

7th lesson

<https://www2.karlin.mff.cuni.cz/~kuncova/en/teachIM.php>
kunc6am@natur.cuni.cz

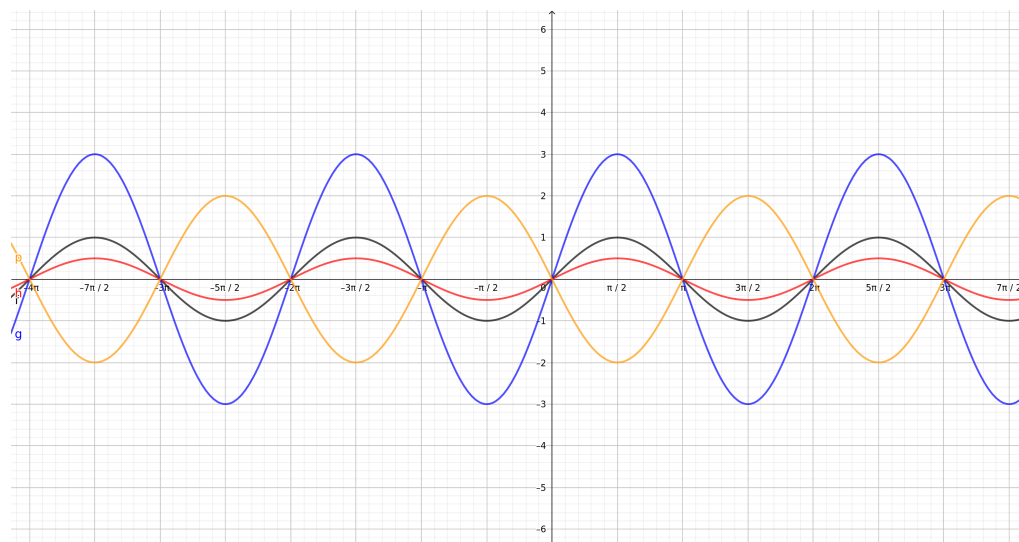
Exercises

1. Evaluate the following (use the unit circle):

- | | | | |
|----------------------------|---------------------------|----------------------------|----------------------------|
| (a) $\sin \frac{2\pi}{3}$ | (e) $\tan \frac{-\pi}{4}$ | (i) $\sin \frac{-4\pi}{3}$ | (m) $\tan \frac{-\pi}{3}$ |
| (b) $\sin \frac{-2\pi}{3}$ | (f) $\tan \frac{7\pi}{4}$ | (j) $\sin \frac{7\pi}{4}$ | (n) $\tan \frac{15\pi}{4}$ |
| (c) $\cos \frac{7\pi}{6}$ | (g) $\cot \frac{5\pi}{4}$ | (k) $\cos \frac{-2\pi}{3}$ | (o) $\cot \frac{-\pi}{3}$ |
| (d) $\cos \frac{-7\pi}{6}$ | (h) $\cos \frac{5\pi}{6}$ | (l) $\tan \frac{3\pi}{4}$ | |

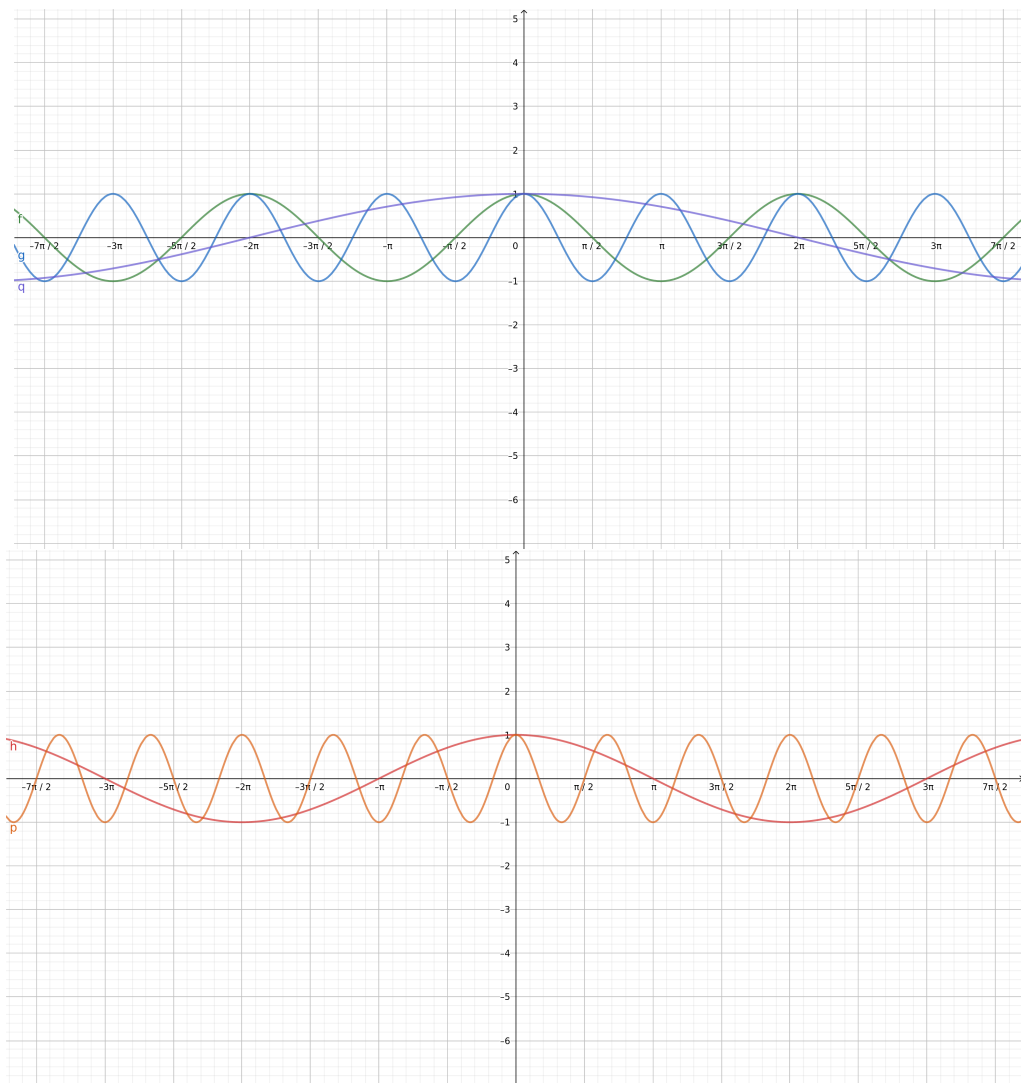
2. Find the graph of

- (a) $\sin x$ (b) $3 \sin x$ (c) $-2 \sin x$ (d) $\frac{1}{2} \sin x$



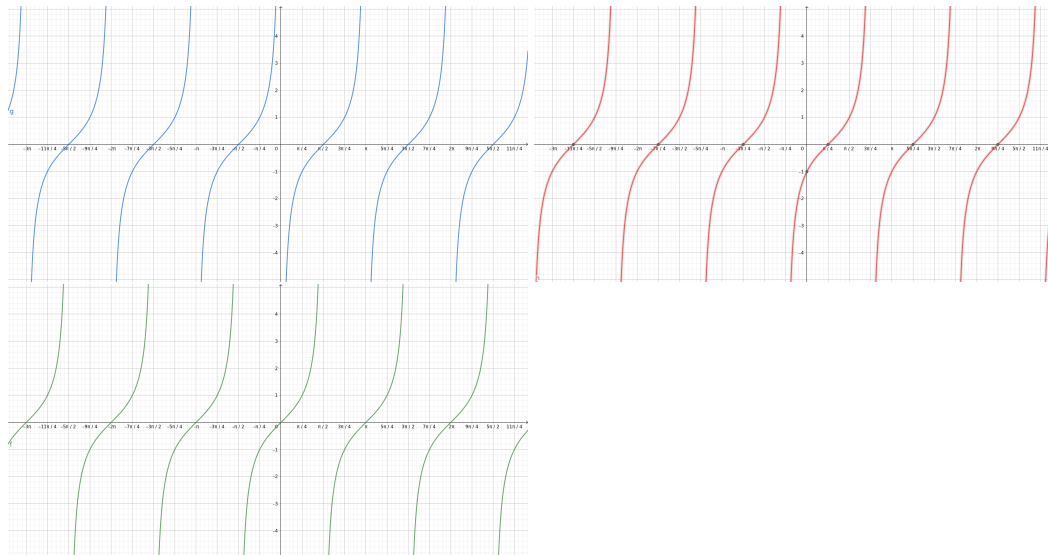
3. Find the graph of

- (a) $\cos x$ (b) $\cos(2x)$ (c) $\cos(3x)$ (d) $\cos(x/2)$ (e) $\cos(x/4)$



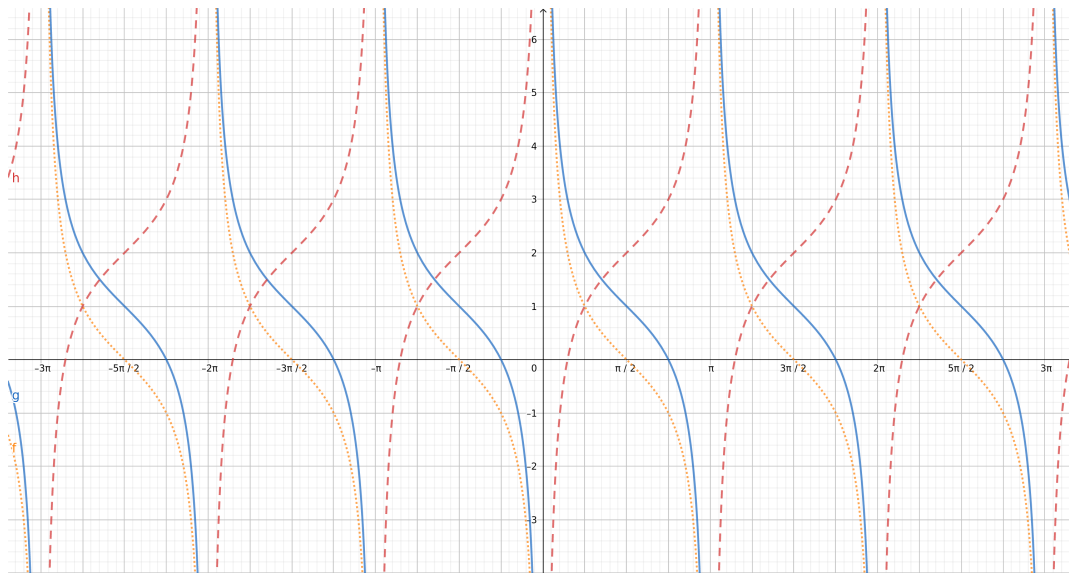
4. Find the graph of

- (a) $\tan x$ (b) $\tan(x + \frac{\pi}{2})$ (c) $\tan(x - \frac{\pi}{4})$



5. Find the graph of

- (a) $\cot x$ (b) $1 + \cot x$ (c) $2 - \cot x$



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

(a) $\sin(x + \frac{\pi}{2})$

(e) $\sin(x)$

(b) $\sin(x - \frac{\pi}{2})$

(f) $-\sin(x)$

(c) $\cos(x + \frac{\pi}{2})$

(g) $\cos(x)$

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

(h) $-\cos(x)$

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

(a) $3 \cos(2x - \frac{\pi}{3}) = 3 \cos(2(x - \frac{\pi}{6}))$

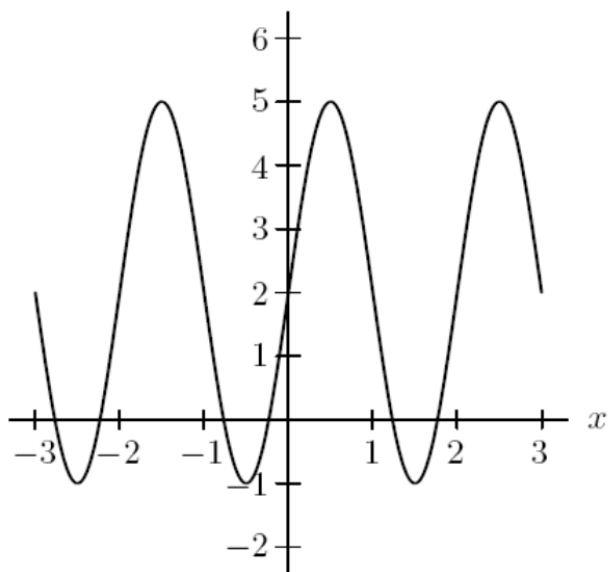
(c) $-\frac{1}{2} \cot(2x)$

(b) $\sin(2\pi x)$

(d) $\tan(\frac{\pi}{6} - \frac{x}{2})$

Source of a lot of the following questions: <http://mathquest.carroll.edu/libraries/PRE.student.01.05.pdf>

8. Find the formula



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

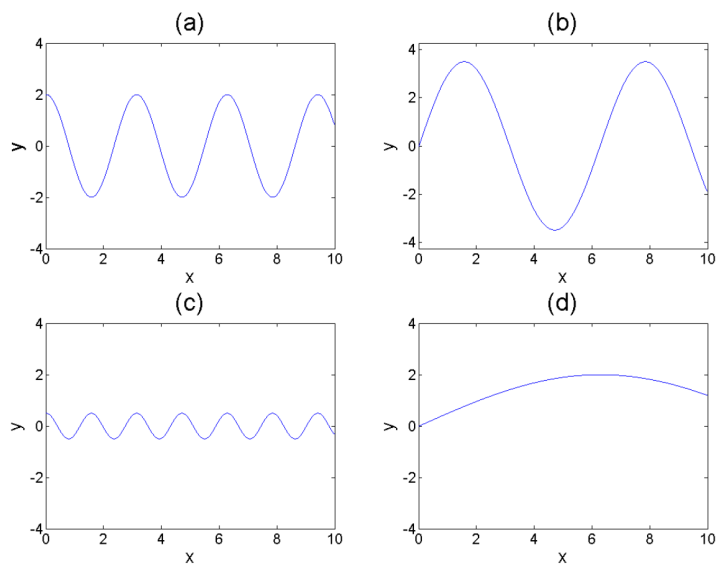
D $3 \cos(\pi x) + 2$

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

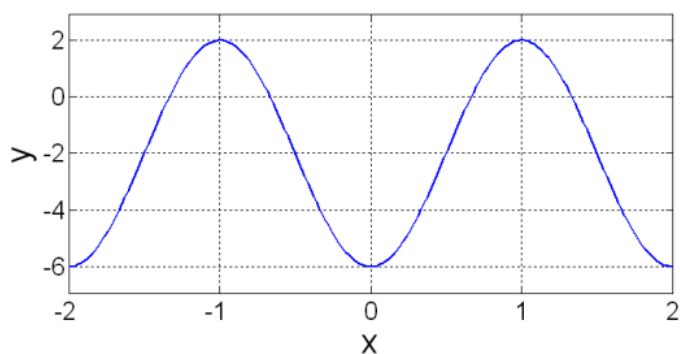
C $3 \sin(\pi x) + 2$

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

9. 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 ?



10. Find the formulae



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

11. Find the formulae:

A $\tan |x|$

B $|\tan x|$

C $\cot |x|$

D $|\cot x|$

