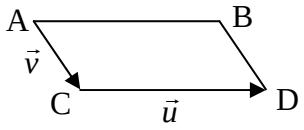
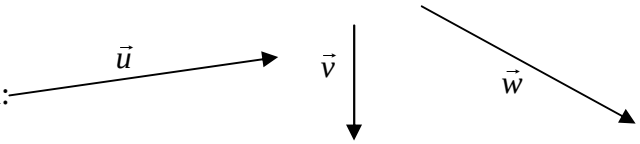
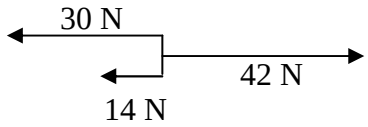
Review of two space and three space vectors **Date: _____**

1. Given: 

Draw $\vec{v}-\vec{u}$ $\vec{u}+\vec{v}$

2. Given: 

draw $-2\vec{v}-\vec{u}+\vec{w}$

3. Find the resultant and the equilibrant of the following forces: 

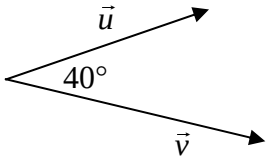
4. Find $\overrightarrow{TG}-\overrightarrow{AQ}-\overrightarrow{TP}+\overrightarrow{GP}+\overrightarrow{TQ}$

5. Forces of 45 N and 35 N act at a point at an angle of 120 degrees to each other. Find the magnitude and direction of the resultant.

6. A 45 kg chandelier is being suspended from 2 ropes of length 12 m and 8 m which are attached to two points on the ceiling 14 m apart. Find the tensions in the wires.

7. Find the resultant of the following forces:
   165 N at $S55°E$ 130 N at $E25°N$ 110 N at $N55°W$ 95 N due West

8. Given $\left|\vec{h}\right|=7,\ \left|\vec{g}\right|=13,\ \left|2\vec{h}-\vec{g}\right|=18$, determine $\left|3\vec{g}-\vec{h}\right|$.

9. Given vectors $\vec{u}$ *and* $\vec{v}$ as shown, find: 

$|\vec{u}|=12, |\vec{v}|=17$
a) $\vec{u}\cdot\vec{v}$ b) $(\vec{u}+3\vec{v})\cdot(2\vec{u}-\vec{v})$
c) the area of the parallelogram created by $\vec{u}$ and $\vec{v}$

10. Given $\vec{x}=2\hat{i}-\hat{j}+5\hat{k},\quad \vec{y}=(-1,2,2),\quad \vec{z}=(3,-2,4)\quad A(-1,3,4),\quad B(-3,2,7)$

Find: a) $\vec{y}\cdot\vec{z}$ b) $\overrightarrow{BA}$ c) $\left|\overrightarrow{BA}\right|$ d) $\hat{y}$ e) the angle between $\vec{x}$ *and* $\vec{z}$
f) $2\vec{x}-3\vec{y}+\vec{z}$ g) $(2\vec{x}-\vec{y})\cdot(3\vec{x}+2\vec{y})$

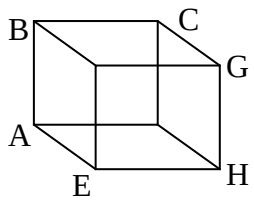
11. Draw the position vector $\vec{u}=(2,-3,5)$. Be sure to draw the x, y, and z axis and label them.

12. Use vectors to demonstrate that the following points are collinear. A(-1,3,-7), B(-3,4,2) and C(5,0,-34)

13. a)If $\vec{x} = (3t,-5,1)$ *and* $\vec{y} = (t+2, t+3,5)$ are perpendicular, find all value(s) for t.
    b) For $\vec{x} = (14,-4k,7)$ *and* $\vec{y} = (2c,-8,21)$, find values for k and c if $\vec{x}$ is parallel with $\vec{y}$.

14. Given W(-1,4,2), X(6,-2,3) and Y(-3,5,1), find:
    a) area of triangle WXY
    b) the co-ordinates of the point Z if WXYZ is a parallelogram.

15. For the unit cube at right, calculate $\overrightarrow{AC} \cdot \overrightarrow{AG}$. Show all your work.



16. If $\overrightarrow{OA}$, $\overrightarrow{OB}$, *and* $\overrightarrow{OC}$ are three edges of a parallelepiped where O is (0,0,0), A is (2,4,-3), B is (4,6,2), and C is (5,0,-2), find the coordinates of the other vertices of the parallelepiped.

Answers: 1.a) $\overrightarrow{BC}$ b) $\overrightarrow{AD}$ 3. 2N left, 2N right 4. $\overrightarrow{TA}$ 5. 40.93 at 47.8° to the 45N force
6. 12 m rope 228.9N and 8 m rope 362.8 N 7. 71.8 N at $N71°E$ 8. $\left|3\vec{g} - \vec{h}\right| = 38.83$
9. a) 156.3 b) 202.5 c) 131 u^2 10. a) 1 b) $(2,1,-3)$ c) $\sqrt{14}$ d) $\left(\frac{-1}{3}, \frac{2}{3}, \frac{2}{3}\right)$ e) 18.3° f) (10, -10, 8) g) 168
13. a) t = 5/3, t = -2, b) k = 2/3, c = 21 14. a) 4.33 u^2 b) (-10, 11, 0) 15. 2
16. (11, 10, -3) and 3 others;