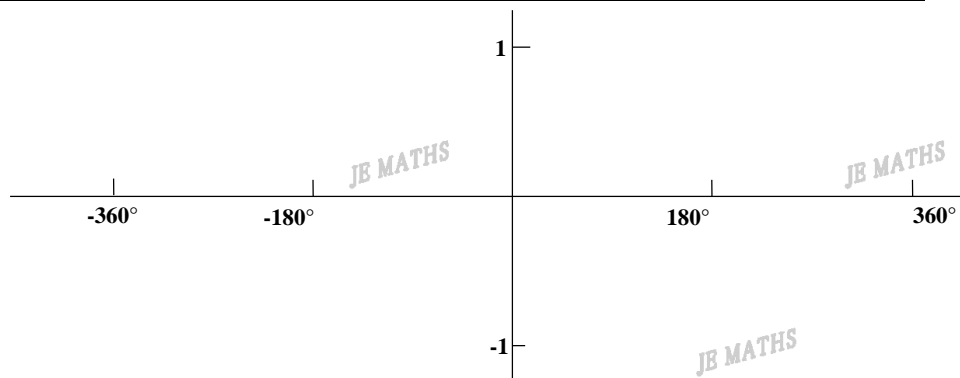


Foundation stage 1:

1. Plot the following basic trigonometric functions for $-360^\circ \leq x \leq 360^\circ$:

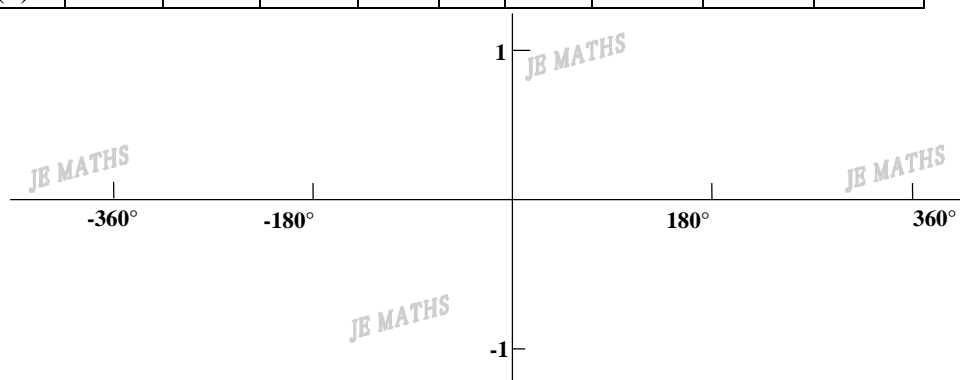
(a) $f(x) = \sin x$

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)									



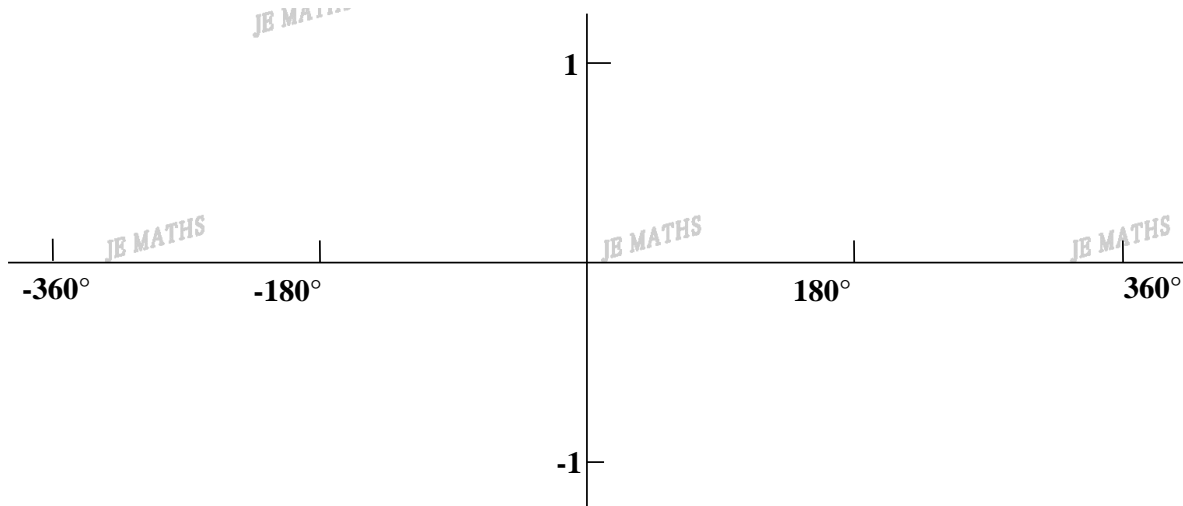
(b) $f(x) = \cos x$

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)									



(c) $f(x) = \tan x$

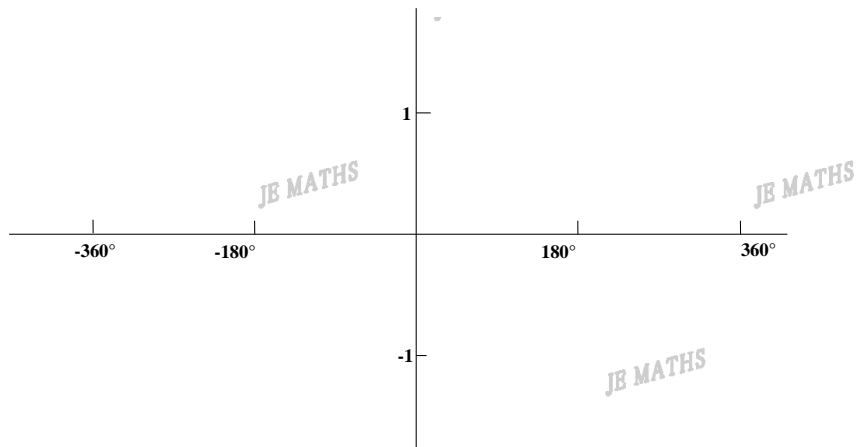
x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)									



2. Plot the following inverse trigonometric functions for $-360^\circ \leq x \leq 360^\circ$ and indicate asymptotes by using dash lines:

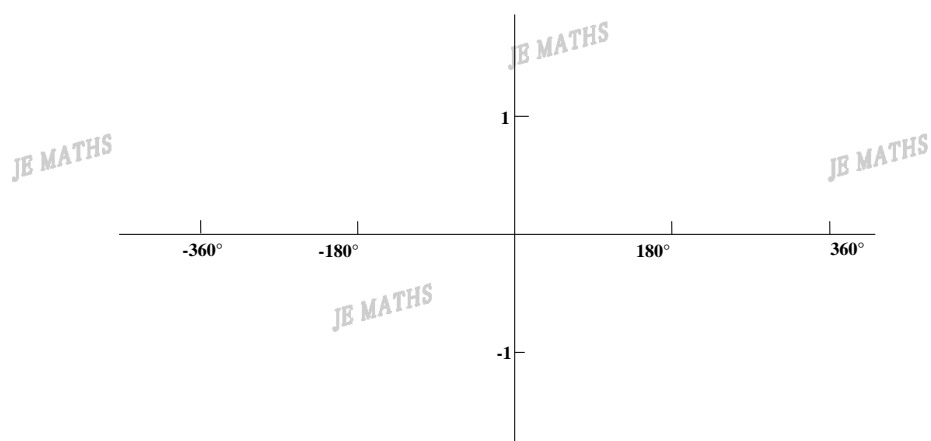
(a) $f(x) = \csc x$

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)									



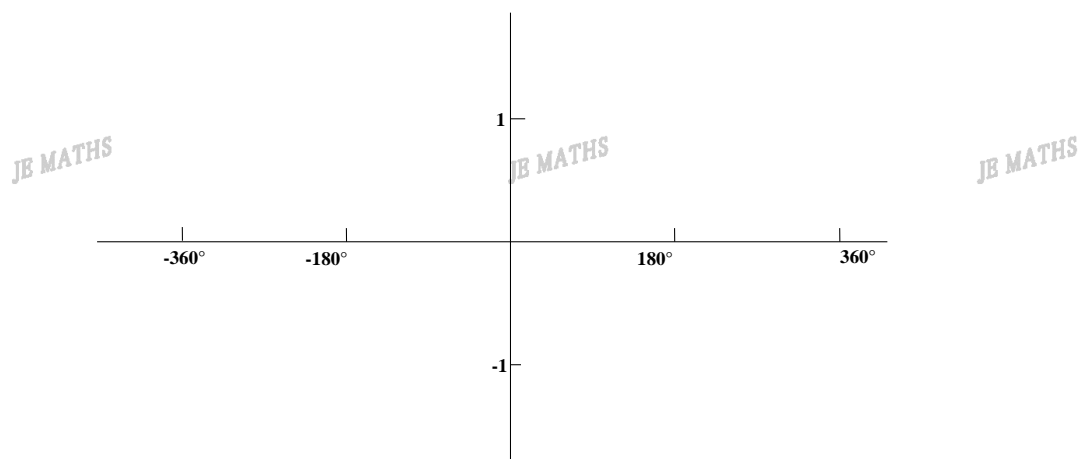
(b) $f(x) = \sec x$

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)									



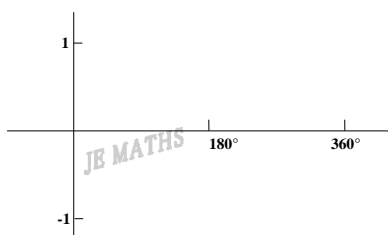
(c) $f(x) = \cot x$

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)									

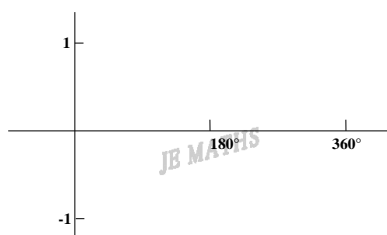


3. Briefly sketch the following functions for $-360^\circ \leq x \leq 360^\circ$, including asymptotes if necessary:

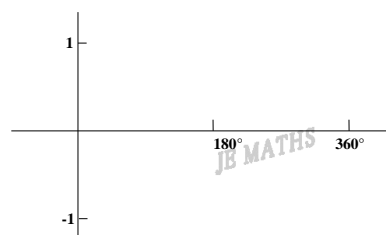
(a) $f(x) = \sin x$



(b) $f(x) = \cos x$



(c) $f(x) = \tan x$



4. Determine the following functions are even, odd or neither:

(a) $f(x) = \sin x$

.....

(b) $f(x) = \cos x$

.....

(c) $f(x) = \tan x$

.....

(d) $f(x) = \operatorname{cosec} x$

.....

(e) $f(x) = \sec x$

.....

(f) $f(x) = \cot x$

.....

5. Find the amplitude and the period of the following functions:

(a) $f(x) = \sin x$

amplitude:

.....

period:

.....

(b) $f(x) = \cos x$

amplitude:

.....

period:

.....

(c) $f(x) = \tan x$

amplitude:

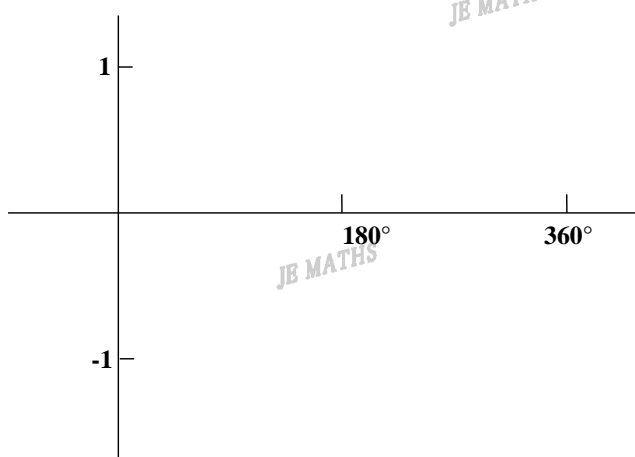
.....

period:

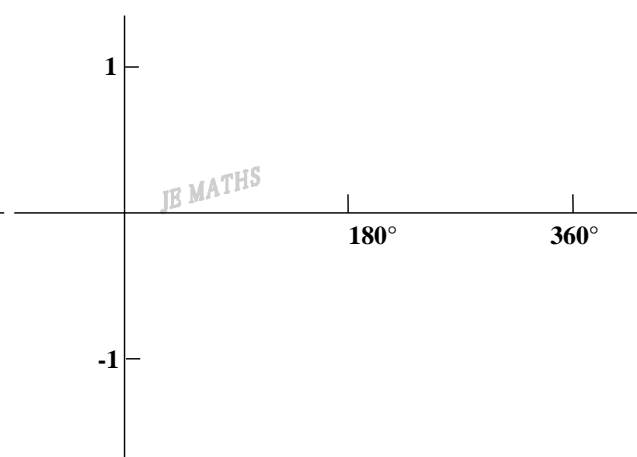
.....

6. Sketch the following trigonometric graphs for one period from the origin by using translation:

(a) $y = -\sin x$



(b) $y = -\cos x$



Find the amplitude and the period of the following functions:

(a) $f(x) = \sin x$

amplitude:

.....

period:

.....

(b) $f(x) = \cos x$

amplitude:

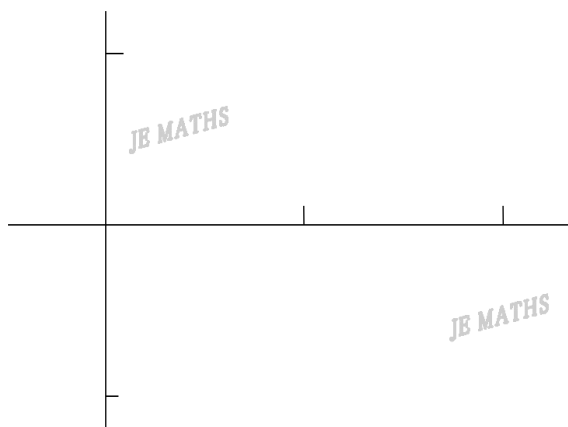
.....

period:

.....

8. Sketch the following trigonometric graphs for one period from the origin by using dilation:

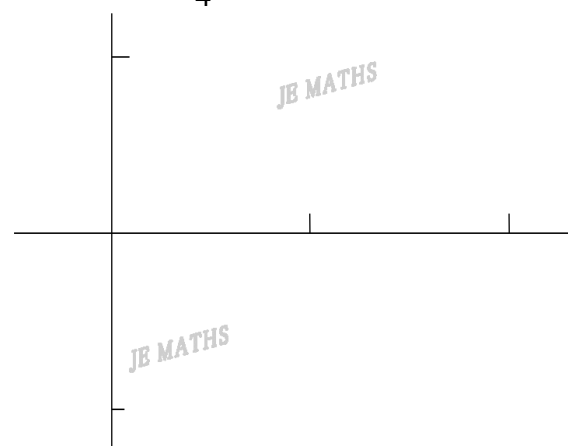
(a) $y = 4 \sin x$



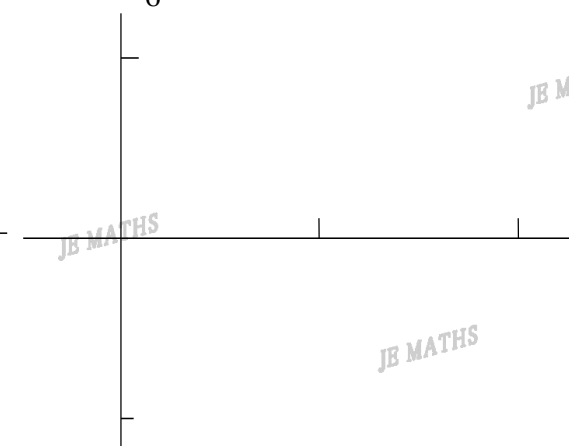
(b) $y = 6 \cos x$



(c) $y = \frac{\sin x}{4}$



(d) $y = \frac{\cos x}{6}$



9. Find the amplitude and the period of the following functions:

(a) $y = 4 \sin x$

amplitude:

period:

(b) $y = 6 \cos x$

amplitude:

period:

(c) $y = \frac{\sin x}{4}$

amplitude:

period:

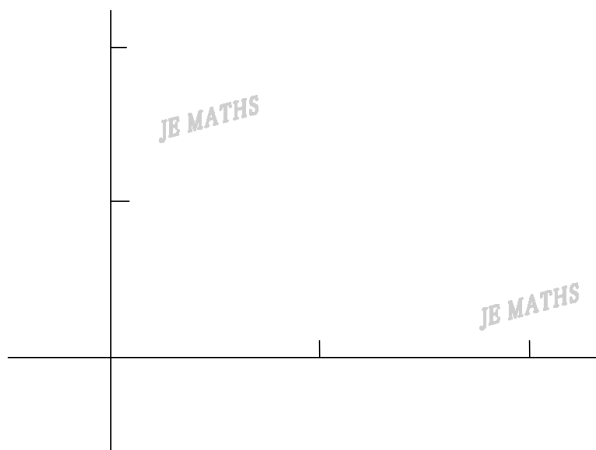
(d) $y = \frac{\cos x}{6}$

amplitude:

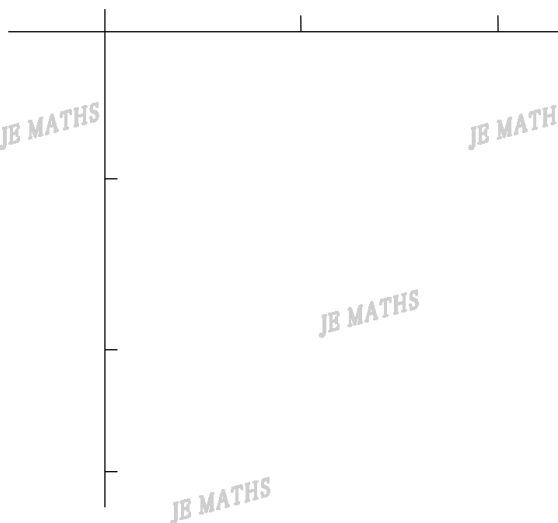
period:

10. Sketch the following trigonometric graphs for one period from the origin by using translation:

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



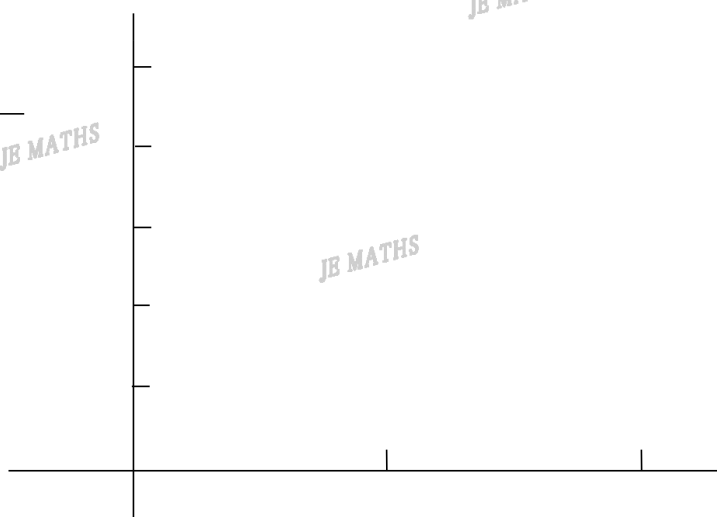
(b) $y = \cos x - 2$



(c) $y = \sin x - 3$



(d) $y = \cos x + 4$



11. Find the range of the following functions:

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

range:

...

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

range:

...

(c) $y = \sin x - 3$

range:

...

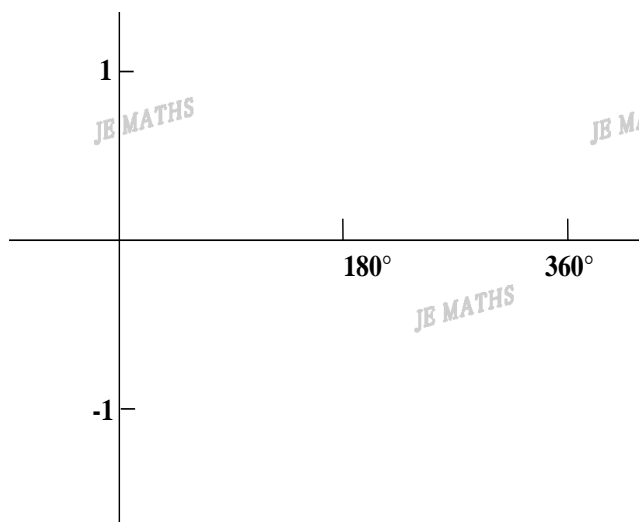
(d) $y = \cos x + 4$

range:

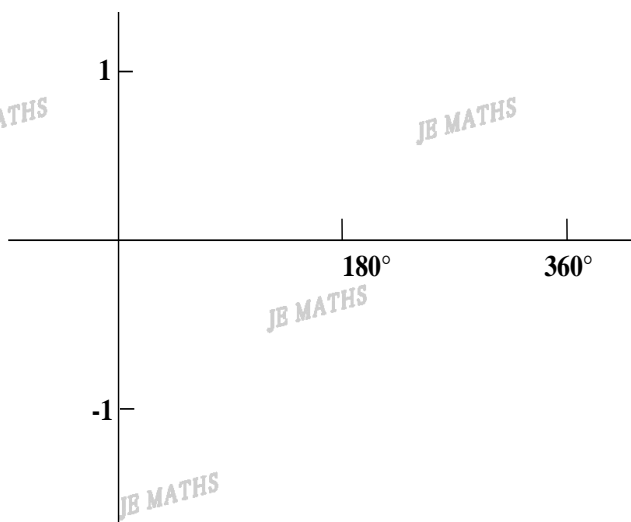
...

12. Sketch the following trigonometric graphs for one period from the origin by using translation:

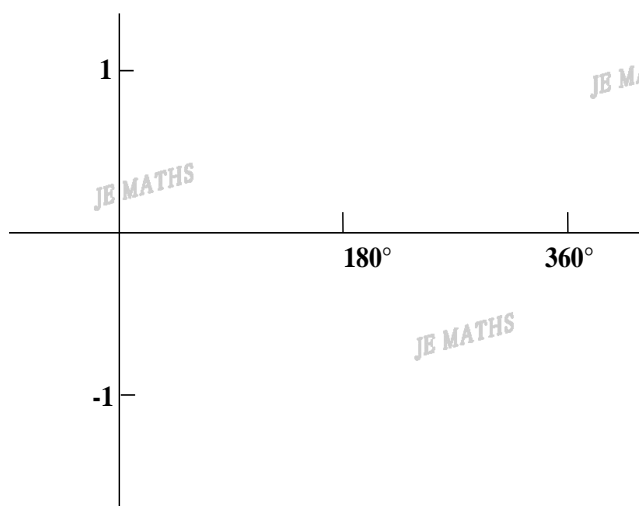
(a) $y = \sin(x - \pi)$



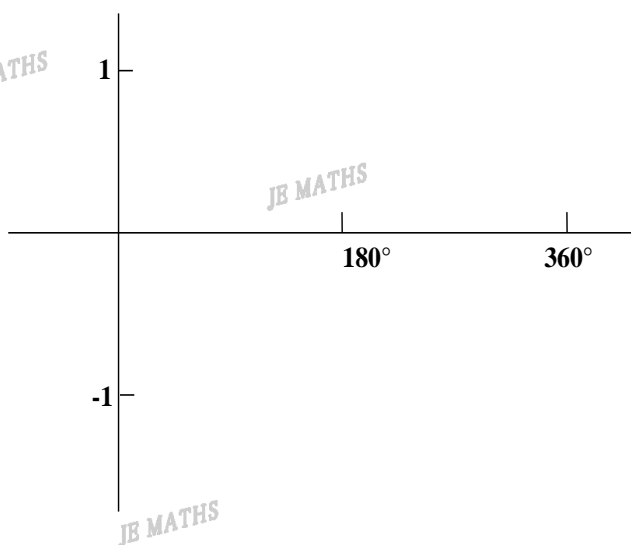
(b) $y = \cos(x + \pi)$



(c) $y = \sin(x + \frac{\pi}{2})$



(d) $y = \cos(x - \frac{\pi}{2})$



13. By looking at the graphs of the following LHS carefully to simplify the following properties:

(a) $\sin(x - \pi) = \underline{\hspace{2cm}}$

(b) $\cos(x + \pi) = \underline{\hspace{2cm}}$

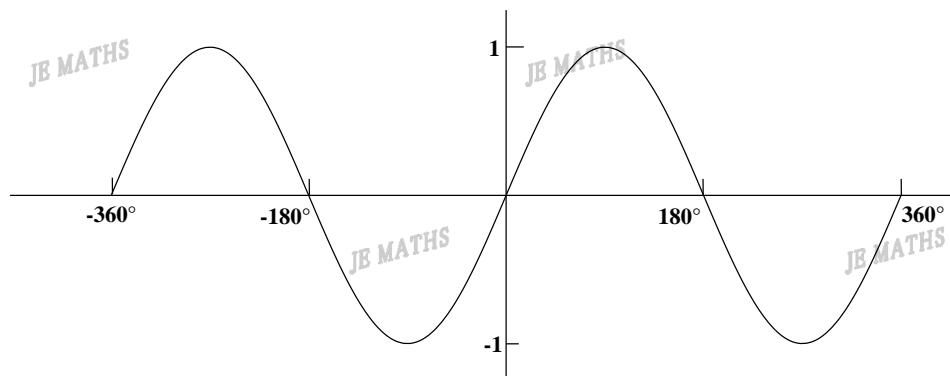
(c) $\sin(x + \frac{\pi}{2}) = \underline{\hspace{2cm}}$

(d) $\cos(x - \frac{\pi}{2}) = \underline{\hspace{2cm}}$

Foundation stage 1:

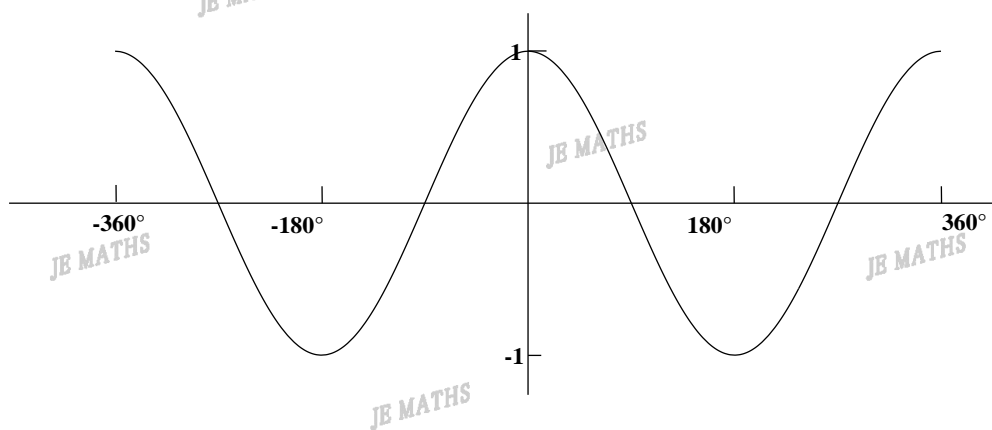
1. (a)

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)	0	-1	0	1	0	1	0	-1	0

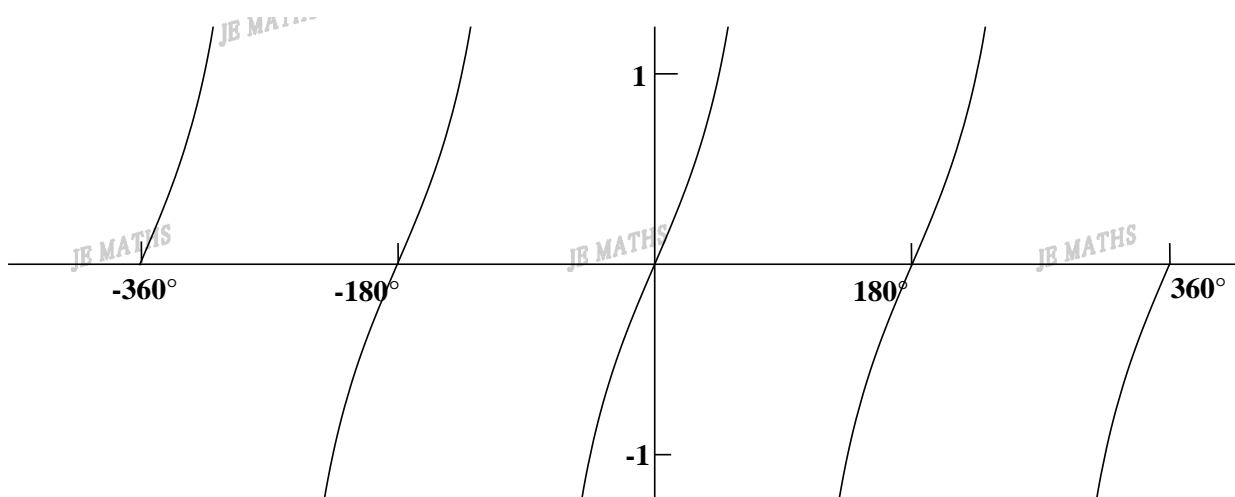


(b)

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)	1	0	-1	0	1	0	-1	0	1

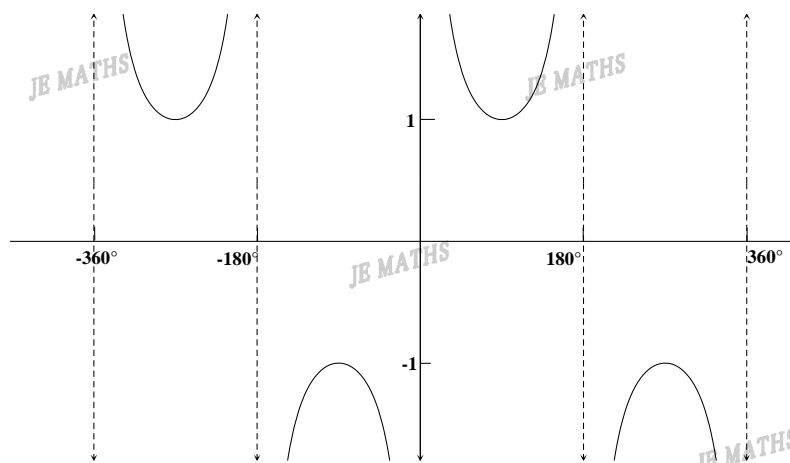
(c) $f(x) = \tan x$

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)	0	∞	0	∞	0	∞	0	∞	0



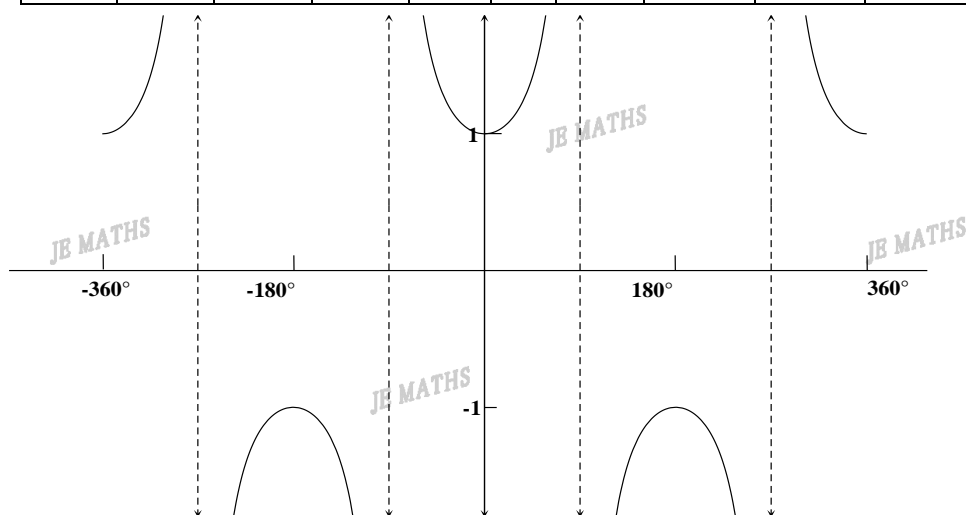
2. (a)

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)	∞	-1	∞	1	∞	1	∞	-1	∞



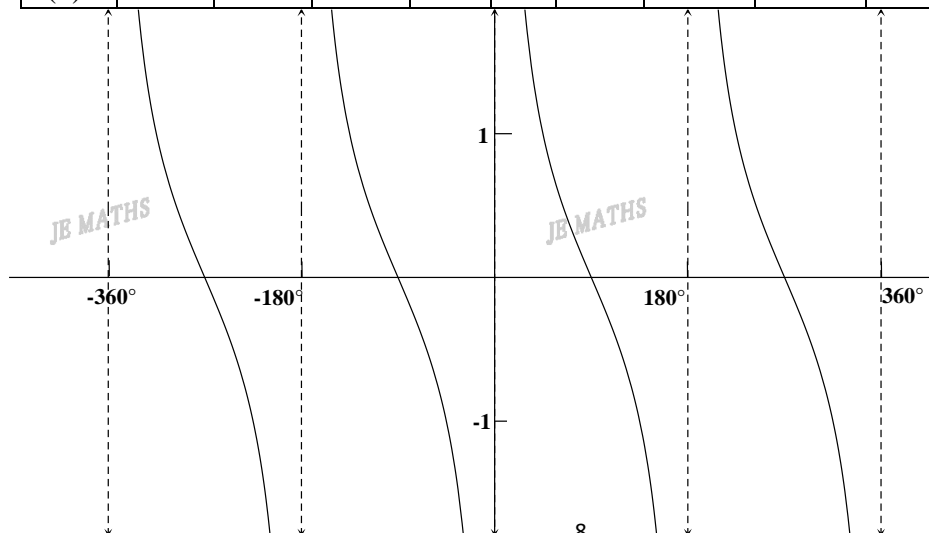
(b)

x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)	1	∞	-1	∞	1	∞	-1	∞	1

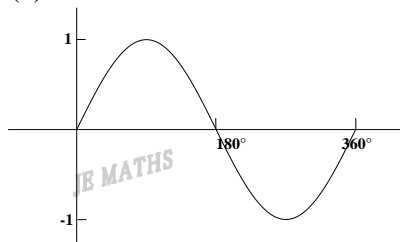


(c)

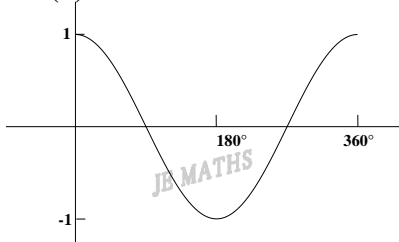
x	-360°	-270°	-180°	-90°	0°	90°	180°	270°	360°
f(x)	∞	0	∞	0	∞	0	∞	0	∞



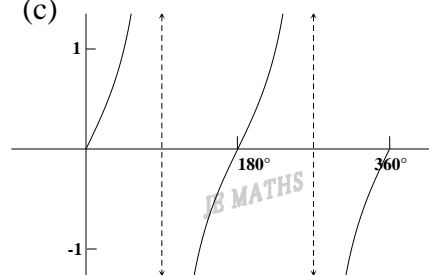
3. (a)



(b)



(c)



4. (a)

odd

(b)

even

(c)

odd

(d)

odd

(e)

even

(f)

odd

5. (a)

amplitude:
amplitude: 1
period:
period: 360°

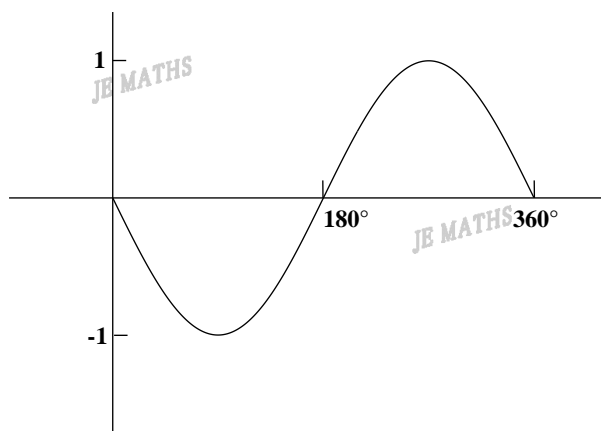
(b)

amplitude:
amplitude: 1
period:
period: 360°

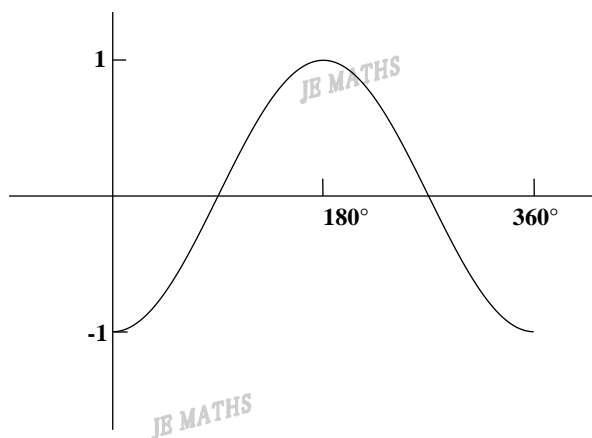
(c)

amplitude:
amplitude: ∞
period:
period: 180°

6. (a)



(b)



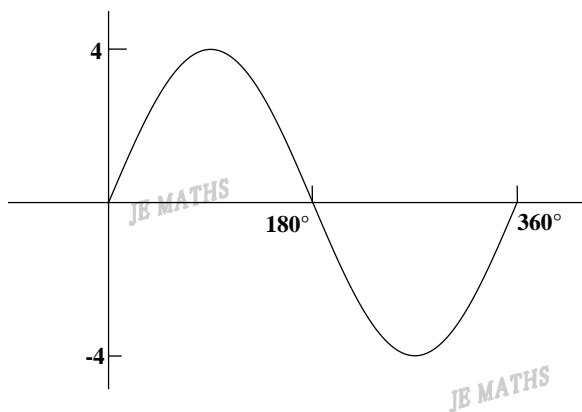
7. (a)

amplitude: 1
period: 360°

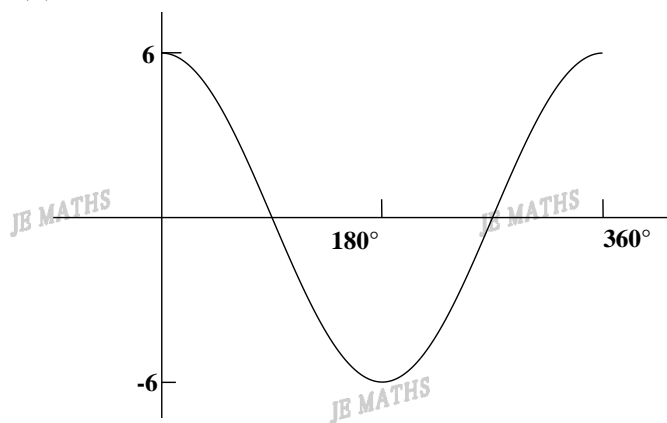
(b)

amplitude: 1
period: 360°

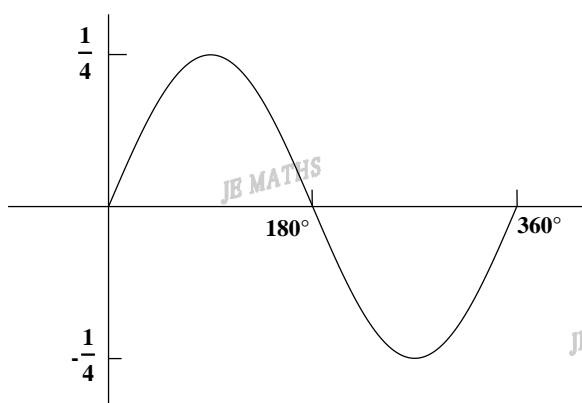
8. (a)



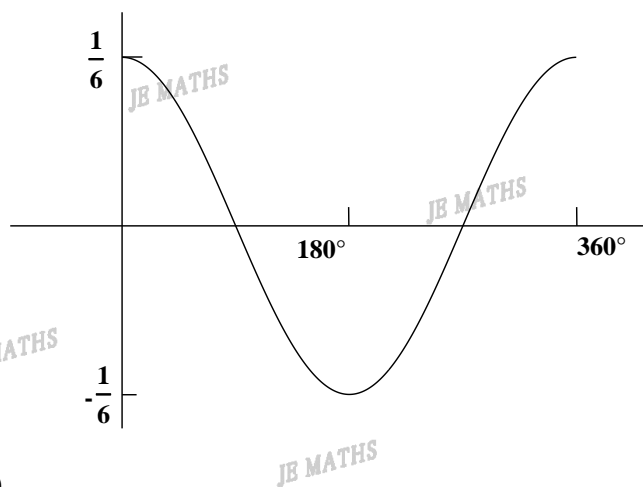
(b)



(c)



(d)



9. (a)

amplitude: 4

period: 360°

(c)

amplitude: $\frac{1}{4}$ period: 360°

(b)

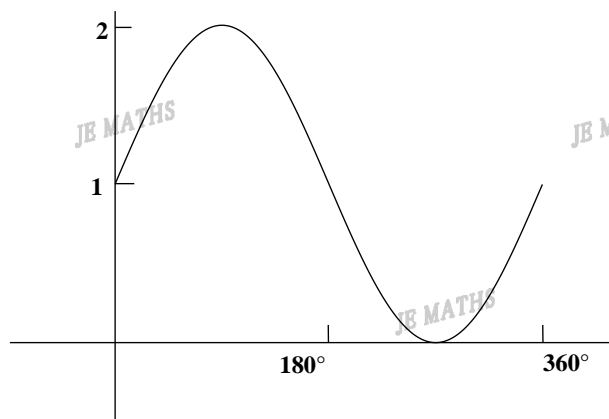
amplitude: 6

period: 360°

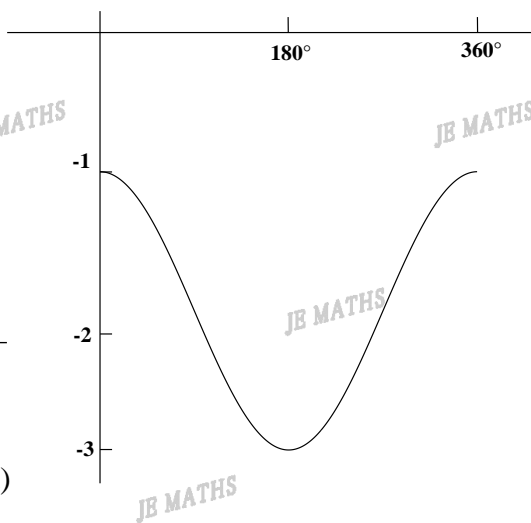
(d)

amplitude: $\frac{1}{6}$ period: 360°

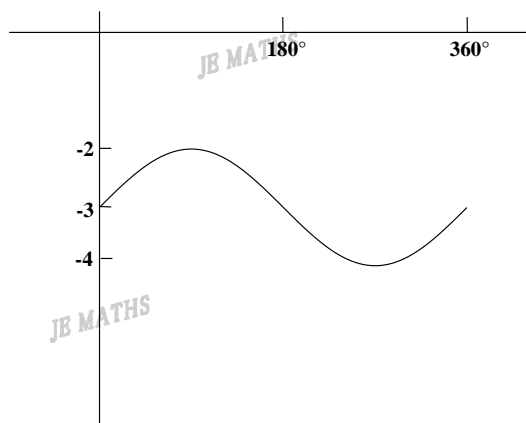
10. (a)



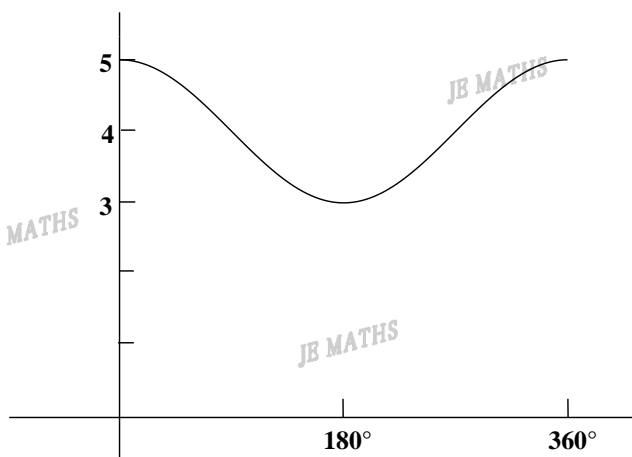
(b)



(c)



(d)



11. (a)

range: $0 \leq x \leq 2$

(c)

range: $-4 \leq x \leq -2$

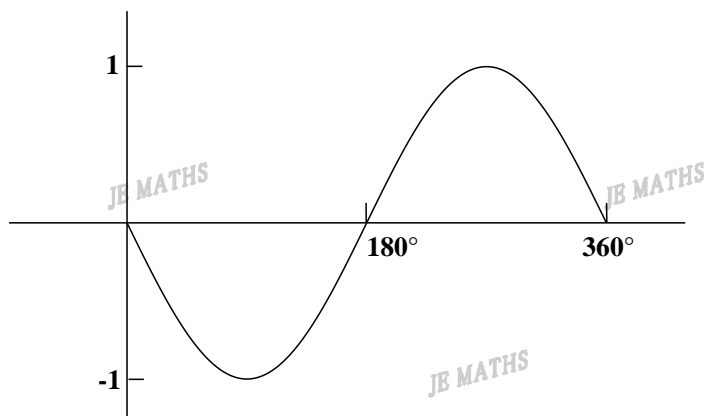
(b)

range: $-3 \leq x \leq -1$

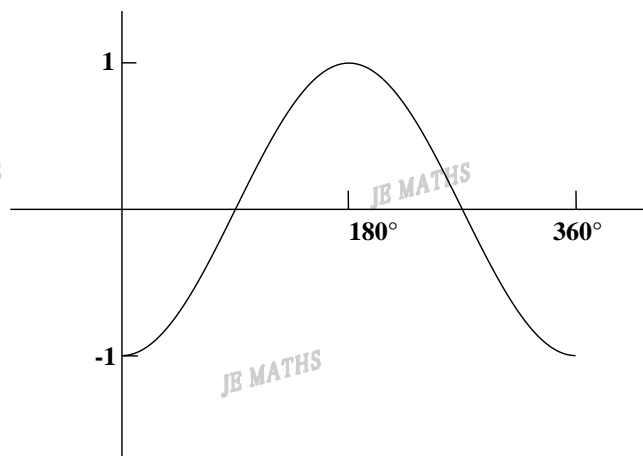
(d)

range: $3 \leq x \leq 5$

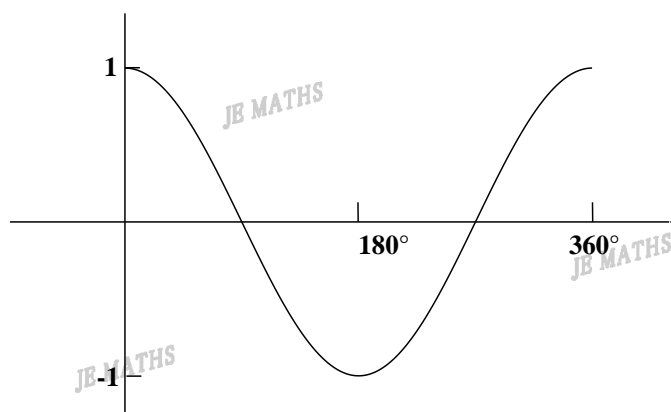
12. (a)



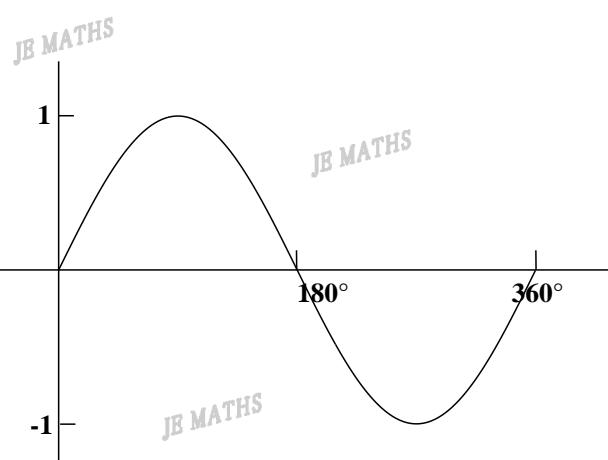
(b)



(c)



(d)



13. (a)

 $-\sin x$

(b)

 $-\cos x$

(c)

 $\cos x$

(d)

 $\sin x$