

4-6I Evaluation- Transformations of Sinusoidal Functions

KNOWLEDGE

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24 MARKS

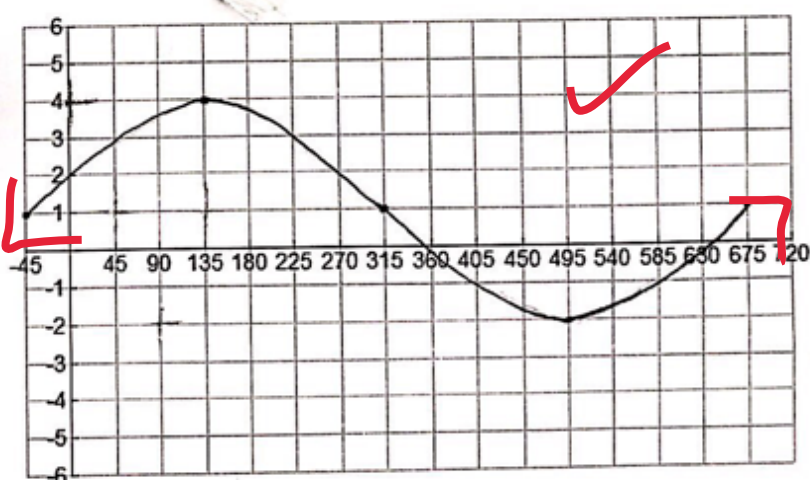
For the following functions, determine the amplitude, period, complete transformations, domain and range, and then sketch one cycle of the graph.

Marking Scheme (out of 12 marks each)

- 1 mark for the amplitude
- 1 mark for the period
- 4 marks for the complete transformations
- 1 mark for the domain
- 1 mark for the range
- 2 marks to transform the 5 key points listed below
- 2 marks to sketch the graph of the function

$y = 3 \sin \left[\frac{1}{2}(x + 45^\circ) \right] + 1$			
Amplitude 3	Period 720	Domain = $\{x \in \mathbb{R}, -45^\circ \leq x \leq 675^\circ\}$	Range = $\{y \in \mathbb{R}, -2 \leq y \leq 4\}$
List (in words) the complete transformations		a: Stretched vertically by a factor of 3, k: Stretched horizontally by a factor of 2. d: move left by 45° . c: move up by 1.	

x	y	→	$2x - 45^\circ$	$3y + 1$
0	0	→	-45°	1
90	1	→	135°	4
180	0	→	315°	1
270	-1	→	495°	-2
360	0	→	675°	1



$y = 2 \cos[3(x - 30^\circ)] + 2$			
Amplitude 2	Period 120	Domain = $\{x \in \mathbb{R}, 30^\circ \leq x \leq 150^\circ\}$	Range = $\{y \in \mathbb{R}, 0 \leq y \leq 4\}$
List (in words) the complete transformations		a: Stretched vertically by a factor of 2. K: compressed horizontally by a factor of $\frac{1}{3}$. d: move right by 30° . C: move up by 2.	

x	y	→	$\frac{1}{3}x + 30^\circ$	$2y + 2$
0	1	→	30°	4
90	0	→	60°	2
180	-1	→	90°	0
270	0	→	120°	2
360	1	→	150°	4

