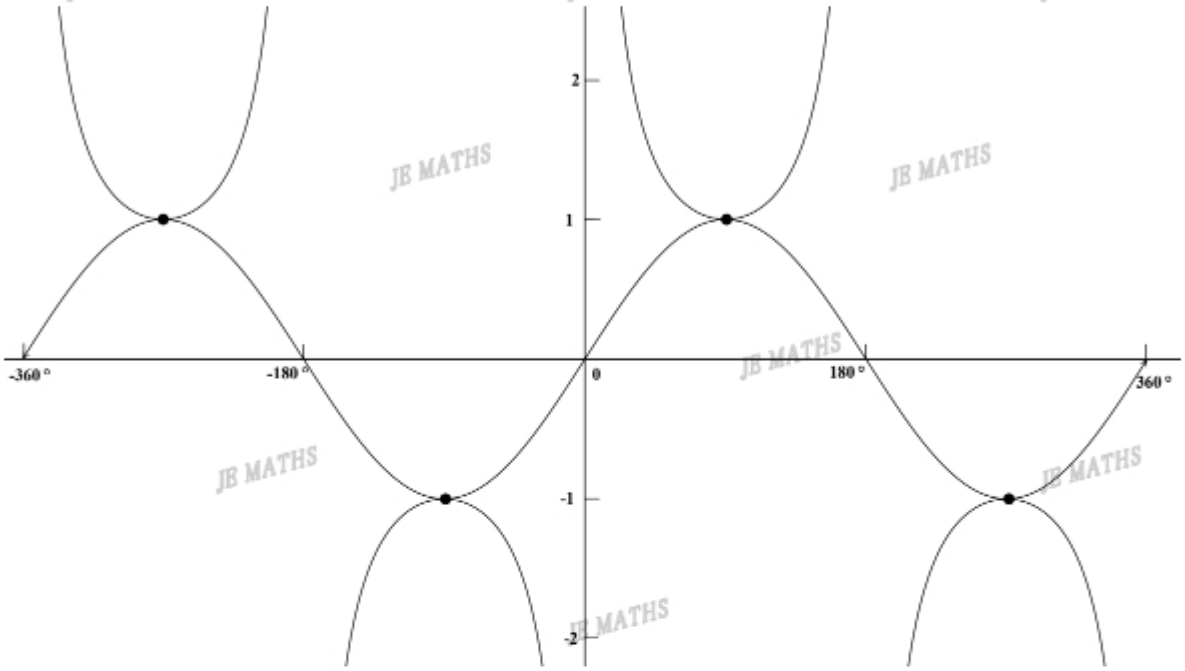
Plot 4 basic trig graphs:

1. (a)

x	-360 °	-270 °	-180 °	-90 °	0 °	90 °	180 °	270 °	360 °
y = sinx	0	1	0	−1	0	1	0	−1	0
y = cosecx	∞	1	∞	−1	∞	1	∞	−1	∞



(b)

	y = sinx	y = cosecx
Domain	$-360° \leq x \leq 360°$	$-360° \leq x \leq 360°,\ x \neq 0°, \pm 180°, \pm 360°$
Range	$-1 \leq y \leq 1$	$y \leq -1$ or $y \geq 1$

2. (a) -sin45 °

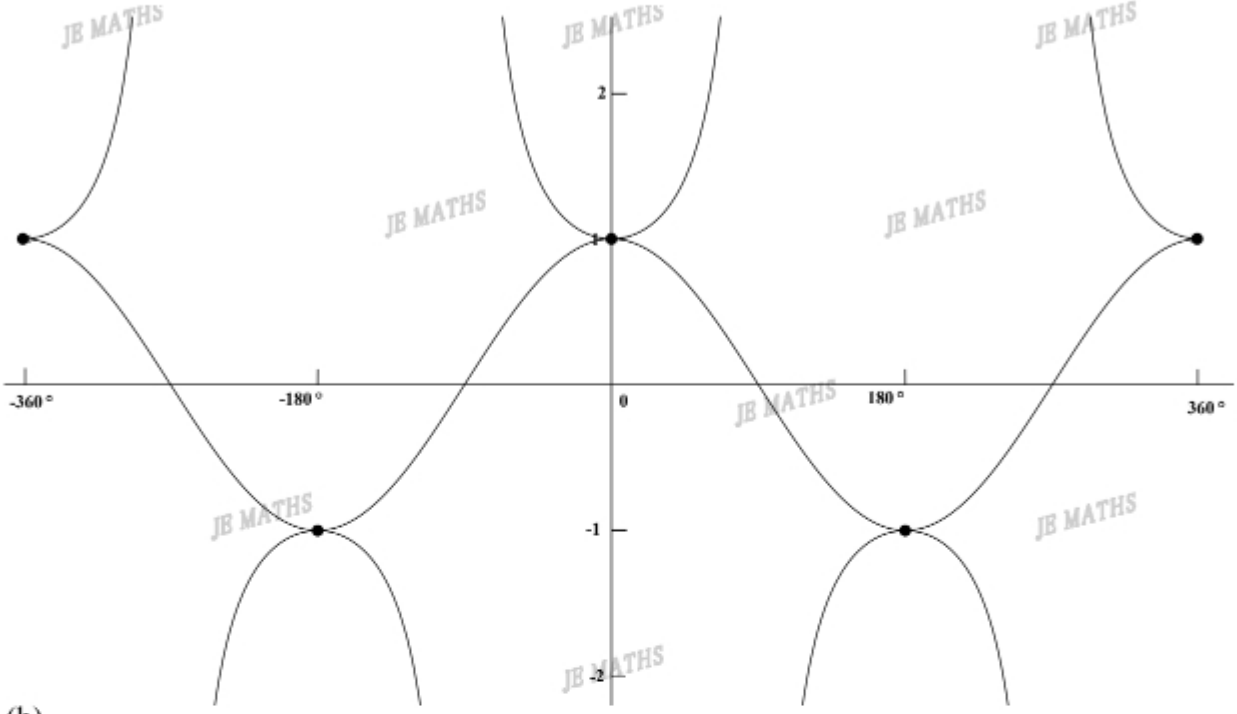
(b) -sin120 °

(c) -cosec240 °

(d) -cosec321 °

3. (a)

x	-360 °	-270 °	-180 °	-90 °	0 °	90 °	180 °	270 °	360 °
y = cosx	1	0	−1	0	1	0	−1	0	1
y = secx	1	∞	−1	∞	1	∞	−1	∞	1



(b)

	y = cosx	y = secx
Domain	$-360° \le x \le 360°$	$-360° \le x \le 360°,\ x \neq \pm 90°, \pm 270°$
Range	$-1 \le y \le 1$	$y \le -1$ or $y \ge 1$

4. (a) cos62 °

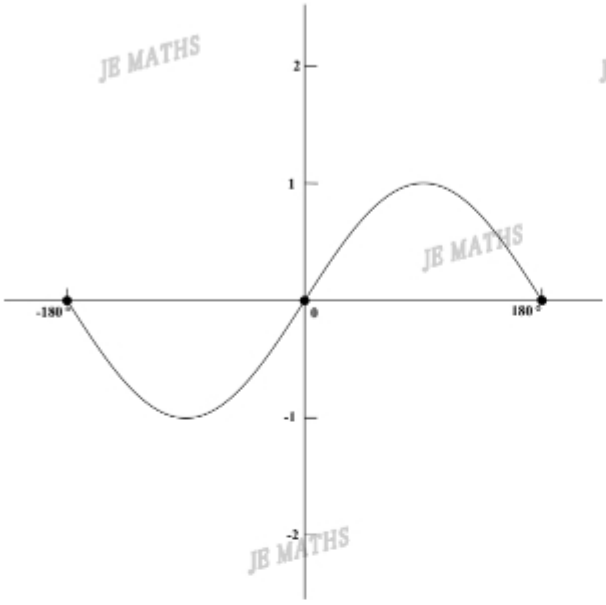
(b) cos100 °

(c) sec249.2 °

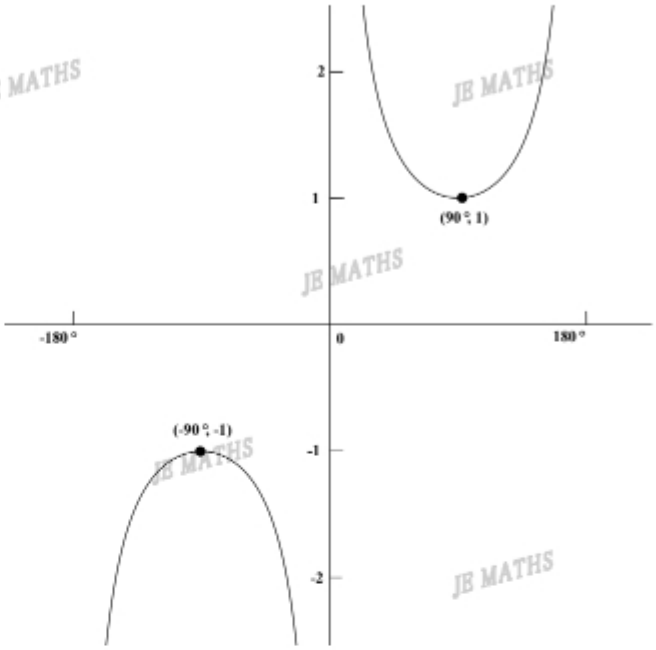
(d) sec310 °01'

- Sketch 4 basic trig graphs:

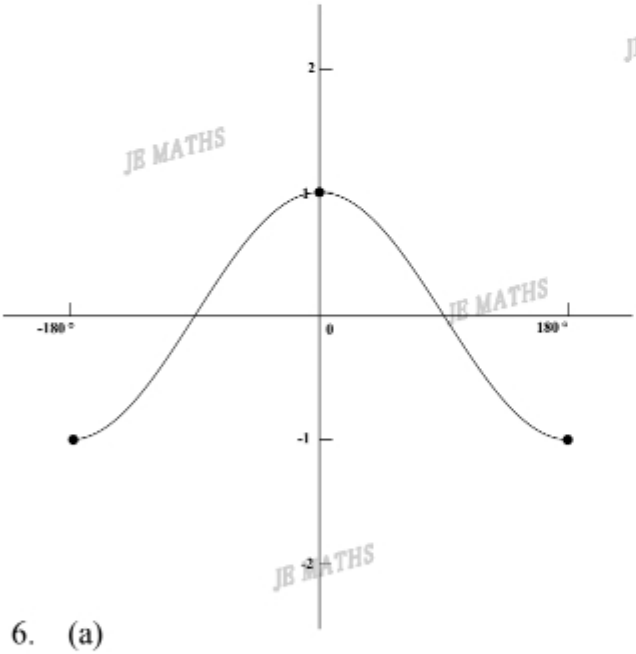
5. (a) $y = \sin x$



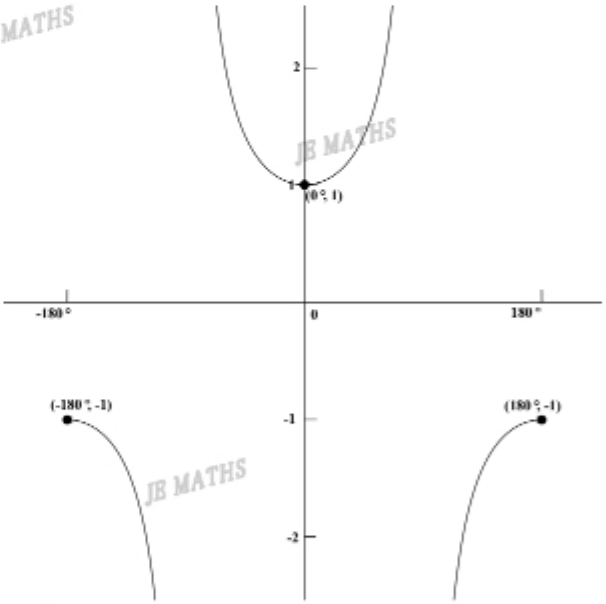
(b) $y = \cos ecx$



(c) $y = \cos x$



(d) $y = \sec x$



6. (a)
= cosx+cosx
= 2cosx

(b)
= -cosecx × -cosecx
= cosec²x

(c)
= -sinx/cosx
= -tanx

(d)
= -cosecx/secx
= - cotx

- Symmetry property: $\sin(x-\theta)=-\sin(\theta-x)$ and $\cos(x-\theta)=\cos(\theta-x)$

7. (a)
= -sin(360 º-x)
= -(-sinx)
= sinx

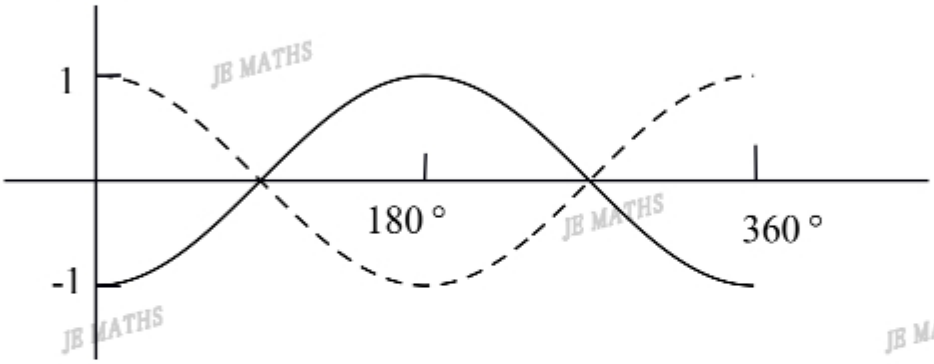
(b)
= cos(180 º-x)
= -cosx

(c)
= -sin(180 º-x)/cosx
= -sinx/cosx
= -tanx

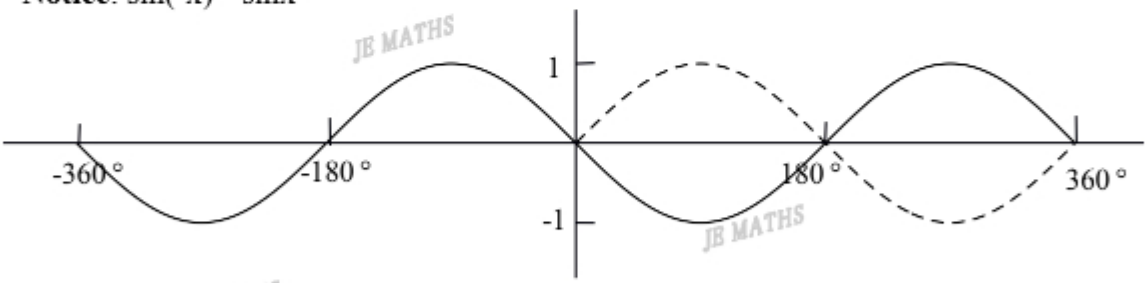
(d)
= -sinx × cos(180 º-x)/[cosx × -sin(180-x)]
= -sinx × -cosx/[cosx × -sinx]
= -1

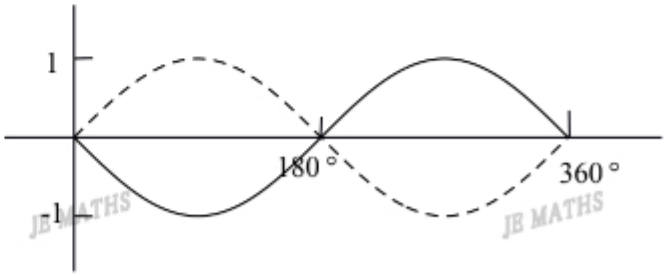
- Reflect in the x, y-axis:

8. (a) -y = cosx
y→-y, reflect in the x-axis.



(b) x→-x, reflect in the y-axis.
Notice: sin(-x)=-sinx

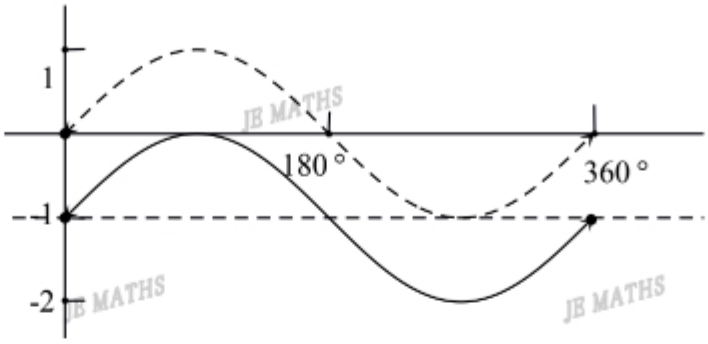




- Translate up and down:

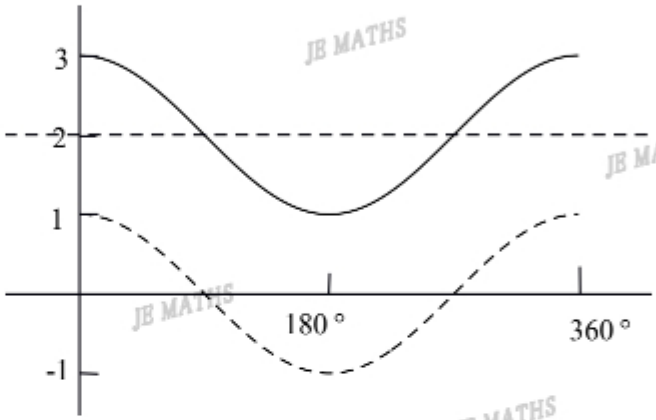
9. (a) $y + 1 = \sin x$

$y \rightarrow y+1$, 1 unit down.



(b) $y-2=\cos x$

$y \rightarrow y-2$, 2 units up.

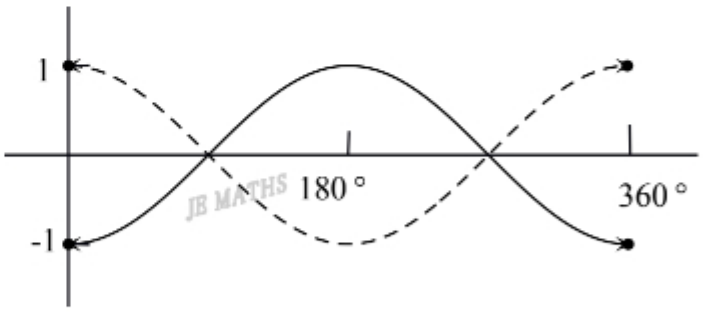


- Translate left and right:

10. (a) $x \rightarrow x+180^\circ$, 180° left.

Notice: $\cos(x+180^\circ) = \cos(180^\circ+x)$

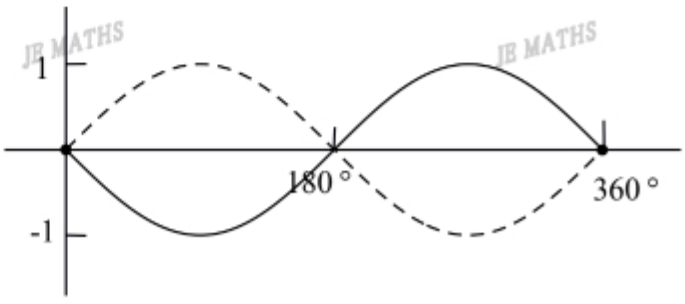
$= -\cos x$



(b) $x \rightarrow x-180^\circ$, 180° right.

Notice: $\sin(x-180^\circ) = -\sin(180^\circ-x)$

$= -\sin x$

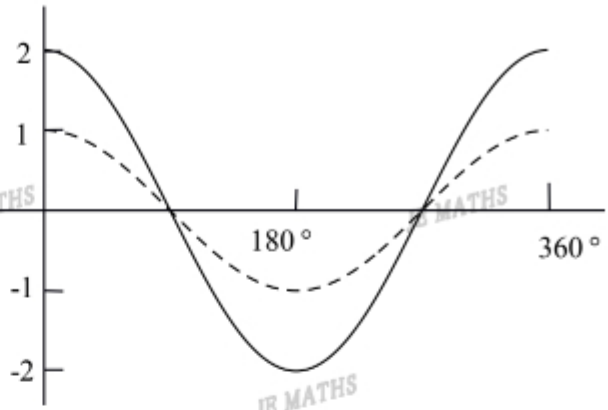


- Dilated in and out vertically:

11. (a) y/2=cosx

y→y/2, stretch **out** by 2 factors vertically.

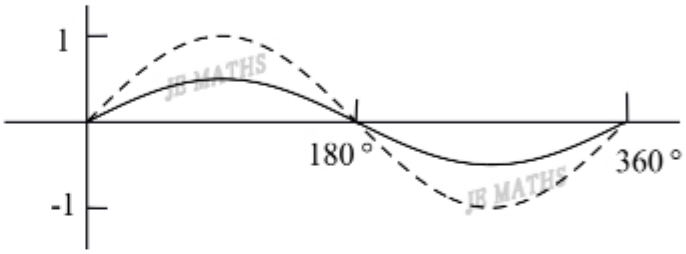
Amplitude: 2



(b) 2y=sinx

y→2y, stretch **in** by 2 factors vertically.

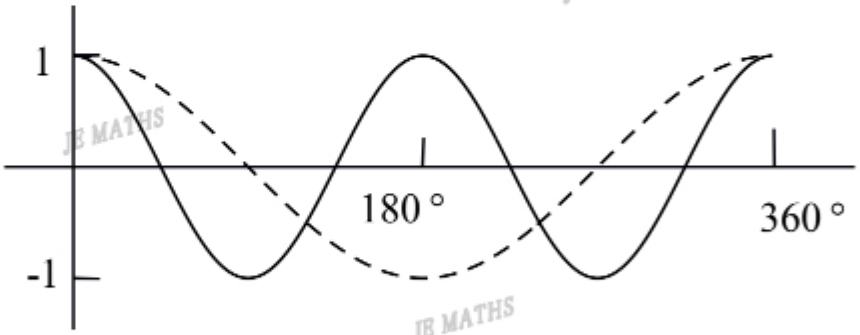
Amplitude: 1/2



- Dilated in and out horizontally:

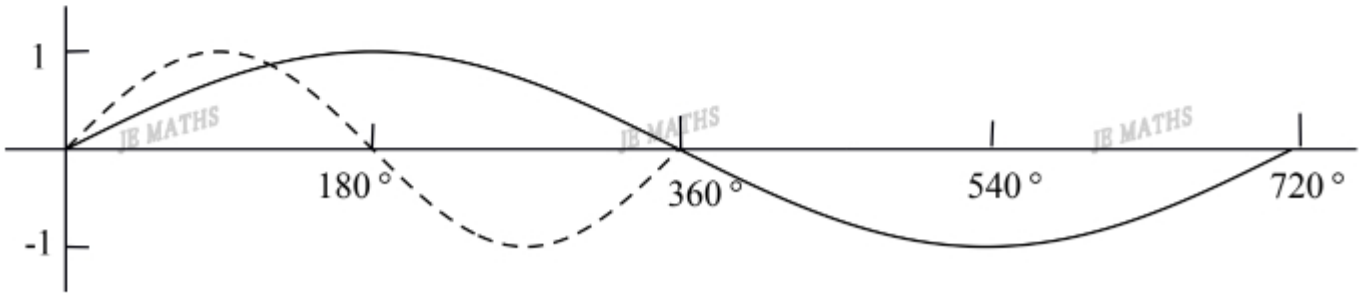
12. (a) $x \rightarrow 2 \times x$, stretch **in** by 2 factors horizontally.

Period: 180°



(b) $x \rightarrow 1/2 \times x$, stretch **out** by 2 factors horizontally.

Period: 720°



- Sketching mixed (2 types) trig functions:

13. (a)
amplitude = 2
range: $-2 \leq y \leq 2$

(b)
amplitude = 1/3
range: $-1/3 \leq y \leq 1/3$

(c)
amplitude = 5
range: $-5 \leq y \leq 5$

(d)
amplitude = 2/7
range: $-2/7 \leq y \leq 2/7$

14. (a)
period =360°÷2 = 180°

(b)
period =360°÷(1/4) = 360°×4=1440°

(c)
period =360°÷4 = 90°

(d)
period =360°÷(3/2) =360°×(2/3) = 240°

15. (a) (i) amplitude = 3

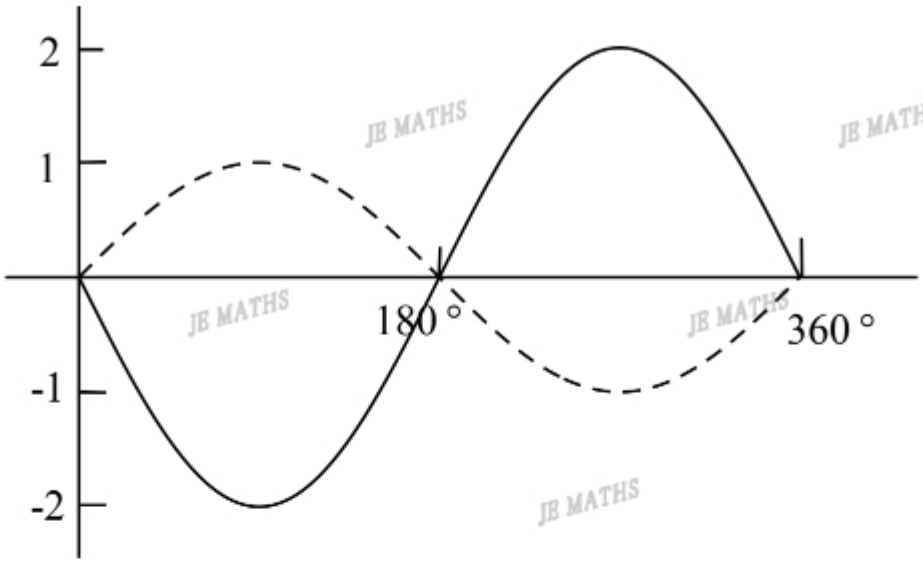
(ii) $-3 + 1 \leq y \leq 3 + 1$
$-2 \leq y \leq 4$

(iii) period = 360°÷2 = 180°

(b) (yes)

16. (a) period: 360°

(b) Sketch.



(c) (i)
amplitude = 2
Notice: amplitude is 2, not -2.

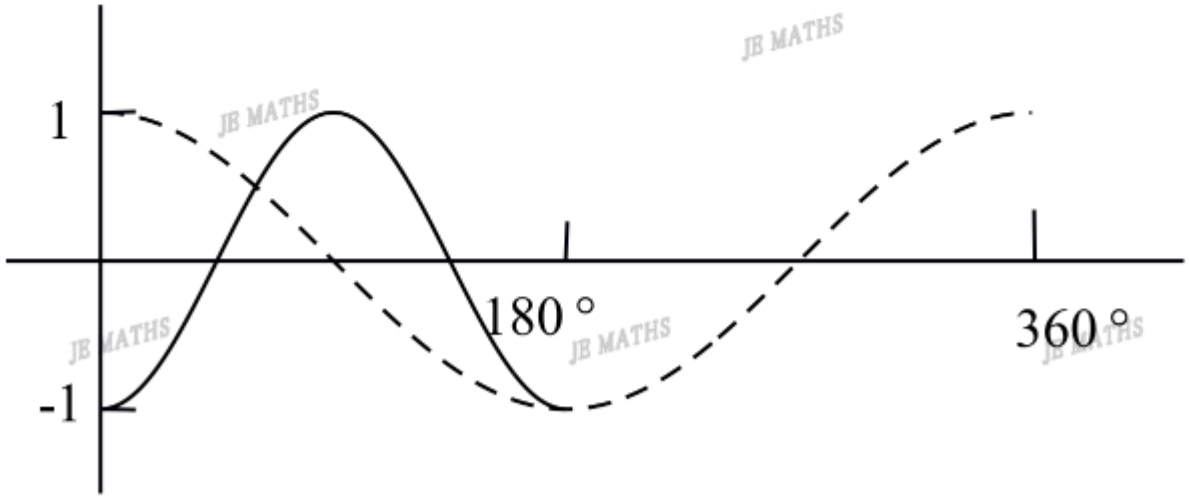
(ii)
$-2 \leq y \leq 2$

17. (a) (i)
amplitude = 1

(ii)
$-1 \leq y \leq 1$

(iii) period: $360^\circ \div 2 = 180^\circ$

(b) Sketch.

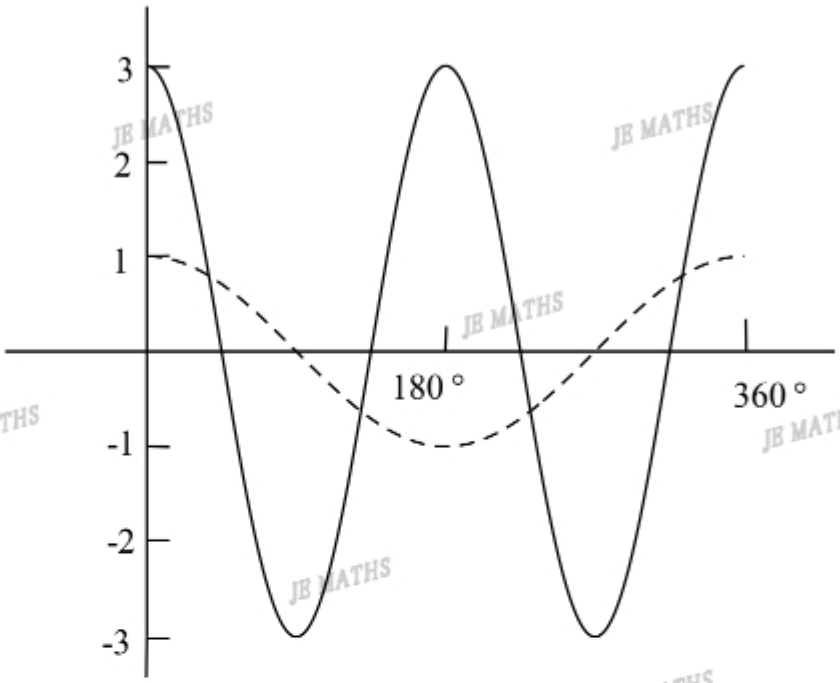


18. (a) (i)
amplitude = 3

(ii)
$-3 \leq y \leq 3$

(iii) period: 360°/2=180°

(b) Sketch.

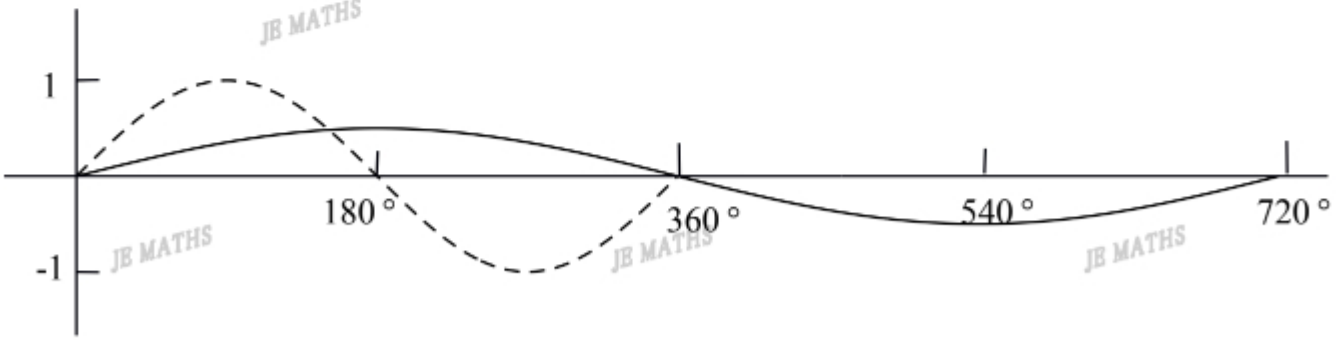


19. (a) (i)
amplitude = 1/2

(ii)
$-1/2 \leq y \leq 1/2$

(iii) period: 360°/(1/2)=720°

(b) Sketch.



20. (a) (i)

amplitude = 3

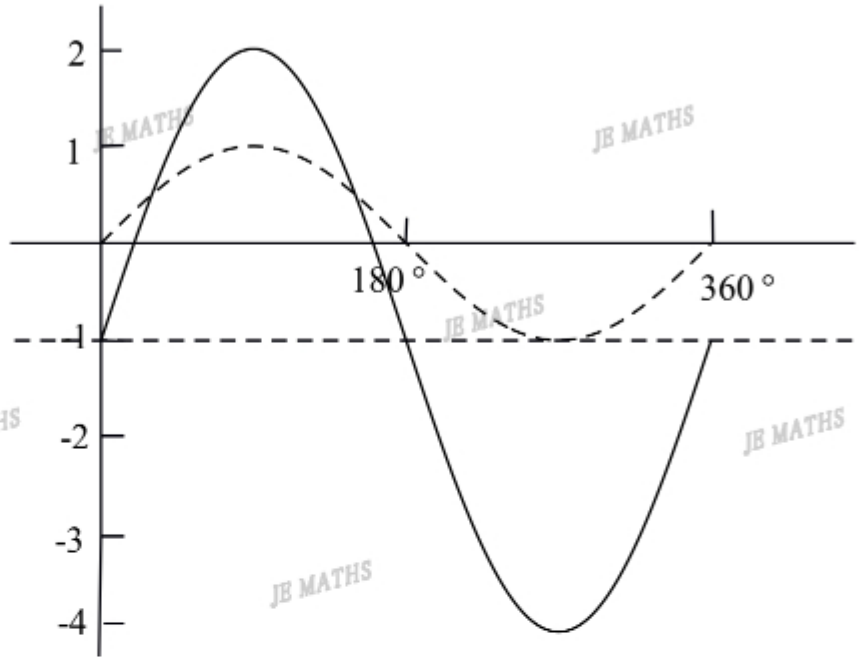
(ii)

$-3 - 1 \leq y \leq 3 - 1$

$-4 \leq y \leq 2$

(iii) period: 360°

(b) Sketch.



21. (a) (i)

amplitude = 2

(ii)

$-2 + 1 \leq y \leq 2 + 1$

$-1 \leq y \leq 3$

(iii) period: 360°

(b) Sketch.