

8 October 2020

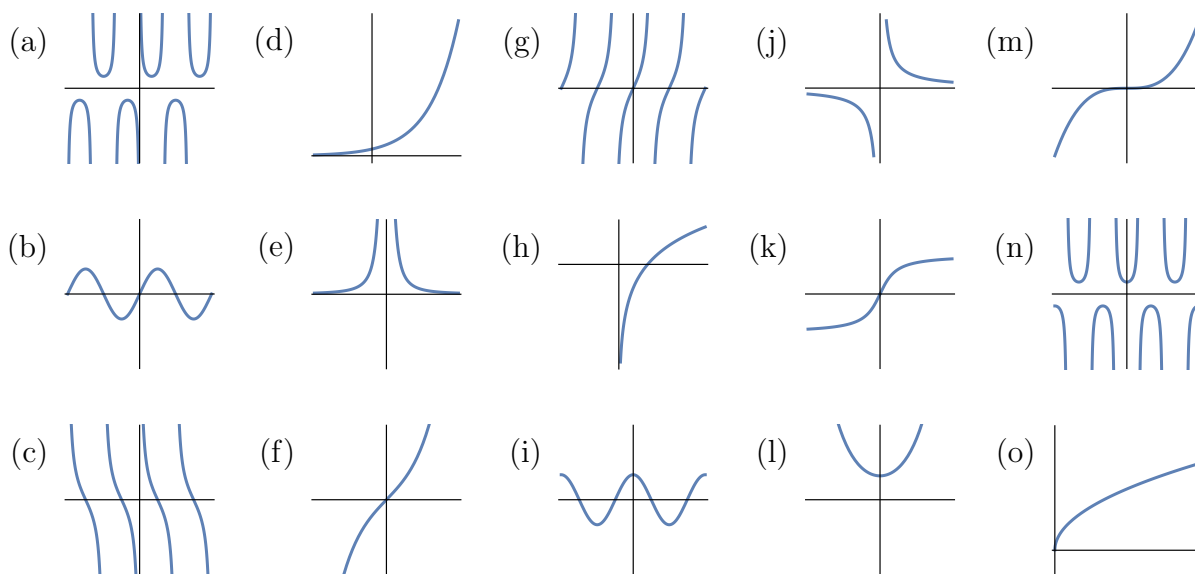
1. **Warm up:** Answer the following questions with True or False.

- (a) If  $x \in [1, \infty)$ , then  $n > m$  implies  $x^n \geq x^m$ , for  $n, m \in \mathbf{N}$ .
- (b) If  $x \in [0, 1]$ , then  $n > m$  implies  $x^n \geq x^m$ , for  $n, m \in \mathbf{N}$ .
- (c) As  $x$  goes to  $\infty$ , the value of  $f(x) = a^x$  also goes to  $\infty$ , for any positive  $a \in \mathbf{R}$ .
- (d) There exists some  $b \in \mathbf{R}$  such that  $a^b$  never changes, for every positive  $a \in \mathbf{R}$ .

2. For each of the following functions, find their range (assuming the domain is  $\mathbf{R}$ ) and inverse function. Or, state why the inverse does not exist.

- (a)  $f(x) = 3x$
- (b)  $g(x) = 5 - 9x$
- (c)  $h(x) = x^2 + 2$
- (d)  $k(x) = x^3 - 1$
- (e)  $\ell(x) = 3e^{2x} - 10$

3. Identify the following graphs with the given trigonometric functions.



$e^x$

$\csc(x)$

$\cot(x)$

$\cos(x)$

$x^3$

$\sin(x)$

$\log(x)$

$\sqrt{x}$

$1/x^2$

$\sec(x)$

$\cosh(x)$

$\arctan(x)$

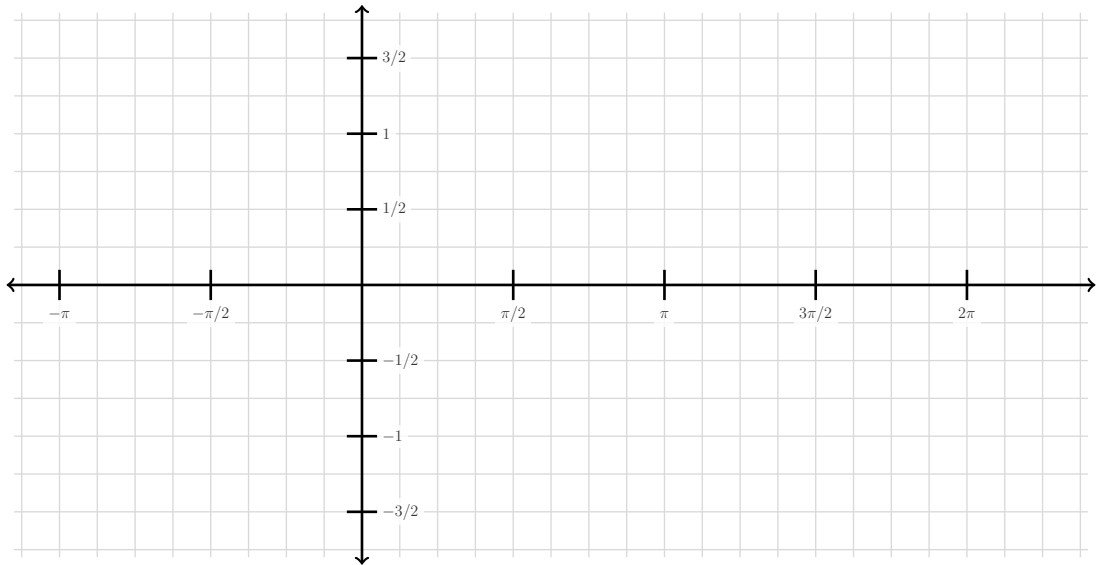
$1/x$

$\tan(x)$

$\sinh(x)$

4. Draw the graphs of the following functions.

$$\sin(x) \quad \sin(x) + \frac{1}{2} \quad \sin\left(x + \frac{\pi}{2}\right) \quad \frac{3}{2} \cdot \sin(x) \quad \frac{\sin(2x) + 1}{2} \quad \cos\left(\frac{x}{2}\right)$$



5. Draw the graphs of the following functions.

$$\frac{1}{x} \quad \frac{2}{x} \quad \frac{1}{2x} + 2 \quad \frac{1}{x+2} \quad \frac{3-2x}{x-1}$$

