Higher Mathematics

Knox Academy
NUMERACY AND COMPUTING FACULTY

the straight line

			other notes		textbook		some past exam paper questions							
Using m=tanθ to calculate a gradient or angle	Calculating the gradient when given an angle	https://youtu.be/3f7jB7fr6D0	Link	Link	Exercise 1.4		2018 Paper 1 Q8	2005 Paper 1 Q1	2004 Paper 2 Q1	2000 Paper 1 Q3				
	Calculating an angle when given the gradient	https://youtu.be/nn6WugLRLbY												
	Calculating the gradient/angle – exact values	https://youtu.be/gM3D6xLWg0A												
Finding the equation of a line parallel to and a line perpendicular to a given line	Parallel gradients	https://youtu.be/ijSa5HSug30					2019 Paper 1 Q7	2017 Paper 1 Q11	2016 Paper 1 Q1	Specimen Paper 1 Q5	2007 Paper 1 Q1	2006 Paper 2 Q1	2003 Paper 1 Q1	2001 Paper 1 Q1
	Perpendicular gradients	https://youtu.be/Fh0B0DIxGos	Link	Link	Exercise 1.3									
	Gradients with exact values	https://youtu.be/bx-BB07jI_I												
Determining whether or not points are collinear	Collinearity		Link	Collinearity	Exercise 1.5		2015 Paper 1 Q9							
Using properties of medians, altitudes and perpendicular bisectors in problems involving the equation of a line and intersection of lines	Equation of the median	https://youtu.be/8BjiTfgYSfA	Link	Link	Exercise 1.9		2018 Paper 1 Q1	2017 Paper 1 Q7	2016 Paper 2 Q1	Specimen Paper 1 Q9	1995 Paper 1 Q5	1999 Paper 2 Q1	1998 Paper 1 Q1	1988 Paper 1 Q1
	Equation of the altitude	https://youtu.be/UTm0Sia6of4	Link	Link	Exercise 1.10									
	Equation of a perpendicular bisector	https://youtu.be/k1jMcDscQA0	Link	Link	Exercise 1.8									
	Point of intersection between 2 lines – positive 'x'	https://youtu.be/XIyEmEuhrI4	Link	Link	Exercise 1.11B		2019 Paper 2 Q1	2018 Paper 2 Q5	2017 Paper 2 Q1	2015 Paper 2 Q1	Exemplar Paper 1 Q6	2014 Paper 2 Q1	2013 Paper 2 Q2	2012 Paper 2 Q2
	Point of intersection between 2 lines – negative 'x'	https://youtu.be/vDV0avGjSos					2011 Paper 1 Q21	2010 Paper 1 Q21	2009 Paper 1 Q21	2008 Paper 2 Q1	Specimen Paper 1 Q1	2006 Paper 1 Q1	2004 Paper 1 Q1	2002 Paper 2 Q1
	Points of intersection – with fractions	https://youtu.be/iKSPt_74kvU					1999 Paper 1 Q2	1996 Paper 2 Q2	1992 Paper 1 Q2					

Graphs of Functions

			other notes		textbook		some past exam paper questions							
Identifying or sketching a function after a transformation of the form kf(x), f(kx), f(x+k), f(x)+k or a combination of these	Graphs of functions – changing the y coords	https://youtu.be/6qVXUzyd-k0	Link	Link	Exercise 5.1	Exercise 5.3								
	Graphs of functions – changing the x coords	https://youtu.be/AlNdcT9ZPio	Link		Exercise 5.2	Exercise 5.4								
	Graphs of functions – changing both of them	https://youtu.be/EdJtKoPTPo	Link		Exercise 5.5		2019 Paper 1 Q10	2017 Paper 1 Q15	2015 Paper 1 Q20	Exemplar Paper 1 Q8	2013 Paper 1 Q11	2012 Paper 1 Q11	2011 Paper 1 Q3	2010 Paper 1 Q20
							2009 Paper 1 Q23	2008 Paper 1 Q8	2004 Paper 1 Q4	Specimen 2 Paper 1 Q14	Specimen 1 Paper 1 Q6			
	Trig graphs - finding the values of a & b	https://youtu.be/LemIAKKMpr3I					2015 Paper 1 Q4	2013 Paper 1 Q4	2012 Paper 1 Q9	2010 Paper 1 Q4	Specimen 1 Paper 1 Q17			
	Trig graphs - Finding the values of a, b & c	https://youtu.be/BebOByoOrH8												
	Sketching graphs of trickier trig functions	https://youtu.be/ITi9TV7MaUE												

Trigonometry (1)

			other notes		textbook		some past exam paper questions							
Application of the addition or double angle formulae	Double angle formula – sin2x	https://youtu.be/dOsStd_iLI7w		Link	Exercise 9.3		2019 Paper 1 Q13	2018 Paper 1 Q13	2016 Paper 1 Q13	2015 Paper 1 Q10	Specimen Paper 1 Q6	2007 Paper 2 Q2	2005 Paper 2 Q2	2003 Paper 1 Q10
	Double angle formula – cos2x	https://youtu.be/ARpNuiPaiyg			Exercise 9.3		2000 Paper 1 Q1	1999 Paper 1 Q1	1999 Paper 1 Q12					
	Addition formulae – for sine and cosine	https://youtu.be/OxbI_nCWIA	Link	Link	Exercise 9.1	Exercise 9.2								

Logs and Exponentials

			other notes		textbook		some past exam paper questions							
Using the laws of logarithms and exponents	Evaluating logarithmic expressions	https://youtu.be/7L2_ISu9Rtw	Link	Link	Exercise 15.6		2018 Paper 1 Q6	2015 Paper 1 Q6	2003 Paper 1 Q12	2000 Paper 1 Q9				
	Logarithmic expressions – combining logs	https://youtu.be/1xntsgXONiU	Link											
	Logarithmic expressions – moving stuff 'up/down'	https://youtu.be/L33XGoHVAIA												
Solving logarithmic and exponential equations	Solving simple logarithmic equations	https://youtu.be/4-u7H0bsm-s	Link	Link	Exercise 15.7		2019 Paper 1 Q14	2018 Paper 1 Q11	2017 Paper 1 Q12	2016 Paper 1 Q14	2013 Paper 2 Q5	2009 Paper 2 Q3	2008 Paper 1 Q23	Specimen Paper 1 Q22
	Solving logarithmic equations	https://youtu.be/sUrr2Ei_D8o					2007 Paper 2 Q8	2005 Paper 2 Q7	2004 Paper 1 Q9	2002 Paper 2 Q7	2001 Paper 1 Q8			
	Solving logarithmic equations with brackets	https://youtu.be/gM4eHKachig												

Differentiation (1)

			other notes	textbook	some past exam paper questions
Differentiating an algebraic function which is, or can be simplified to, an expression in powers of x	Basic differentiation	https://youtu.be/RwEFjJO_864		Playlist #1-6	2016 Paper 1 Q2 · 2015 Paper 1 Q7 · 2003 Paper 1 Q5 · 2000 Paper 1 Q1 · 1999 Paper 1 Q5 · 1996 Paper 1 Q5
	Differentiation – with fractions and indices	https://youtu.be/YUUlgWqb20c			
	Harder differentiation	https://youtu.be/BeSRJqWWZw			
October mid-term assessment					
Determining the equation of a tangent to a curve at a given point by differentiation	Finding the derivative at a particular point	https://youtu.be/eSEmBf7wP2k		Link	2017 Paper 1 Q8
	Harder substitution	https://youtu.be/DDUy0nU1OkU			
	Rates of change	https://youtu.be/BgEiLSL_gVY			
	Calculating the gradient of a tangent to curve	https://youtu.be/Rrm2Qmt17YU		Link	2018 Paper 1 Q7 · 2015 Paper 1 Q2 · Exemplar Paper 1 Q1 · 2014 Paper 2 Q4 · 2008 Paper 1 Q22 · Specimen 1 Paper 2 Q4 · 2007 Paper 2 Q5 · 2006 Paper 2 Q3 · 2004 Paper 2 Q5 · 1999 Paper 1 Q9
	The equation of a tangent to curve	https://youtu.be/iiDiPo2pk2g			
	Finding a point when given the gradient	https://youtu.be/UW8hdaMRyOs			

Quadratics

			other notes	textbook	some past exam paper questions
Given the nature of the roots of an equation, use the discriminant to find an unknown	The discriminant - solving for equal roots	https://youtu.be/Bx_avqqBnnM	Link	Link	2019 Paper 1 Q2 · 2017 Paper 1 Q4 · 2016 Paper 2 Q2 · Exemplar Paper 2 Q3 · Specimen Paper 1 Q4 · 2014 Paper 2 Q3 · 2012 Paper 2 Q1 · 2007 Paper 1 Q4 · 2006 Paper 2 Q2 · 2001 Paper 1 Q2
	Solving for real or no real roots	https://youtu.be/WQlNfbvOOvg			
	Solving for equal, real or no real roots	https://youtu.be/nuoqp6TGKO8			
Finding the coordinates of the point(s) of the intersection of a straight line and a curve or of two curves	Intersection of line & curve – 2 points of contact	https://youtu.be/OKNJ9GJvA6B	Link	Link	Specimen Paper 1 Q2
	Intersection of line & curve – 1 point of contact	https://youtu.be/cN_dNJz8z_k			
	Intersection of line & curve – no points of contact	https://youtu.be/cMAPgbNfp5A			
Completing the square in a quadratic expression where the coefficient of x2 is non-unitary	Completing the square (non-unitary x^2)	https://youtu.be/Cfurz_VdZDA	Link	Link	2019 Paper 2 Q7 · 2018 Paper 2 Q4 · 2017 Paper 2 Q4 · 2016 Paper 1 Q12 · 2015 Paper 2 Q2 · Specimen Paper 1 Q8 · 2013 Paper 1 Q21 · 2002 Paper 1 Q7 · 2001 Paper 1 Q4
	Completing the square (negative non-unitary x^2)	https://youtu.be/_LOKwKwPTbY			
	Maximum and minimum values	https://youtu.be/7a3YHrsy4P4			
Determine the equation of a Parabola	Writing the equation of a quadratic function with a common factor	https://youtu.be/aC7C-gpBWeY	Link		
	Writing the equation of a quadratic function in trinomial form	https://youtu.be/jwSZqUNckRo			
	Writing the equation of a cubic function	https://youtu.be/z_M7IryUu64			
Solve quadratic inequalities	Solving quadratic inequalities - common factor	https://youtu.be/wG3qJ1bs1XE	Link	Link	2018 Paper 2 Q10 · 2015 Paper 1 Q8 · 2013 Paper 1 Q19 · 2012 Paper 1 Q19 · 2011 Paper 1 Q18 · 2010 Paper 1 Q18 · 2009 Paper 1 Q19
	Quadratic inequalities - unitary x^2 trinomials	https://youtu.be/YfJtfPcOo9k			
	Quadratic inequalities - non-unitary x^2 trinomials	https://youtu.be/XFWiS-125xo			

Differentiation (2)

			other notes	textbook	some past exam paper questions
Differentiating ksin(x), kcos(x)	Further differentiation - with brackets	https://youtu.be/723N7cXY9Yo			2019 Paper 1 Q6 · 2016 Paper 2 Q10a · 2010 Paper 2 Q6a · 2007 Paper 1 Q10 · 2017 Paper 2 Q11 · 2016 Paper 2 Q11b · Specimen Paper 1 Q10 · 2006 Paper 2 Q9 · 2003 Paper 2 Q6 · 1999 Paper 2 Q10 · 2005 Paper 1 Q5
Differentiating a composite function using the chain rule	Further differentiation - with trigonometry	https://youtu.be/TmrJXPTB1A			
	Further differentiation - with brackets & trig	https://youtu.be/ZPCtVEDjqfA			

Functions

			other notes	textbook	some past exam paper questions
Determining a composite function given f(x) and g(x), where f(x) and g(x) can be trigonometric, logarithmic, exponential or algebraic functions — knowledge and use of the terms domain and range is expected	Restrictions on the domain – for fractions	https://youtu.be/aBIphqHWgM	Link		2015 Paper 2 Q2 · 2005 Paper 1 Q4 · 2003 Paper 1 Q9
	Restrictions on the domain – for square roots	https://youtu.be/_rFNTwGvhpk			
	Domain and range	https://youtu.be/W78yzyIAAA			
	Composite functions – 'f(g(number))'	https://youtu.be/VBl4dVNBXE	Link	Link	2019 Paper 1 Q12 · 2017 Paper 1 Q1 · 2016 Paper 1 Q12 · Specimen Paper 1 Q8 · 2014 Paper 2 Q3 · 2012 Paper 2 Q1 · 2009 Paper 2 Q2 · 2007 Paper 1 Q3 · 2006 Paper 1 Q3
	Composite functions – 'f(g(x))'	https://youtu.be/yCxP4mp6GQM			
	Composite functions – working backwards	https://youtu.be/RiB52FahCz8			
Determining the inverse of functions	Calculating inverse functions	https://youtu.be/wQs-j223zaQ	Link	Link	2019 Paper 2 Q8 · 2018 Paper 1 Q2 · 2017 Paper 1 Q6 · 2016 Paper 1 Q6 · 2015 Paper 1 Q5 · Exemplar Paper 1 Q11
Sketching the inverse of a logarithmic or an exponential function	Graphs of exponential functions	https://youtu.be/cBZJy39HnIE	Link		2016 Paper 1 Q10 · 2015 Paper 1 Q13 · 2010 Paper 1 Q19 · 2009 Paper 1 Q10 · 2005 Paper 1 Q7
	Graphs of logarithmic functions	https://youtu.be/GIB4LkomwnU			
	Inverse graphs of exp & log functions	https://youtu.be/PFh5q7TRp78		Link	

Polynomials

			other notes	textbook	some past exam paper questions
Factorising a cubic or quartic polynomial expression	Factorising cubic polynomials when given factor	https://youtu.be/HM5dHBe-9ig	Link	Link	2019 Paper 2 Q10 · 2018 Paper 2 Q7 · 2017 Paper 2 Q2 · 2016 Paper 2 Q3(a) · 2015 Paper 1 Q3 · Specimen Paper 1 Q7 · 2006 Paper 1 Q9 · 2004 Paper 1 Q2 · 2003 Paper 2 Q1
	Factorising cubic polynomials when not given a factor and missing terms	https://youtu.be/XE8d8pNIHU			
	Factorising polynomials of degree 4	https://youtu.be/GQEpLPPiD8k			
Solving a cubic or quartic polynomial equation	Solving a cubic or quartic polynomial equation		Link	Link	

Prelim assessment