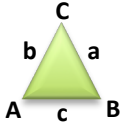
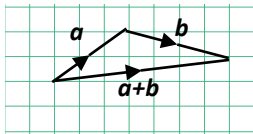


# National 5 Learning Checklist - Applications

Topic	Skills	Extra Study / Notes			
<b>Trigonometry</b>					
Triangle	Label Triangle 				
Area of a Triangle	$A = \frac{1}{2}absinC$				
Sine Rule	$\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$				
	Use Sine Rule to find a side				
	Use Sine Rule to find an angle. <b>NB:</b> $sinA = \dots$ $A = sin^{-1}(\dots)$				
Coosine Rule	Use $a^2 = b^2 + c^2 - 2bccosA$ to find a side				
	Use $cosA = \frac{b^2 + c^2 - a^2}{2bc}$ to find an angle <b>NB:</b> $cosA = \dots$ $A = cos^{-1}(\dots)$				
Bearings	Use knowledge of bearings to solve trig problems. Including knowledge of Corresponding, Alternate and Supplementary angles.				
<b>Vectors</b>					
2D Line Segments	Add or subtract 2D line Segments <ul style="list-style-type: none"> <li>• Vectors end-to-end</li> <li>• Arrows in same direction</li> </ul> 				
3D Vectors	Determine coordinates of a point from a diagram representing a 3D object				
Vector Components	Add and Subtract 2D and 3D vector components. $\mathbf{a} = \begin{pmatrix} 1 \\ 1 \\ 4 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 3 \\ 2 \\ 5 \end{pmatrix}$ $\mathbf{a} + \mathbf{b} = \begin{pmatrix} 1+3 \\ 1+2 \\ 4+5 \end{pmatrix}$				
	Multiply vector components by a scalar $2\mathbf{a} = 2 \begin{pmatrix} 1 \\ 1 \\ 4 \end{pmatrix} = \begin{pmatrix} 2 \\ 2 \\ 8 \end{pmatrix}$				
	Find the magnitude of a 2D or 3D vector: For vector $\begin{pmatrix} x \\ y \end{pmatrix}$ magnitude = $\sqrt{x^2 + y^2}$ For vector $\begin{pmatrix} x \\ y \\ z \end{pmatrix}$ magnitude = $\sqrt{x^2 + y^2 + z^2}$				
<b>Percentages</b>					
Compound Interest	Calculate multiplier from percentage: e.g. 5% increase <b>100% + 5% = 105% = 1.05</b>				
	Use multiplier to calculate compound interest / depreciation. e.g. £500 with 5% interest for 3 years <b>1.05<sup>3</sup> x 500</b>				

Percentages Contd.					
Percentage increase/decrease	% Increase/decrease = $\frac{\text{difference}}{\text{original}} \times 100$				
Reverse the Change	Find initial amount. e.g. Watch reduced by 30% to £42. <b>70% = £42, 1% = £0.60, 100% = £60 or <math>42 \div 0.7 = £60</math></b>				
Fractions					
Add and Subtract Fractions	Find a common denominator $\frac{2}{3} + \frac{4}{5} = \frac{10}{15} + \frac{12}{15}$				
Add and Subtract Mixed Numbers	Add or subtract whole numbers, or make an improper fraction: $2\frac{2}{3} + 3\frac{4}{5} = 5\frac{10}{15} + \frac{12}{15}$ or $2\frac{2}{3} + 3\frac{4}{5} = \frac{8}{3} + \frac{19}{5}$				
Multiply Fractions	Multiply top with top, bottom with bottom: $\frac{3}{7} \times \frac{4}{5} = \frac{12}{35}$				
Multiply Mixed Numbers	Make top heavy fraction then as above: $3\frac{3}{7} \times \frac{4}{5} = \frac{23}{7} \times \frac{4}{5} = \frac{92}{35}$				
Divide Fractions	Invert second fraction and multiply: $\frac{6}{7} \div \frac{2}{3} = \frac{6}{7} \times \frac{3}{2} = \frac{18}{10} = \frac{9}{5}$				
Statistics					
Comparing data	Calculate the mean: $\bar{x} = \frac{\text{sum of data}}{\text{number of terms}}$				
	Find five figure summary: L = lowest term, Q1 = lower quartile, Q2 = Median, Q3 = upper quartile, h = highest term				
	Interquartile range: IQR = Q3 – Q1 middle 50% of data				
	Semi-Interquartile range: SIQR = $\frac{Q3 - Q1}{2}$				
	Calculate Standard Deviation: $s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$ or $s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$				
	Know that IQR, SIQR and standard deviation are a measure of the <i>spread</i> of data. Lower value means more <i>consistent</i> data.				
Line of Best Fit	Use knowledge of straight line to find the equation of a line of best fit: <b><math>y = mx + c</math> or <math>y - b = m(x - a)</math></b>				
	Use equation of line of best fit to find estimate for new value. Usually do so by substituting value for x into equation.				
	Draw best fitting line: <ul style="list-style-type: none"> <li>• In line with direction of points</li> <li>• Roughly the same number of points above and below line.</li> </ul>				