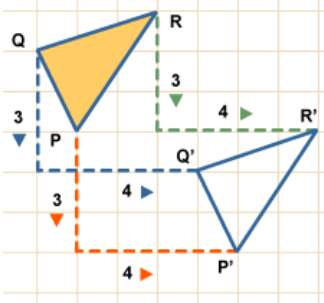
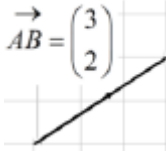
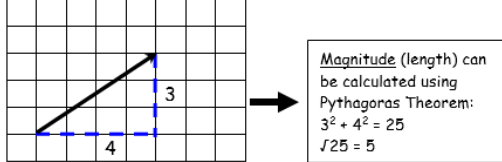

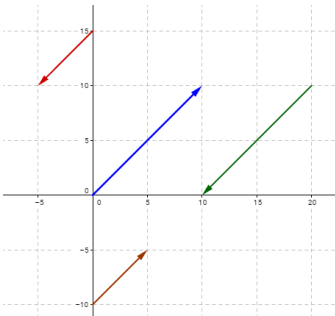
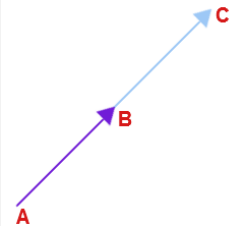
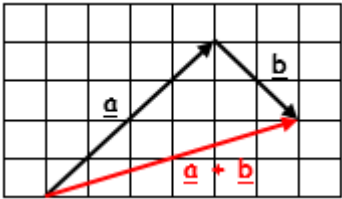
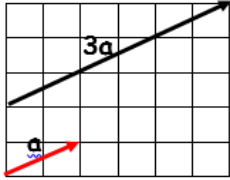
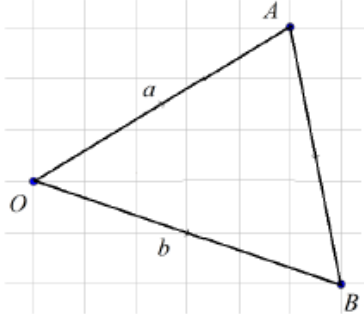
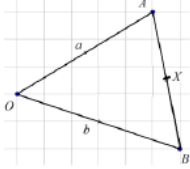


Topic: Vectors

Topic/Skill	Definition/Tips	Example
1. Translation	Translate means to move a shape . The shape does not change size or orientation .	
2. Vector Notation	A vector can be written in 3 ways: \mathbf{a} or \overrightarrow{AB} or $\begin{pmatrix} 1 \\ 3 \end{pmatrix}$	
3. Column Vector	In a column vector, the top number moves left (-) or right (+) and the bottom number moves up (+) or down (-)	$\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ means '2 right, 3 up' $\begin{pmatrix} -1 \\ -5 \end{pmatrix}$ means '1 left, 5 down'
4. Vector	A vector is a quantity represented by an arrow with both direction and magnitude . $\overrightarrow{AB} = -\overrightarrow{BA}$	
5. Magnitude	Magnitude is defined as the length of a vector.	
6. Equal Vectors	If two vectors have the same magnitude and direction , they are equal .	
7. Parallel Vectors	Parallel vectors are multiples of each other.	

8. Collinear Vectors	<p>Collinear vectors are vectors that are on the same line.</p> <p>To show that two vectors are collinear, show that one vector is a multiple of the other (parallel) AND that both vectors share a point.</p>	
9. Resultant Vector	<p>The resultant vector is the vector that results from adding two or more vectors together.</p> <p>The resultant can also be shown by lining up the head of one vector with the tail of the other.</p>	<p>if $\underline{a} = \begin{pmatrix} 4 \\ 4 \end{pmatrix}$ and $\underline{b} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$</p> <p>then $\underline{a} + \underline{b} = \begin{pmatrix} 4 \\ 4 \end{pmatrix} + \begin{pmatrix} 2 \\ -2 \end{pmatrix} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$</p> 
10. Scalar of a Vector	<p>A scalar is the number we multiply a vector by.</p>	 <p>Example:</p> $3\mathbf{a} + 2\mathbf{b} =$ $= 3\begin{pmatrix} 2 \\ 1 \end{pmatrix} + 2\begin{pmatrix} 4 \\ -1 \end{pmatrix}$ $= \begin{pmatrix} 6 \\ 3 \end{pmatrix} + \begin{pmatrix} 8 \\ -2 \end{pmatrix}$ $= \begin{pmatrix} 14 \\ 1 \end{pmatrix}$
11. Vector Geometry	 <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> $\begin{array}{ll} \vec{OA} = a & \vec{AO} = -a \\ \vec{OB} = b & \vec{BO} = -b \end{array}$ </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> $\begin{array}{l} \vec{AB} = \vec{AO} + \vec{OB} = -a + b = b - a \\ \vec{BA} = \vec{BO} + \vec{OA} = -b + a = a - b \end{array}$ </div>	<p>Example 1: X is the midpoint of AB. Find \vec{OX}</p> <p>Answer: Draw X on the original diagram</p>  <p>Now build up a journey.</p> <p>You could use $\vec{OX} = \vec{OA} + \frac{1}{2}\vec{AB}$.</p> <p>This will give: $\vec{OX} = a + \frac{1}{2}(b - a)$.</p> <p>This will simplify to $\frac{1}{2}a + \frac{1}{2}b$ or $\frac{1}{2}(a + b)$</p>