

Foundations 30 Formula Sheet

Financial Mathematics: Investing & Borrowing Money

<p>Simple Interest</p> $i = Prt$ $A = P + Prt$ $A = P(1 + rt)$	<p>Compound Interest</p> $A = P(1 + i)^n$ $P = \frac{A}{(1 + i)^n}$	<p>Rule of 72</p> $\text{Doubling Time} = \frac{72}{\text{Annual Interest Rate}}$ <p>Rate of Return</p> $\frac{\text{interest}}{\text{principal}} \times 100\%$
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Conditional Statements

<p>If p, then q</p> <p>Hypothesis: If p Conclusion: Then q</p> <p>Biconditional: p if and only if q</p> <p>Converse: If q, then p</p> <p>Inverse: If not p, then not q</p> <p>Contrapositive: If not q, then not p</p>
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Counting

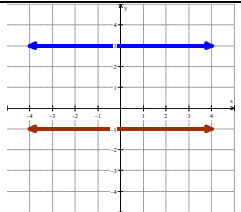
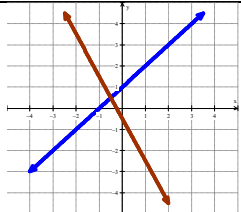
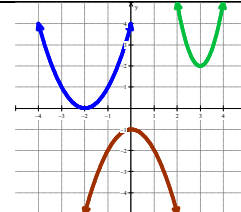
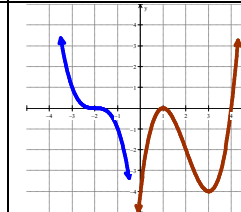
<p>Fundamental Counting Principle: $a \times b \times c \times \dots$</p> <p>Factorial: $5! = 5 \times 4 \times 3 \times 2 \times 1$</p>	
<p>Permutation: ${}_n P_r$</p>	<p>Permutation with Repetition:</p>
<p>Combination: ${}_n C_r$</p>	$\frac{n!}{r!s!t!\dots}$

Probability

<p>Probability: $\frac{\# \text{ favourable outcomes}}{\text{total } \# \text{ outcomes}}$</p> <p>Odds in Favour: $\# \text{ favourable} : \# \text{ unfavourable}$</p> <p>Odds Against: $\# \text{ unfavourable} : \# \text{ favourable}$</p> <p>$P(A \cup B) = P(A) + P(B) - P(A \cap B)$</p> <p>Independent Events: $P(A \cap B) = P(A) \times P(B)$</p> <p>Dependent Events: $P(A \cap B) = P(A) \times P(B A)$</p>
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+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Properties of Polynomial Functions

Type of Function	Constant	Linear	Quadratic	Cubic
Degree	0	1	2	3
Sketch				
Possible Number of x-intercepts	0, except for $y = 0$ for which every value is on the x-axis	1	0, 1, or 2	1, 2, or 3
Number of y-intercepts	1	1	1	1
End Behaviour	Q2 → Q1 or Q3 → Q4	Q3 → Q1 or Q2 → Q4	Q2 → Q1 or Q3 → Q4	Q3 → Q1 or Q2 → Q4
Domain	$\{x x \in \mathbb{R}\}$	$\{x x \in \mathbb{R}\}$	$\{x x \in \mathbb{R}\}$	$\{x x \in \mathbb{R}\}$
Range	$\{y y = \text{constant}, y \in \mathbb{R}\}$	$\{y y \in \mathbb{R}\}$	$\{y y \leq \text{max}, y \in \mathbb{R}\}$ or $\{y y \geq \text{min}, y \in \mathbb{R}\}$	$\{y y \in \mathbb{R}\}$
Possible Number of Turning Points	0	0	1	0 or 2

Properties of Exponential Functions and Logarithmic Functions

Function	$y = a(b)^x$ $b > 1$	$y = a(b)^x$ $0 < b < 1$	Function	$y = a \log x$ $y = a \ln x$
Number of x-intercepts	0	0	The x-intercepts	1
The y-intercept	a	a	Number of y-intercept	0
End Behaviour	Q2 → Q1	Q2 → Q1	End Behaviour	Q4 → Q1 OR Q1 → Q4
Increasing/Decreasing	Increasing	Decreasing	Increasing/Decreasing	Increasing OR Decreasing
Domain	$\{x x \in \mathbb{R}\}$	$\{x x \in \mathbb{R}\}$	Domain	$\{y y > 0, y \in \mathbb{R}\}$
Range	$\{x x > 0, x \in \mathbb{R}\}$	$\{x x > 0, x \in \mathbb{R}\}$	Range	$\{y y \in \mathbb{R}\}$

Properties of Sinusoidal Functions

	$y = a \cos b(x-c) + d$ $y = a \sin b(x-c) + d$
Amplitude	$ a $
Period	Degrees: $\frac{360^\circ}{b}$ Radians: $\frac{2\pi}{b}$
Equation of the Midline	$y = d$
Maximum Value	$\text{amplitude} + d$
Minimum Value	$-\text{amplitude} + d$
Range	$\{y \min \leq y \leq \max, y \in \mathbb{R}\}$
Horizontal Shift (Horizontal Translation)	c