Subject: Maths

Topic: Graphs and Graph Transformations

Topic/Skill	Definition/Tips	Example
1. Coordinates	Written in pairs. The first term is the x-coordinate (movement across). The second term is the y-coordinate (movement up or down)	A: (4,7) B: (-6,-3) B: (-6,-3)
2. Linear Graph	Straight line graph. The equation of a linear graph can contain an x-term, a y-term and a number.	Example: Other examples: $x = y$ $y = 4$ $x = -2$ $y = 2x - 7$ $y + x = 10$ $2y - 4x = 12$
3. Quadratic Graph	A 'U-shaped' curve called a parabola. The equation is of the form $y = ax^2 + bx + c$, where a , b and c are numbers, $a \ne 0$. If $a < 0$, the parabola is upside down .	$y = x^2-4x-5$ $y = x^2-4x-5$ $y = x^2-4x-5$
4. Cubic Graph	The equation is of the form $y = ax^3 + k$, where k is an number. If $a > 0$, the curve is increasing. If $a < 0$, the curve is decreasing.	a>0
5. Reciprocal Graph	The equation is of the form $y = \frac{A}{x}$, where A is a number and $x \neq 0$. The graph has asymptotes on the x-axis and y-axis.	y = 1/x 0
6. Asymptote	A straight line that a graph approaches but never touches.	horizontal asymptote vertical asymptote x

7. Exponential	The equation is of the form $y = a^x$, where		
Graph	a is a number called the base .	4	4 /
	If $a > 1$ the graph increases .		2
	If $0 < a < 1$, the graph decreases.	2	
	The graph has an asymptote which is the	-2 0 2	-2 0 2
	x-axis.		
$8. y = \sin x$	Key Coordinates: (0,0), (90,1), (180,0), (270,-1), (360,0)	T	
	(0,0), (30,1), (180,0), (270,-1), (300,0)		θ
	y is never more than 1 or less than -1.	90° 180° 270° 360	450° 540° 630° 720°
	Pattern repeats every 360°.	1.0	
$9. y = \cos x$	Key Coordinates:	$\downarrow_{1.0}$ graph of y = cosine θ	
	(0,1),(90,0),(180,-1),(270,0),(360,1)		
		90 180 270 360	450° 540° 630° 720°
	y is never more than 1 or less than -1.		450. 540. 650. 720.
10	Pattern repeats every 360°.	+ 1.0	ν = tan θ
$10. y = \tan x$	Key Coordinates: (0.0) (45.1) (125.1) (120.0)	y graph of $y = \tan \theta$	
	(0,0), (45,1), (135,-1), (180,0), (225,1), (315,-1), (360,0)	4 / /	
	(223, 1), (313, -1), (300, 0)	2 -/ /	$\left(\begin{array}{cccccccccccccccccccccccccccccccccccc$
	Asymptotes at $x = 90$ and $x = 270$	90° 180° 270° 360°	450° 540° 630° 720°
	Pattern repeats every 360°.	-4 - / /	/ /
11. f(x) + a	Variable translation up a unit (0)	$f(x) y \qquad f(x) + 3$	
, (1)	Vertical translation up a units. $\binom{0}{a}$		↑
			-
		3	
		-3 -2 -1	$2 \ 3 \ 4 \ 5 \times x$
		-11:	
		3	
			(-2)
12. f(x+a)	Horizontal translation <u>left</u> a units. $\begin{pmatrix} -a \\ 0 \end{pmatrix}$	f(x+2) $f(x)$	$y \qquad f(x-2)$
			<i>7 7 7</i>
		2	
		- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1/2 2/ 4 5 × X
13f(x)	Reflection over the x-axis.	-51 ^y	f (x)
13. <i>f</i> (<i>x</i>)	Terrection over the A taxes.		
		2	
		-3 -2 -1 1	2 3 4 5 x
		-2	
			\
11 5()	Deflection even the wearing	-f(x)	W f(x)
14. $f(-x)$	Reflection over the y-axis .	<i>f (-x)</i>	y f(x)
		2	
			>x
		-5 -4 -3 -2 -1	1 2 3/ 4 5 "
		-2	

