

# Tutorial 1: MA1E01

## Functions

1. For the piecewise function

$$g(x) = \begin{cases} \sqrt{x+1} & x \geq 1 \\ 3 & x < 1, \end{cases}$$

find  $g(3)$ ,  $g(-1)$ ,  $g(\pi)$ ,  $g(-1.1)$  and  $g(t^2 - 1)$ .

2. Find the natural domain of

$$(a) f(x) = \sqrt{x^2 + x - 6}$$

$$(b) f(x) = \frac{1}{1 - \sin x}$$

$$(c) f(x) = \frac{3}{2 - \cos x}$$

3. Express the following functions in piecewise form without using absolute values:

$$(a) f(x) = |x| - 7x + 1$$

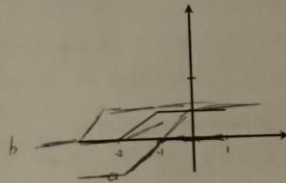
$$(b) f(x) = 4|x - 2| - |x + 2|$$

4. Compare the domains of the functions

$$f(x) = \frac{(x+2)(x^2-1)}{(x+2)(x-1)} \quad \text{and} \quad g(x) = x+1$$

and plot the functions on separate graphs.

5. The graph of  $y = f(x)$  is



Sketch the graph of

$$(a) y = f(x) - 1$$

$$(b) y = f(x - 1)$$

$$(c) y = \frac{1}{2}f(x)$$

$$5 \sqrt{\frac{35^6}{5^6} - \frac{75^2}{5^2}} \quad 5 \sqrt{\frac{3^6}{5^6} - \frac{7^2}{5^2}}$$

$$\frac{(\sqrt{x-6})(\sqrt{x+6})}{\sqrt{x^2-36}} \\ x + 6\sqrt{x-6} - 6\sqrt{x-6} - 36 \\ \sqrt{x+6} \\ 36+6 \\ = 42$$

$$\frac{13-t^3}{14t^2+5}$$

- getting bigger  
+ getting bigger

$$\frac{x}{x^2-16} \quad 3 \quad \frac{3}{4-16} \quad = \frac{3}{-12} \quad = -\frac{1}{4}$$

$$\frac{3-t^3}{4t^3+16} \quad x=2 = 0.1190 \\ y = -0.23$$

$$x=5$$

$$x=25$$

$$-999.999$$

$$3-t^3 = 0.25 (4t^2+16) \\ 17-4t^3 = 4t^2+16$$

$$8t^3+22$$

$$10000$$

$$1 \quad 0.23$$

$$-1 = -0.236$$

$$-0.4 = -0.099$$

$$-0.1 = -0.024$$

$$-0.00001 = -0.000024$$

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