# Goniometric functions

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Intro Math 21/22

## Exercise

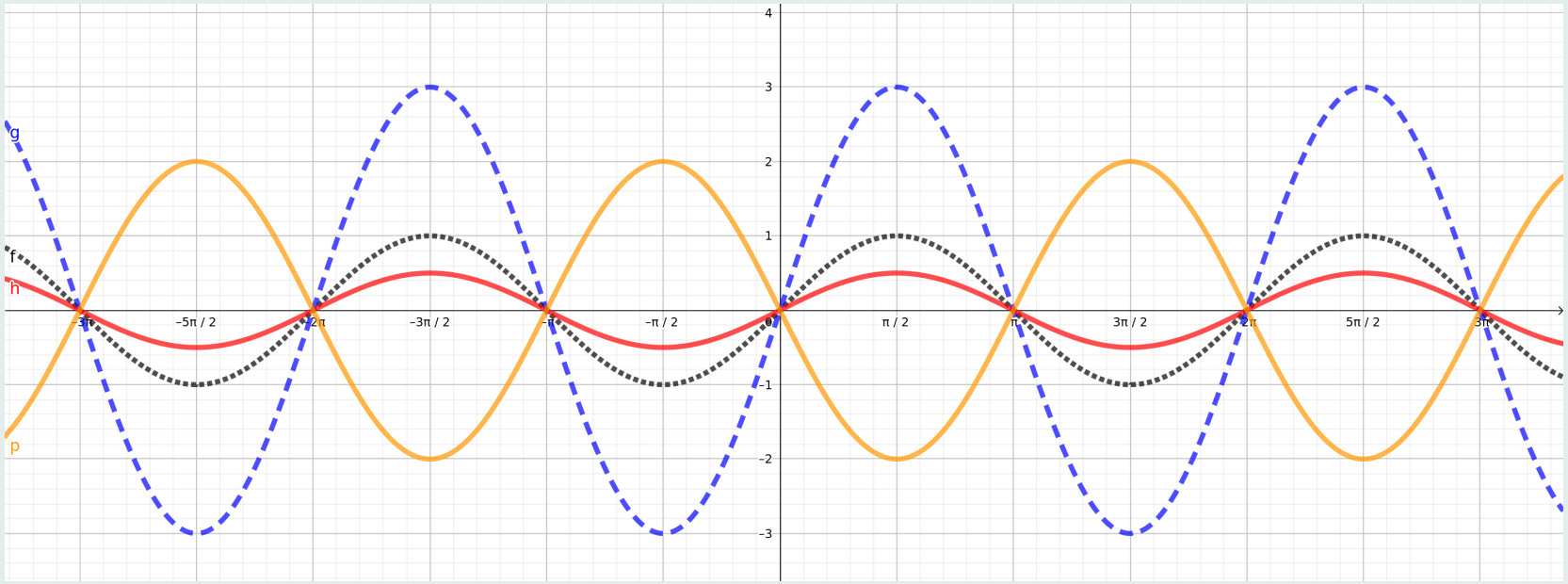
Evaluate the following (use the unit circle):

1. $\sin \frac{2\pi}{3}$
2. $\sin \frac{-2\pi}{3}$
3. $\cos \frac{7\pi}{6}$
4. $\cos \frac{-7\pi}{6}$
5. $\tan \frac{-\pi}{4}$
6. $\tan \frac{7\pi}{4}$
7. $\cot \frac{5\pi}{4}$
8. $\cos \frac{5\pi}{6}$
9. $\sin \frac{-4\pi}{3}$
10. $\sin \frac{7\pi}{4}$
11. $\cos \frac{-2\pi}{3}$
12. $\tan \frac{3\pi}{4}$
13. $\tan \frac{-\pi}{3}$
14. $\tan \frac{15\pi}{4}$
15. $\cot \frac{-\pi}{3}$

## Exercise

Find the graph of

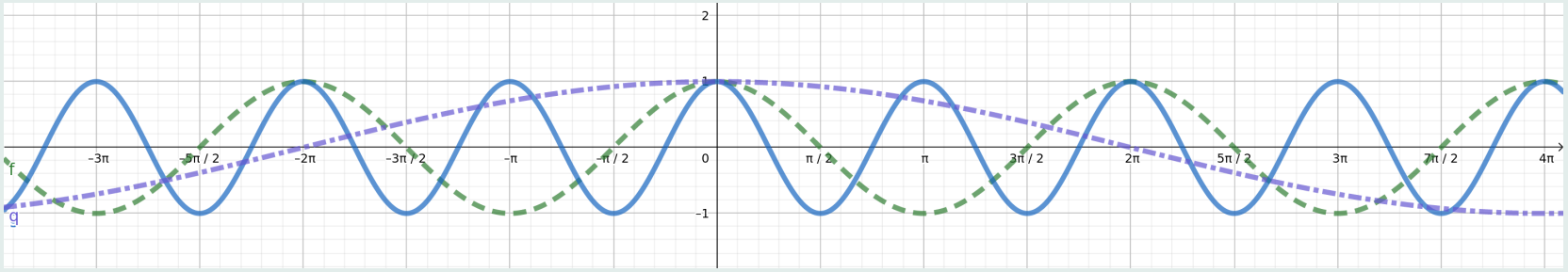
A $\sin x$ B $3\sin x$ C $-2\sin x$ D $\frac{1}{2}\sin x$

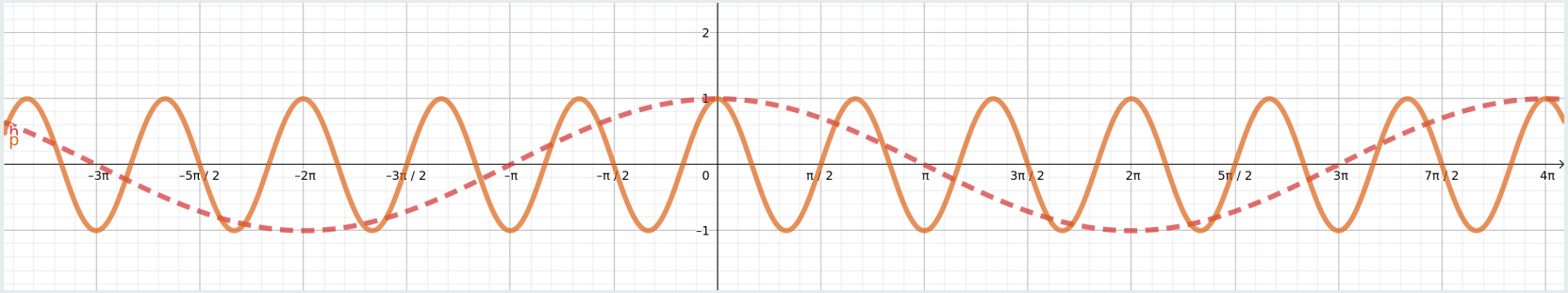


## Exercise

Find the graph of

A $\cos x$ B $\cos(2x)$ C $\cos(3x)$ D $\cos(x/2)$ E $\cos(x/4)$

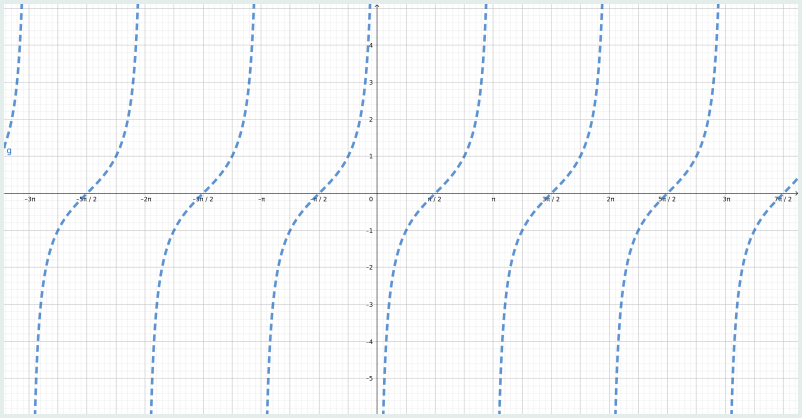


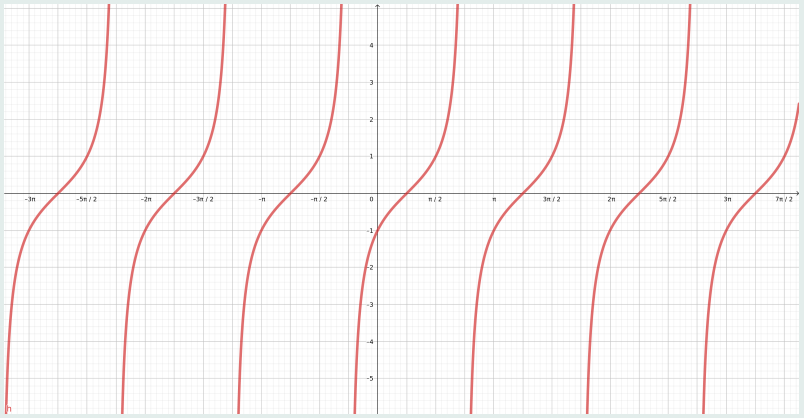



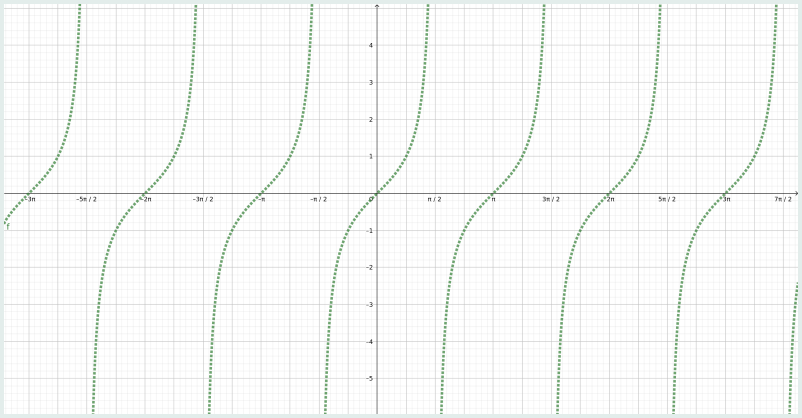
## Exercise

Find the graph of

A $\tan x$ B $\tan\left(x + \frac{\pi}{2}\right)$ C $\tan\left(x - \frac{\pi}{4}\right)$



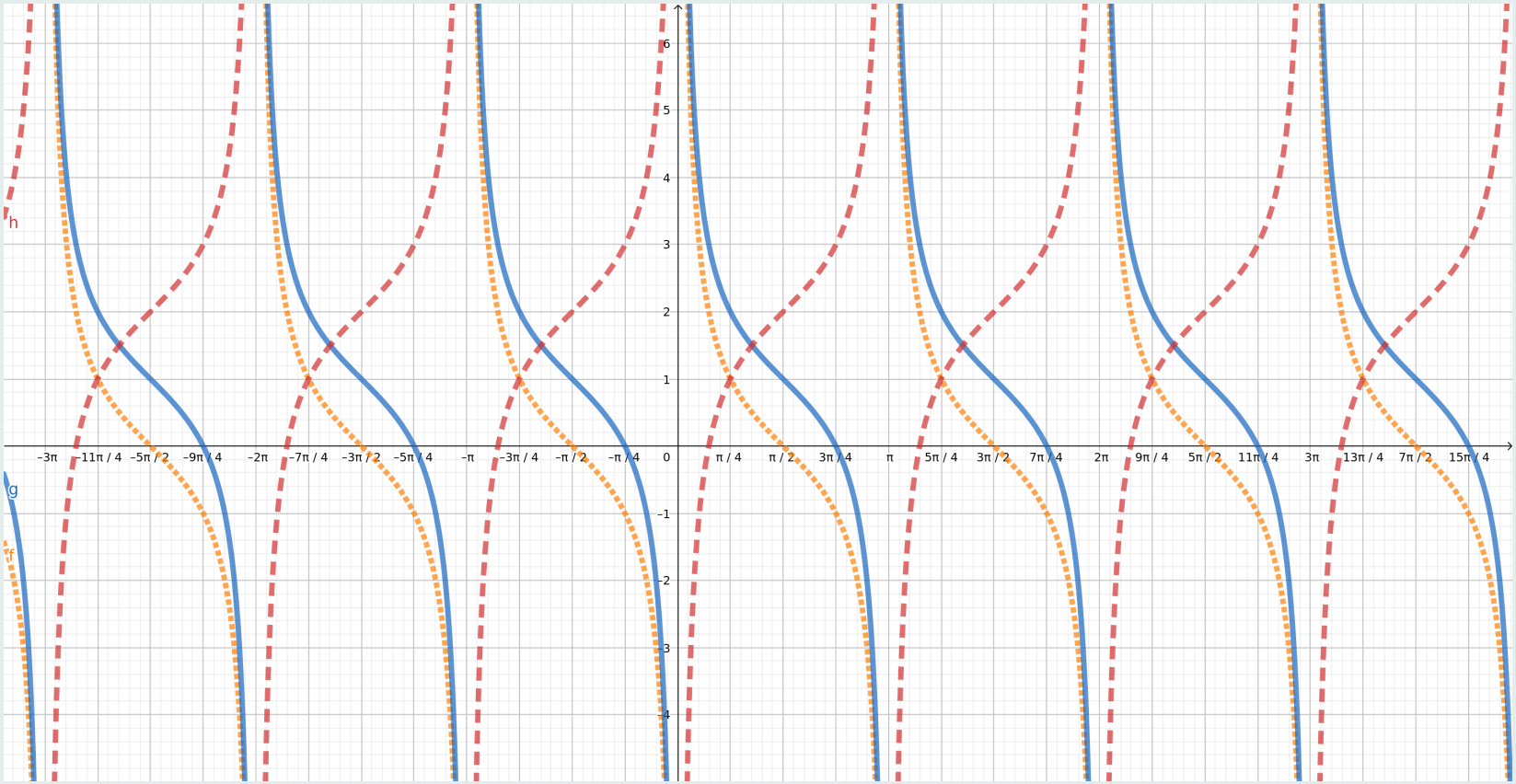




## Exercise

Find the graph of

A $\cot x$ B $1 + \cot x$ C $2 - \cot x$



## Exercise

Sketch the following graphs and decide, which functions are equal (at first, try without computer):

1. $\sin(x + \frac{\pi}{2})$
2. $\sin(x - \frac{\pi}{2})$
3. $\cos(x + \frac{\pi}{2})$
4. $\cos(x - \frac{\pi}{2})$
5. $\sin(x)$
6. $-\sin(x)$
7. $\cos(x)$
8. $-\cos(x)$

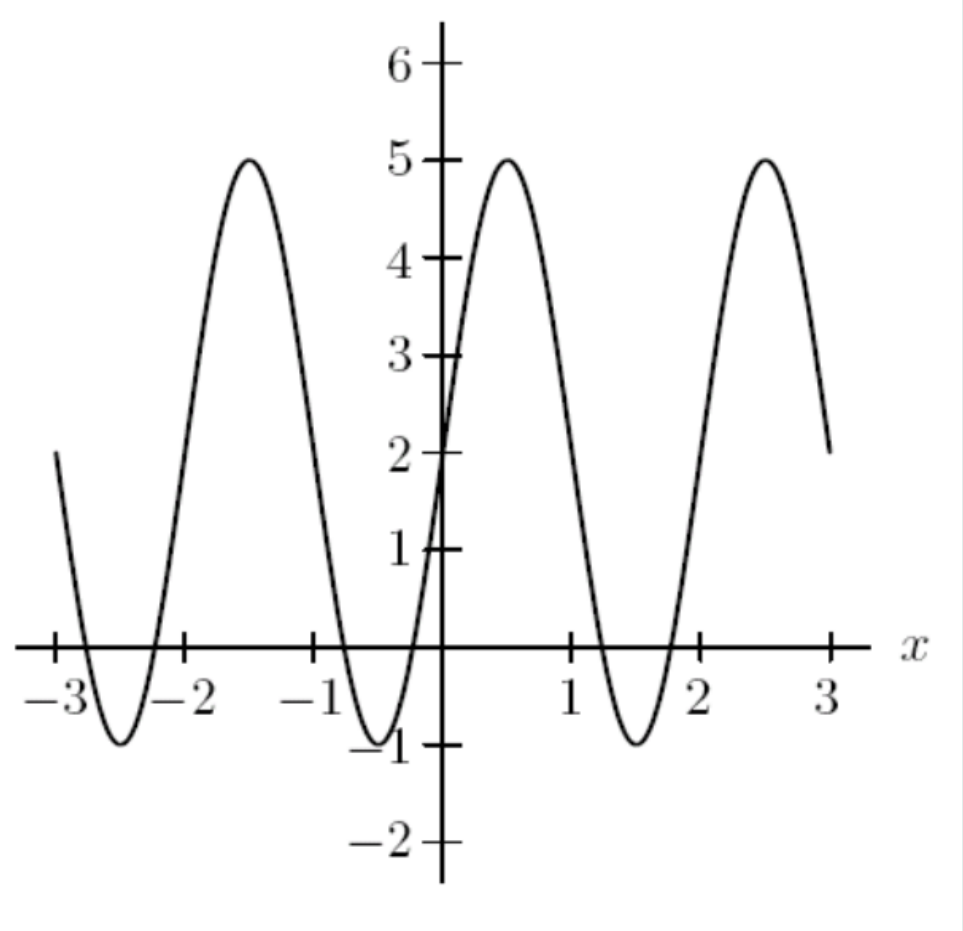
## Exercise

Sketch the following graphs (at first, try without computer):

1. $3\cos(2x - \frac{\pi}{3}) = 3\cos(2(x - \frac{\pi}{6}))$
2. $\sin(2\pi x)$
3. $-\frac{1}{2}\cot(2x)$
4. $\tan\left(\frac{\pi}{6} - \frac{x}{2}\right)$

## Exercise (http://mathquest.carroll.edu/libraries/PRE.student.01.05.pdf)

Find the formula




A $3\sin(2x) + 2$

B $3\cos(2x) + 2$

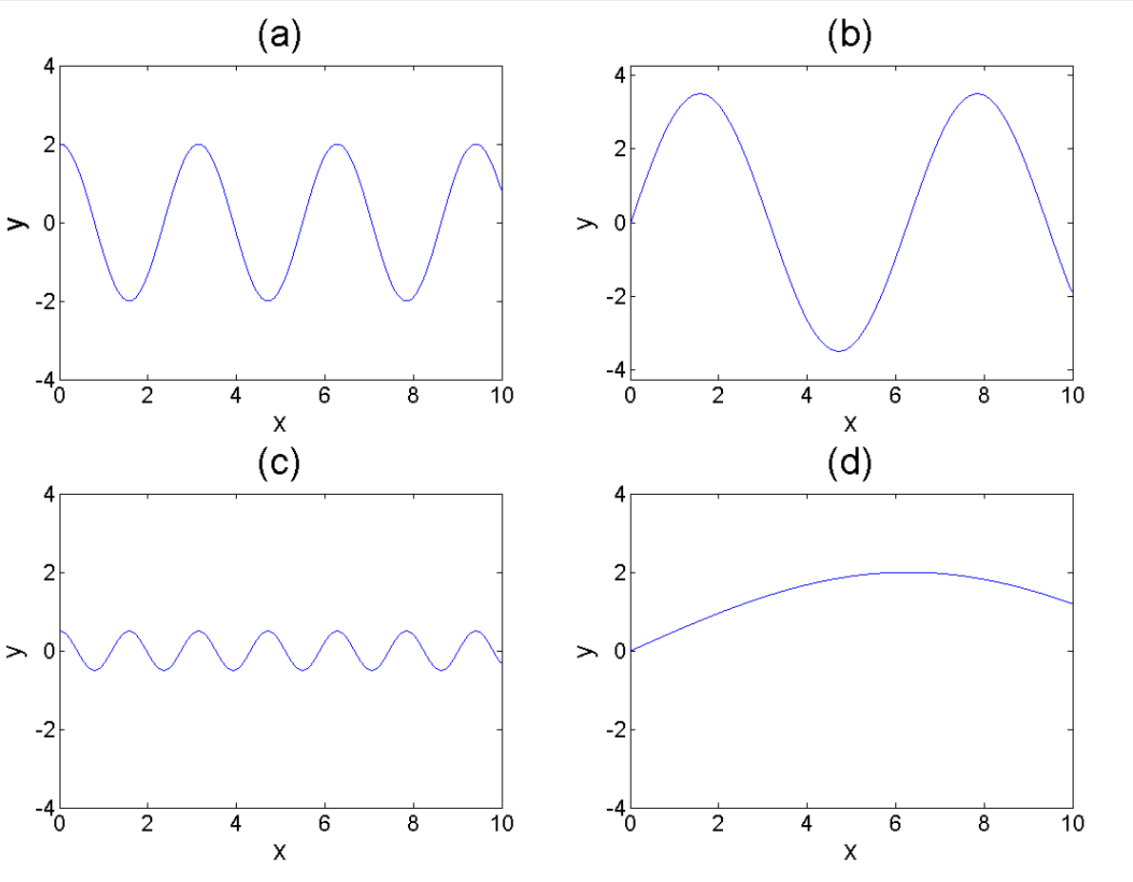
C $3\sin(\pi x) + 2$

D $3\cos(\pi x) + 2$

E $3\sin\left(\frac{x}{\pi}\right) + 2$

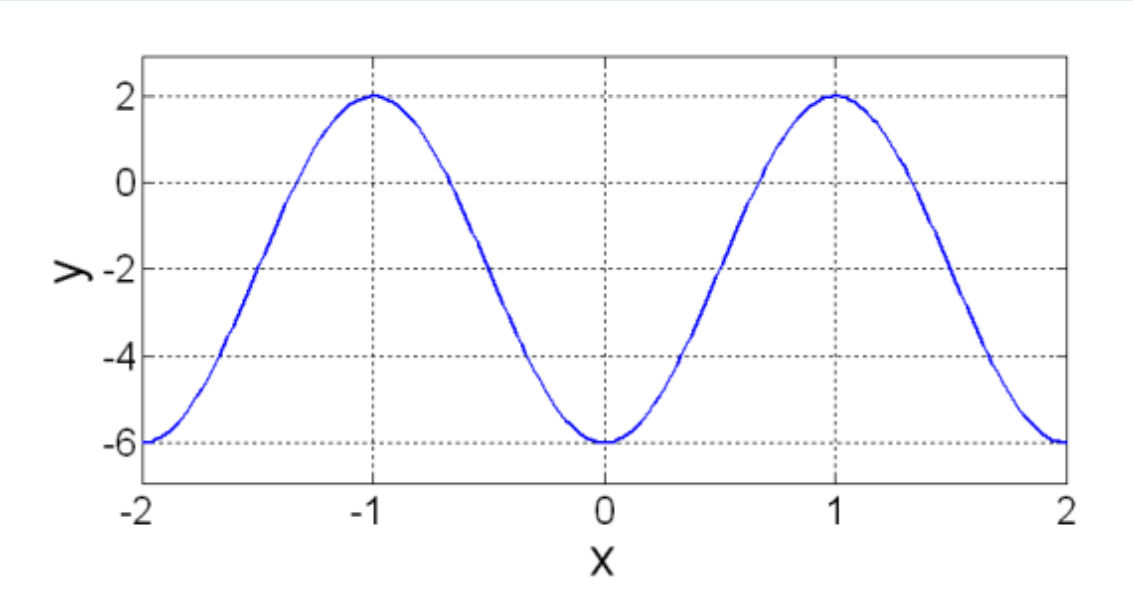
## Exercise (http://mathquest.carroll.edu/libraries/PRE.student.01.05.pdf)

There is a function of the form $y = A\sin(Bx + C)$, where $A, B, C \in \mathbb{R}$. Which function has the largest value of $B$?



## Exercise (http://mathquest.carroll.edu/libraries/PRE.student.01.05.pdf)

Find the formulae




A $4\sin\left(\pi x - \frac{\pi}{2}\right) - 2$

B $-4\sin\left(\pi x + \frac{\pi}{2}\right) - 2$

C $-4\cos\left(\pi x\right) - 2$

D $4\cos\left(\pi x + \pi\right) - 2$

## Exercise

Find the formulae:

A $\tan|x|$ B $|\tan x|$ C $\cot|x|$ D $|\cot x|$