j} + (a_x b_y - a_y b_x)\mathbf{k}$$

Area of a parallelogram = $|a \times b|$

Torque = $a \times b$

Volume of a parallelepiped = $a \cdot (b \times c)$

Area of a triangle = $\frac{1}{2} |a \times b|$

