

Grade 10 Mid-Term February Revision

10 Questions - 46 Marks - 45 Minutes

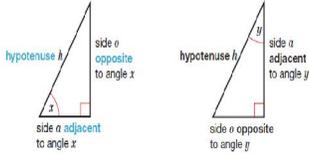
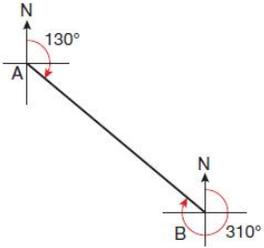
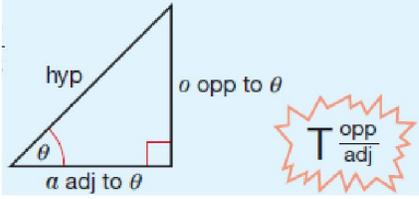
Topics:

- Shape and Space 3
- Handling Data 2
- Number 4
- Algebra 4
- Graphs 4
- Shape and Space 4
- Handling Data 3

Pages 213 - 297 - Edexcel Mathematics Student Book 1

Space and Shape 3

P. 213 - 223

Learning Objectives	Basic Principles	Key points
<p>-Use the tangent ratio to find a length and an angle in a right-triangle</p> <p>-Use angles of elevation and depression</p> <p>-Use the tangent ratio to solve problems</p>	 <p>Angle of elevation</p>  <p>Angle of depression</p>  <p>Bearings are measured -Clockwise -from north</p>  <p>A is 310° from B. B is 130° from A.</p>	<p>-tan $\theta =$</p>  <p>-To calculate an acute angle from a tangent ratio, use the [INV][tan] or [SHIFT][tan] buttons.</p>

Vocabulary: similar, ratio, decimal places, gradient, tangent, degree mode (calculator), significant figures, cross-sectional, radius, rhombus, mid-point, quadrilateral, equilateral, bisect, isosceles triangle

Handling Data 2

P. 224 - 235

Learning Objectives	Basic Principles	Key points																											
<p>-Estimate the mean and range from a grouped frequency table</p> <p>-Find the modal class and the group containing the median</p>	<p>-To collect and find patterns in large amounts of data, it is necessary to group the information together and use frequency tables.</p> <p>-A quick way to do this is by tally tables that allow fast calculation of frequency.</p> <p>-Tally marks are arranged into groups of five to make counting faster, allowing frequencies to be displayed.</p> <table border="1" data-bbox="599 732 1045 1014"> <thead> <tr> <th>TYPE OF PET</th> <th>TALLY</th> <th>FREQUENCY</th> </tr> </thead> <tbody> <tr> <td>Dog</td> <td> </td> <td>11</td> </tr> <tr> <td>Cat</td> <td> </td> <td>7</td> </tr> <tr> <td>Goldfish</td> <td> </td> <td>6</td> </tr> <tr> <td>Guinea pig</td> <td> </td> <td>3</td> </tr> <tr> <td>Hamster</td> <td> </td> <td>2</td> </tr> <tr> <td>Lizard</td> <td> </td> <td>1</td> </tr> <tr> <td>Tortoise</td> <td> </td> <td>1</td> </tr> <tr> <td>Rabbit</td> <td> </td> <td>3</td> </tr> </tbody> </table> <p>-Mean = (total of all values)/(total number of values)</p> <p>-Median=value of the middle number</p> <p>-Mode=number that occurs most frequently</p> <p>-Discrete data can only be integer values (number of people, goals, boats...)</p> <p>-Continuous data can have any value in a particular range (time, speed, weight...).</p> <p>-The symbol sigma Σ is used many times in statistics as a quick way to write 'adding up' of a particular quantity.</p>	TYPE OF PET	TALLY	FREQUENCY	Dog		11	Cat		7	Goldfish		6	Guinea pig		3	Hamster		2	Lizard		1	Tortoise		1	Rabbit		3	<p>-If data is distributed with a frequency distribution table, the mean is given by</p> $\text{Mean} = \frac{\sum fx}{\sum f}$ <p>-Discrete data: x values are the exact scores.</p> <p>-Continuous data: x values are the mid-point of each class.</p> <p>-Σ is a Greek letter 'sigma' which means add up all the values.</p>
TYPE OF PET	TALLY	FREQUENCY																											
Dog		11																											
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<p>Vocabulary: mean, median, mode, integer, range, bar chart, classes, frequency polygon, mid-point, modal class, round</p>																													

Number 4

P. 237 - 246

Learning Objectives	Basic Principles	Key points																			
<p>-Find an amount after a repeated percentage change, including compound interest.</p> <p>-Find an original amount after a percentage increase or decrease</p> <p>-Solve real-life problems involving percentages</p>	<p>-To calculate x as a percentage of y:</p> <p>-To calculate x percent of y: 1% of y so $x\%$ of y</p> <p>-The $(x/100)$ part of the last expression is the multiplying factor.</p> <p>-5% of a quantity can be found by using a multiplying factor of 0.05.</p> <p>-95% of a quantity can be found by using a multiplying factor of 0.95 and so on.</p> <p>-‘Per annum’ (p.a.) is frequently used and means ‘per year’.</p> <p>-To increase a quantity by $R\%$, multiply it by $1+R/100$</p> <p>-To decrease a quantity by $R\%$, multiply it by $1-R/100$</p> <table border="1" data-bbox="480 1100 997 1318"> <thead> <tr> <th>PERCENTAGE CHANGE</th> <th>MULTIPLYING FACTOR</th> </tr> </thead> <tbody> <tr> <td>+15%</td> <td>1.15</td> </tr> <tr> <td>+85%</td> <td>1.85</td> </tr> <tr> <td>-15%</td> <td>0.85</td> </tr> <tr> <td>-85%</td> <td>0.15</td> </tr> </tbody> </table>	PERCENTAGE CHANGE	MULTIPLYING FACTOR	+15%	1.15	+85%	1.85	-15%	0.85	-85%	0.15	<p>-To increase a quantity by $R\%$ p.a. for n years, multiply it by $(1+)^n$</p> <p>-To decrease a quantity by $R\%$ p.a. for n years, multiply it by $(1-)^n$</p> <table border="1" data-bbox="1052 562 1479 659"> <thead> <tr> <th>PERCENTAGE CHANGE p.a.</th> <th>n YEARS</th> <th>MULTIPLYING FACTOR</th> </tr> </thead> <tbody> <tr> <td>+15% (appreciation)</td> <td>5</td> <td>$(1.15)^5$</td> </tr> <tr> <td>-15% (depreciation)</td> <td>10</td> <td>$(0.85)^{10}$</td> </tr> </tbody> </table>	PERCENTAGE CHANGE p.a.	n YEARS	MULTIPLYING FACTOR	+15% (appreciation)	5	$(1.15)^5$	-15% (depreciation)	10	$(0.85)^{10}$
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+15% (appreciation)	5	$(1.15)^5$																			
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<p>Vocabulary: multiplying factor, compound interest, depreciates, rate, appreciated</p>																					

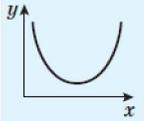
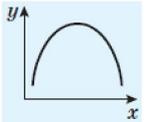
Algebra 4

P. 247 - 258

Learning Objectives	Basic Principles	Key points
<ul style="list-style-type: none">-Substitute numbers into formulae-Change the subject of a formula	<ul style="list-style-type: none">-When solving equations, isolate the unknown letter by systematically doing the same operation to both sides.-Use your calculator to evaluate expressions to a certain number of significant figures or decimal places.	<p>When using any formula:</p> <ul style="list-style-type: none">-Write down the facts with the correct units.-Write down the equations.-Substitute the facts.-Do the working.-To rearrange an equation or formula, apply the same rules that are used to solve equations.-When the letter that will become the subject appears twice in the formula, one of the steps will involve factorizing.-When using a formula, rearrange the formula if necessary.
<p>Vocabulary: significant figures, parallelogram, trapezium, radius, circumference, standard form correct to, cross section, acute, obtuse, equilateral triangle, perimeter, tangent, gradient</p>		

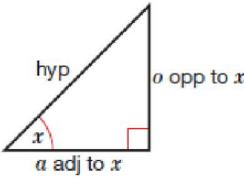
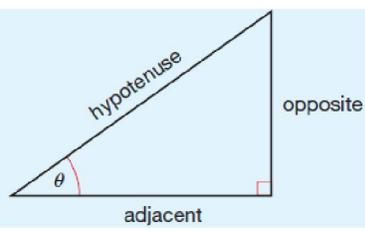
Graphs 4

P. 259 - 270

Learning Objectives	Basic Principles	Key points
<p>-Recognise and draw graphs of quadratic functions</p> <p>-Interpret quadratic graphs relating to real-life situations</p> <p>-Use graphs to solve quadratic equations</p>	<p>- You have seen how to plot straight lines of type $y = mx + c$; but, in reality, many graphs are curved.</p> <p>-Quadratic curves are those in which the highest power of x is x^2, and they produce curves called parabolas.</p> <p>-Quadratic graphs are those of type $y = ax^2 + bx + c$, where a, b and c are constants.</p> <p>-They are simple to draw either manually or with the use of a calculator.</p>	<p>-Expressions of type $ax^2 + bx + c$ are called quadratics. When they are plotted, they produce parabolas.</p> <p>If $a > 0$, the curve is U-shaped.</p>  <p>If $a < 0$, the curve is an inverted U shape.</p>  <p>-Plot enough points in order to draw a smooth curve, especially where the curve turns.</p> <p>-Do not connect the points with straight lines. Plotting intermediate points will show you that this is incorrect.</p>
<p>Vocabulary: quadratic curves, power, parabolas, quadratic graphs, inverted, linear simultaneous equations, quadratic equation, intersects, intercepts</p>		

Space and Shape 4

P. 271 - 284

Learning Objectives	Basic Principles	Key points
<p>-Use the trigonometric ratios to find a length and an angle in a right-angled triangle</p> <p>-Use angles of elevation and depression</p> <p>-Use the trigonometric ratios to solve problems</p>		<p>$-\sin \theta = \frac{\text{opp}}{\text{hyp}}$</p> <p>$-\cos \theta = \frac{\text{adj}}{\text{hyp}}$</p>  <p>When using trigonometrical ratios in a right-angled triangle, it is important to choose the correct one.</p> <p>-Identify the sides of the triangle as opposite, adjacent or hypotenuse to the angle you are looking at.</p> <p>-Write down the sine, cosine and tangent ratios as:</p> <p>$S = \frac{\text{opp}}{\text{hyp}}$ $C = \frac{\text{adj}}{\text{hyp}}$ $T = \frac{\text{opp}}{\text{adj}}$</p> <p>-Mark off the side you have been given in the question. The ratio with the two marks is the correct one to use.</p> <p>-Use the [INV] and [sin], [cos] or [tan] buttons on a calculator to find the angle, making sure that the calculator is in degree mode.</p>
<p>Vocabulary: adjacent, angle of elevation, hypotenuse, isosceles triangle, equilateral triangle, inscribed, inverse, degree mode (calculator), bearing, quadrilateral, angle of depression</p>		

Handling Data 3

P. 285 - 297

Learning Objectives	Basic Principles	Key points															
<p>-Find the inter-quartile range of discrete data</p> <p>-Draw and interpret cumulative frequency tables and diagrams</p> <p>-Estimate the median and inter-quartile range from a cumulative frequency diagram</p>	<p>-It is often useful to know more about data than just the mean value.</p> <p>Consider two social events:</p> <table border="1" data-bbox="574 506 914 621"> <thead> <tr> <th></th> <th>Guests</th> <th>Mean age (yrs)</th> <th>Ages of guests</th> <th>Age range</th> </tr> </thead> <tbody> <tr> <td>Party A</td> <td>5</td> <td>16</td> <td>2, 2, 2, 2, 72</td> <td>72 - 2 = 70</td> </tr> <tr> <td>Party B</td> <td>5</td> <td>16</td> <td>16, 16, 16, 16, 16</td> <td>16 - 16 = 0</td> </tr> </tbody> </table> <p>It is probable that the additional information about the dispersion (spread) of ages in the final column will determine which party you would prefer to attend. The mean does not tell you everything.</p>		Guests	Mean age (yrs)	Ages of guests	Age range	Party A	5	16	2, 2, 2, 2, 72	72 - 2 = 70	Party B	5	16	16, 16, 16, 16, 16	16 - 16 = 0	<p>-Lower quartile (Q_1) = $\frac{1}{4}(n+1)th$ value (25th percentile)</p> <p>-Median (Q_2) = $\frac{1}{2}(n+1)th$ value (50th percentile)</p> <p>-Upper quartile (Q_3) = $\frac{3}{4}(n+1)th$ value (75th percentile)</p> <p>-Range = highest value – lowest value</p> <p>-Inter-quartile range (IQR) = upper quartile – lower quartile = $Q_3 - Q_1$</p> <p>IQR is the range of the middle 50% of the data. If the value lies between two numbers, the mean of these values is used.</p> <p>For a set of n values on a cumulative frequency diagram, the estimate for</p> <p>-The lower quartile (Q_1) is the $n/4$th value</p> <p>-The median (Q_2) is the $n/2$th value</p> <p>-The upper quartile (Q_3) is the $3n/4$th value.</p>
	Guests	Mean age (yrs)	Ages of guests	Age range													
Party A	5	16	2, 2, 2, 2, 72	72 - 2 = 70													
Party B	5	16	16, 16, 16, 16, 16	16 - 16 = 0													
<p>Vocabulary: dispersion, quartiles, anomalies, percentile, inter-quartile range, consecutive, inter-quartile range, cumulative frequency, end-points</p>																	