Compound interest:
Total amt after n years:

$A = P\left(1 + \frac{r}{100}\right)^n$

Simple interest:

Total interest after t years: $I = \frac{PRT}{100}$

Mensuration:
(*csa= curved surface area)

csa of cone $= \pi rl$

csa of sphere $= 4\pi r^2$

csa of cylinder $= 2\pi rh$

vol of cone $= \frac{1}{3}\pi r^2 h$

vol of sphere $= \frac{4}{3}\pi r^3$

vol of cylinder $= \pi r^2 h$

Area of circle $= \pi r^2$

Cir of circle $= 2\pi r$

Arc Length(r) $= r\theta$

Area of sector(r)$= \frac{1}{2} r^2\theta$

Arc Length($^\circ$) $= \frac{x}{360} \times 2\pi r$

Area of sector($^\circ$)$= \frac{x}{360} \times \pi r^2$

Similar Figures:
Ratio of length $= \frac{l_1}{l_2}$

Ratio of area $= \left(\frac{l_1}{l_2}\right)^2$

Ratio of volume $= \left(\frac{l_1}{l_2}\right)^3$

Trigonometry:
$\sin\theta = \frac{opp}{hypo}$

$\cos\theta = \frac{adj}{hypo}$

$\tan\theta = \frac{opp}{adj}$

Pythagoras theorem:
$c^2 = a^2 + b^2$

Sine rule:
$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule:
$a^2 = b^2 + c^2 - 2bc\cos A$

$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

Coordinate Geometry:
length=

$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

gradient of AB $= \frac{y_2 - y_1}{x_2 - x_1}$

$y - y_1 = m(x - x_1)$

eq of line AB: $y = mx + c$

Area of $\Delta = \frac{1}{2}ab\sin C$

Statistics :
Mean $= \frac{\Sigma fx}{\Sigma f}$

SD $= \sqrt{\frac{\Sigma fx^2}{\Sigma f} - \left(\frac{\Sigma fx}{\Sigma f}\right)^2}$

Lower q= 25^{th} percentile

Median = 50^{th} percentile

Upper q= 75^{th} percentile

Interquartile range= upper q - lower q

Quadratic equation:
$(a+b)^2 = a^2 + 2ab + b^2$

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

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

Congruency Tests
1) SSS 2) SAS(included ∠) 3) AAS 4)ASA 5) RHS

Similarity Tests
1) Ratio of sides are equal
2) AAA
3) SAS(included ∠)

Quadratic equation:
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$ax^2 + bx + c = 0$

Case 1: $b^2 - 4ac > 0$
two distinct real roots.

Case 2: $b^2 - 4ac = 0$
Two real and equal roots.

Case 3: $b^2 - 4ac < 0$
no real roots.

Sum of roots: $\alpha + \beta = -\frac{b}{a}$

Product of roots: $\alpha\beta = \frac{c}{a}$

Quadratic equation:
x^2 -(sum of roots)x + (product of roots) =0

Quadratic inequalities:

$(x-a)(x-b) < 0 \rightarrow a < x < b,\ b > a$

$(x-a)(x-b) > 0 \rightarrow x < a$ or $x > b$

For $ax^2 + bx + c > 0$ (a>0) and $ax^2 + bx + c < 0$ (a<0), then $b^2 - 4ac < 0$.

Cubic equations:
$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

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Law of Indices
(a) $a^m \times a^n = a^{m+n}$

(b) $a^m \div a^n = a^{m-n}$

(c) $(a^m)^n = a^{mn}$

(d) $a^m \times b^m = (ab)^m$

(e) $a^m \div b^m = \left(\frac{a}{b}\right)^m$

(f) $a^0 = 1$

(g) $a^{-n} = \frac{1}{a^n}$

(h) $\left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m$

(i) $a^{\frac{1}{n}} = \sqrt[n]{a}$

(i) $a^{\frac{m}{n}} = \left(\sqrt[n]{a}\right)^m$

Operations on surds
$a\sqrt{x} + b\sqrt{x} = (a+b)\sqrt{x}$

$a\sqrt{x} - b\sqrt{x} = (a-b)\sqrt{x}$

$\left(\sqrt{x}\right)\left(\sqrt{y}\right) = \sqrt{(xy)}$

$\frac{\sqrt{x}}{\sqrt{y}} = \sqrt{\frac{x}{y}}$

Rationalizing the denominator
(a) $\frac{\sqrt{x}}{\sqrt{y}} = \frac{\sqrt{x}}{\sqrt{y}} \times \frac{\sqrt{y}}{\sqrt{y}} = \frac{\sqrt{xy}}{y}$

(b) $\frac{1}{\sqrt{x} + \sqrt{y}} = \frac{1}{\sqrt{x} + \sqrt{y}} \times \frac{\sqrt{x} - \sqrt{y}}{\sqrt{x} - \sqrt{y}} = \frac{\sqrt{x} - \sqrt{y}}{x - y}$

Logarithms
If $a^x = b, a > 0$

then $\log_a b = x$

Laws of Logarithms

(a) $\log_a xy = \log_a x + \log_a y$

(b) $\log_a \frac{x}{y} = \log_a x - \log_a y$

(c) $\log_a (x)^n = n\log_a x$

(d) $\log_a 1 = 0$

(e) $\log_a a = 1$

(f) $\log_a x = \frac{\log_b x}{\log_b a}$,

$\log_a x = \frac{1}{\log_x a}$

Note : $\log_a x$ exists if $a > 0$ and $x > 0$.

Coordinate Geometry
Area of ΔABC

$= \frac{1}{2}\begin{vmatrix} x_1 & x_2 & x_3 & x_1 \\ y_1 & y_2 & y_3 & y_1 \end{vmatrix}$

$= \frac{1}{2}(x_1y_2 + x_2y_3 + x_3y_1 - x_2y_1 - x_3y_2 - x_1y_3)$

Midpoint M,

$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

For two lines l_1 and l_2,

(a) l_1 is parallel to l_2

→their gradients are equal

(b) l_1 is perpendicular to l_2

→ the product of their gradients is -1.

Circles
centre (a,b) , radius r

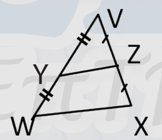
Equation of circle:

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

The Binomial Theorem
$(x+y)^n =$

$x^n + \binom{n}{1}x^{n-1}y + \binom{n}{2}x^{n-2}y^2 + \binom{n}{3}x^{n-3}y^3 + \ldots + \binom{n}{r}x^{n-r}y^r + \ldots + y^n$

$(r+1)^{th}$ term $= \binom{n}{r}x^{n-r}y^r$

The Midpoint Theorem


Y and Z are the midpoints of VW and VX respectively.

Result: $YZ // WX$, $YZ = \frac{1}{2}WX$

The Alternate Segment Theorem