SQA Higher

MATHS

$a^2 - b^2 =$
$(a+b)(a-b)$

MUTT
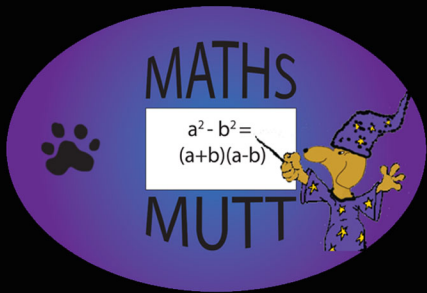
Revision Checklist

Apps 1.1 : Applying algebraic skills to rectilinear shapes.

Gradients ☐
m = tanθ ☐
Distance Formula ☐
Midpoint Formula ☐
Parallel lines ☐
Perpendicular lines ☐
y = mx + c ☐
y - b = m(x - a) ☐
Ax + By + C = 0 ☐
Collinearity ☐
Intersection of straight lines ☐
Perpendicular bisectors ☐
Altitudes of a triangle ☐
Centroids, circumcentres ☐
Circumcircle, concurrency ☐
Orthocentre ☐
Medians of a triangle ☐
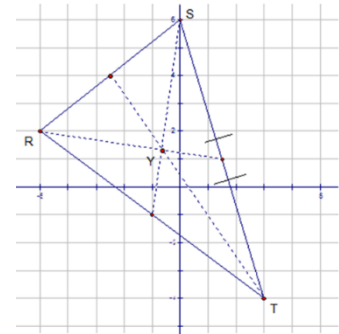
Apps 1.2 : Applying algebraic skills to circles.

$x^2 + y^2 = r^2$ ☐

Centre (a,b) $(x-a)^2 + (y-b)^2 = r^2$, ☐

General equation $x^2 + y^2 + 2gx + 2fy + c = 0$ ☐

Tangents to a circle ☐

Intersections of lines and circles ☐
☐
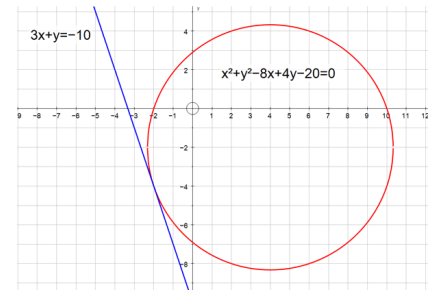
Notes

Apps 1.3 :Applying algebraic skills to sequences.

nth term of sequence ☐

Linear recurrences $u_{n+1}=mu_{n+c}$ ☐

Convergence / Divergence ☐

Calculating limits $L=c/(1-m)$ ☐

Arithmetic sequence $u_{n+1}=u_{n+b}$ ☐

Geometric sequence $u_{n+1}=au_n$ ☐

Fibonacci sequences $u_{n+2}=u_{n+1}+u_n$ ☐

Proof

If a limit exists then $\lim_{n\to 0}u_n = L$

$$\therefore \lim_{n\to 0}u_{n+1} = L$$

$$u_{n+1} = au_n + b$$

$$\therefore \quad L = aL + b$$
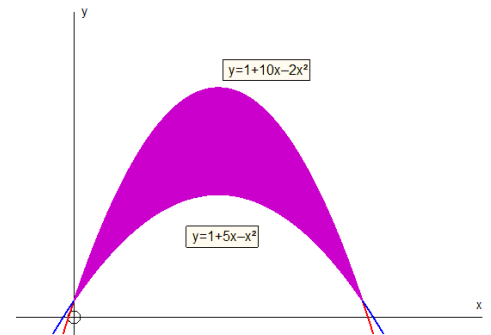
$$\Rightarrow \quad L - aL = b$$

$$\Rightarrow \quad L(1-a) = b$$

$$\Rightarrow \quad L = \frac{b}{(1-a)}$$

Apps 1.4 : Applying calculus skills to optimisation and area.

Area under trig curves ☐

Area under a curve ☐

Area between two curves ☐

$y=1+10x-2x^2$

$y=1+5x-x^2$

Notes

E&F 1.1 : Applying algebraic skills to logarithms and exponentials

Exponential growth and decay ☐
The number e ☐
$Y = a^x \quad x = \log_a y$ ☐
Log laws ☐
Solving exponential equations ☐
Using graphs to solve $y = ax^n$ or $y=ab^x$ ☐

$$\log_a x = \frac{\log_b x}{\log_b a}$$

E&F 1.2 : Applying trigonometric skills to manipulating expressions.

Rcos(x-α) ☐
Rcos(x+α) ☐
Rsin(x-α) ☐
Rsin(x+α) ☐
Maxima and minima ☐
Trig equations ☐

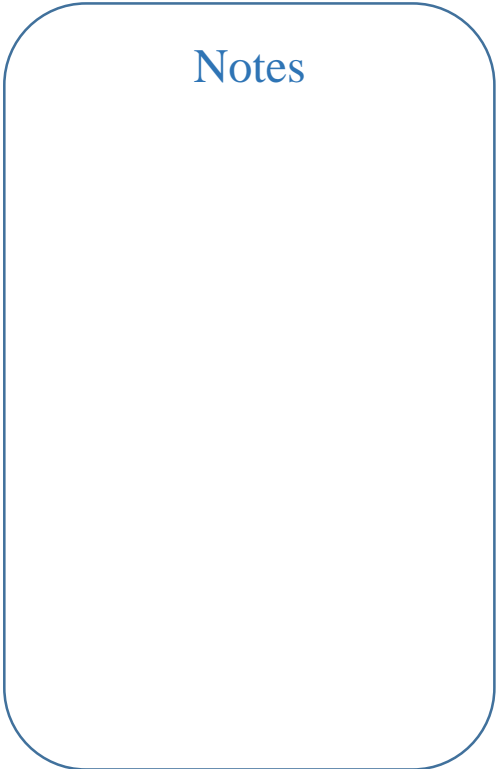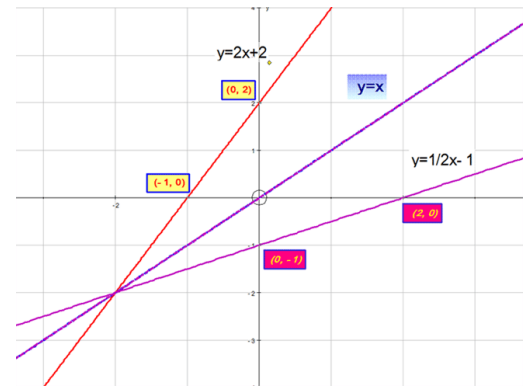$$\sin(A+B)=sinA\cos B+cosA\sin B$$

$$\sin(A-B)=sinA\cos B-cosA\sin B$$

$$\cos(A+B)=\cos A\cos B-\sin A\sin B$$

$$\cos(A-B)=\cos A\cos B+\sin A\sin B$$

Notes

E&F 1.3 : Applying algebraic and trigonometric skills to functions.

Set notation ☐
Domains ☐
Codomains ☐
Range ☐
Image ☐
Function ☐
Composite functions ☐
Inverse functions ☐
Exponential functions ☐
Logarithmic functions ☐
Standard graphs ☐
Graph of y = f(x) + a ☐
Graph of y = f(x+ a) ☐
Graph of y = - f(x) ☐
Graph of y = f(-x) ☐
Graph of y = kf(x) ☐
Graph of y = f(kx) ☐
Exponential graphs ☐
Logarithmic graphs ☐
Period & amplitude ☐
Trigonometric graphs ☐
Graph of y = acos(nx) ☐
Graph of y = asinx ☐
Graph of y = sin(ax+ b) ☐
Graph of y = cos(ax+ b) ☐
Graph of y = (1-sinx)^2 +2 ☐

y=2x+2
(0, 2)
y=x
y=1/2x- 1
(-1, 0)
(2, 0)
(0, -1)

Notes

E&F 1.4: Applying geometric skills to vectors

3D trigonometry ☐
3D co-ordinates ☐
Scalars and vectors ☐
Vectors and directed line segments ☐
Magnitude of vectors ☐
Addition, subtraction of vectors ☐
Multiplicatipon by a scalar ☐
Position vector ☐
Section formula ☐
Unit vectors ☐
Scalar product a.b ☐
Distributive law for scalar product ☐

B
n 2
m
1
P
A
O

$$\mathbf{p} = \frac{n}{n+m}\mathbf{a} + \frac{m}{n+m}\mathbf{b}$$
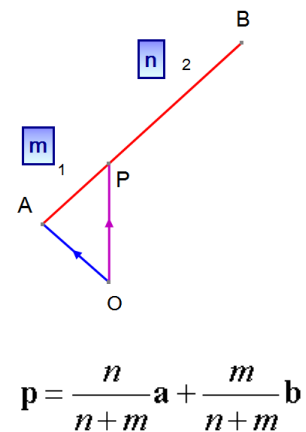
R&C 1.1 : Applying algebraic skills to solve equations

Polynomials ☐
Nested method ☐
Synthetic division ☐
Remainder theorem ☐
Factor theorem ☐
Solving polynomial equations ☐
Approximate roots of f(x) ☐
Solving quadratics by :- ☐
….Factorisation ☐
….Completing the square ☐
….Quadratic formula ☐
….graphical means ☐
Tangents to curves ☐
Discriminant ☐
Solving quadratic inequalities ☐

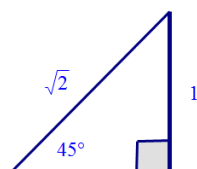| x	a	b	c	d
		ax	$(ax+b)x$	$((ax+b)x+c)x$
	a	$ax+b$	$(ax+b)x+c$	$((ax+b)x+c)x+d$
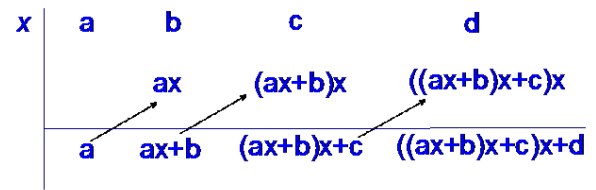
Notes

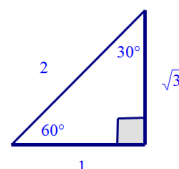## R&C 1.2 : Applying trigonometric skills to solve equations.

Radians ☐
Exact values ☐
Revision basics, sine rule, cosine rule, area of triangle. ☐
Compound angles:- ☐
cos(A+B) cos(A - B) ☐
sin(A+B) sin(A - B) ☐
Sin2A Cos2A ☐
Trigonometric equations ☐
Further trig equations ☐
Graphs y=sin(x+α) , y=sin(x-α) ☐
Graphs y=cos(x+α) , y=cos(x-α) ☐

Notes

Isosceles triangle

$\sqrt{2}$ 1

45°

Half an equilateral triangle

2   30°

$\sqrt{3}$

60°

1

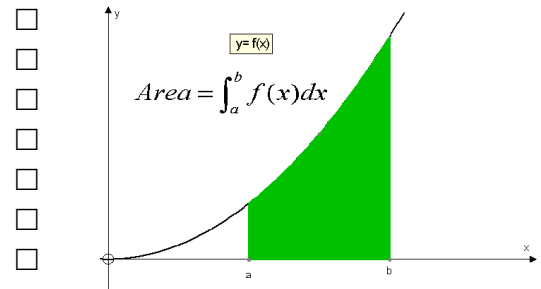|	Rads	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
	Degrees	30°	45°	60°	90°
	Sin	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
	Cos	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
	Tan	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	undefined

R&C 1.3 : Applying calculus skills of differentiation.

gradient of tangent to curve ☐
notation dy/dx   and   f'(x) ☐
if $f(x) = x^n$, $f'(x) = nx^{n-1}$ ☐
if $f(x) = g(x) + h(x)$, $f'(x) = g'(x) = h'(x)$ ☐
if $f(x) = kg(x)$, $f'(x) = kg'(x)$ k is a constant ☐
stationary points ☐
maximum / minimum turning points ☐
horizontal point of inflexion ☐
Differentiate trig functions ☐
Chain rule for differentiation ☐
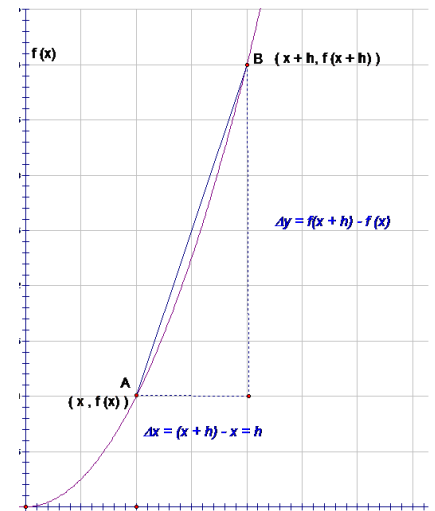
R&C 1.4 : Applying calculus skills of integration.

Standard integrals ☐
Integrate trig functions ☐
Anti -differentiation ☐
Differential equations ☐
Integration using formula ☐
Definite integrals ☐
☐

$$Area = \int_a^b f(x)dx$$

Notes

www.mathsmutt.co.uk