

4-6I Evaluation- Transformations of Sinusoidal Functions

KNOWLEDGE

/24

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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

- a → vertical* } stretch $\leftarrow |a| > 1$ factor $|a|$
 compress $\leftarrow |a| < 1$ factor $|a|$
k → Horizontal } stretch $\leftarrow |k| < 1$ factor $|k|$
 compress $\leftarrow |k| > 1$ factor $|k|$
- 1 mark for the range
 - 2 marks to transform the 5 key points listed below
 - 2 marks to sketch the graph of the function

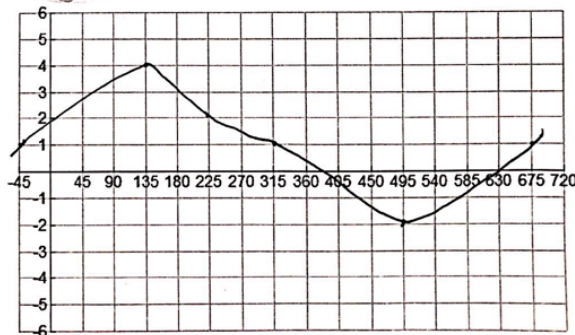
d/c ⇒ transformation by unit

$$y = 3 \sin \left[\frac{1}{2} (x + 45^\circ) \right] + 1$$

Amplitude <i>振幅</i> 3	Period <i>周期</i> 720° $\frac{360}{k}$	Domain <i>领域</i> $-45^\circ \leq x \leq 675^\circ$	Range <i>范围</i> $(y \in \mathbb{R}; -2 \leq y \leq 4)$
List (in words) the complete transformations <i>列出完整转换</i>	Vertical stretch factor 3 Horizontal stretch factor 2. Horizontal shift to left 45° Vertical shift up 1 unit.		

y = 5(x + 45^\circ) \cdot x = 2y - 45^\circ

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



MCR3U

$y = 2 \cos[3(x - 30^\circ)] + 2$			
Amplitude 2	Period 120	Domain $30^\circ \leq x \leq 150^\circ$	Range $y \in \mathbb{R}; 0 \leq y \leq 4$
List (in words) the complete transformations		Vertical stretch factor 2. Horizontal stretch factor $\frac{1}{3}$. Horizontal stretch shift to right 30° . Vertical shift up 2 unit.	

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

