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| **H Unit 13: Proportion** | **Year 11 Road map** |
| In this unit you will learn about number and measures. The aims are as follows:**LG1**: Knowledge **LG2**: Application **LG3**: SkillsAssessment Grades: |
|  | **Learning Goals/Outcomes/Content** | Video clips | R A G |  |  |
| 13a Reciprocal and exponential graphs; Gradient and area under graphs |
| 1 |  Recognise, sketch and interpret graphs of the reciprocal function  with *x* ≠ 0  | 161 |  |  |  |
| 2 | State the value of *x* for which the equation is not defined;  | 161 |  |  |  |
| 3 | Recognise, sketch and interpret graphs of exponential functions *y* = *kx* for positive values of *k* and integer values of *x*;  | 194 |  |  |  |
| 4 | Use calculators to explore exponential growth and decay;  | 194 |  |  |  |
| 5 | Set up, solve and interpret the answers in growth and decay problems; | 194 |  |  |  |
| 6 | Interpret and analyse transformations of graphs of functions and write the functions algebraically, e.g. write the equation of f(*x*) + *a*, or f(*x* – *a*):  | 196a |  |  |  |
| 7 | apply to the graph of *y* = f(*x*) the transformations *y* = –f(*x*), *y* = f(–*x*) for linear, quadratic, cubic functions;  | 196a |  |  |  |
| 8 | apply to the graph of y = f(*x*) the transformations *y* = f(*x*) + *a*, *y* = f(*x* + *a*) for linear, quadratic, cubic functions;  | 196a |  |  |  |
| 9 | Estimate area under a quadratic or other graph by dividing it into trapezia; | 216a |  |  |  |
| 10 | Interpret the gradient of linear or non-linear graphs, and estimate the gradient of a quadratic or non-linear graph at a given point by sketching the tangent and finding its gradient;  | 216a |  |  |  |
| 11 | Interpret the gradient of non-linear graph in curved distance–time and velocity–time graphs: | 216a |  |  |  |
| 12 | for a non-linear distance–time graph, estimate the speed at one point in time, from the tangent, and the average speed over several seconds by finding the gradient of the chord;  | 216a |  |  |  |
| 13 | for a non-linear velocity–time graph, estimate the acceleration at one point in time, from the tangent, and the average acceleration over several seconds by finding the gradient of the chord;  | 216a |  |  |  |
| 14 | Interpret the gradient of a linear or non-linear graph in financial contexts;  | 216b |  |  |  |
| 15 | Interpret the area under a linear or non-linear graph in real-life contexts;  | 216a |  |  |  |
| 16 | Interpret the rate of change of graphs of containers filling and emptying;  | 216b |  |  |  |
| 17 | Interpret the rate of change of unit price in price graphs.  | 216b |  |  |  |
| 13b Direct and inverse proportion |
| 18 |  Recognise and interpret graphs showing direct and indirect proportion;  | 199 |  |  |  |
| 19 | Identify direct proportion from a table of values, by comparing ratios of values, for *x* squared and *x* cubed relationships;  | 199 |  |  |  |
| 20 | Write statements of proportionality for quantities proportional to the square, cube or other power of another quantity;  | 199 |  |  |  |
| 21 | Set up and use equations to solve word and other problems involving direct proportion;  | 199 |  |  |  |
| 22 | Use *y* = *kx* to solve direct proportion problems, including questions where students find *k*, and then use *k* to find another value;  | 199 |  |  |  |
| 23 | Solve problems involving inverse proportion using graphs by plotting and reading values from graphs; | 199 |  |  |  |
| 24 | Solve problems involving inverse proportionality;  | 199 |  |  |  |
| 25 | Set up and use equations to solve word and other problems involving direct proportion or inverse proportion.  | 199 |  |  |  |

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| Student’s comments or questions |