Consider the Modulus

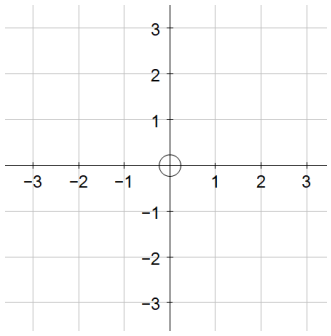
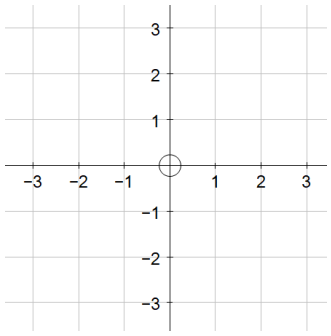
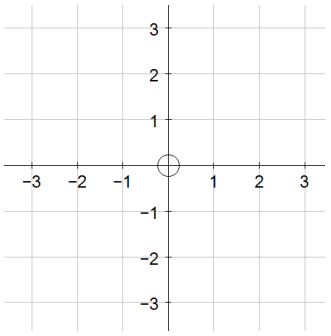
Decide which symbol to place in the middle to make each equation always true

$$|a+b| \leq = \geq |a| + |b|$$

$$|a+b| \leq = \geq \big||a| - |b|\big|$$

Where a, b are real numbers.

Sketch…

$y = 3x - 3$	$y = \|3x - 3\|$	$y = 3\|x\| - 3$
		
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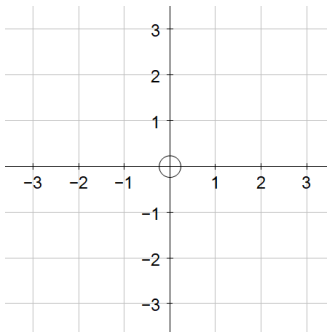	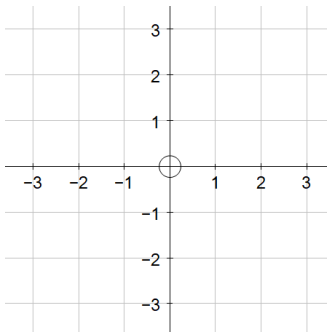	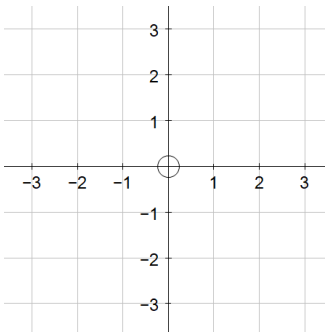

Which of these are functions?

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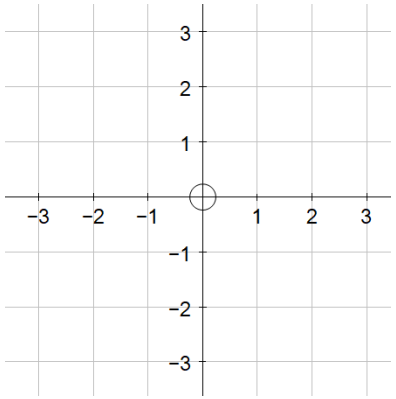	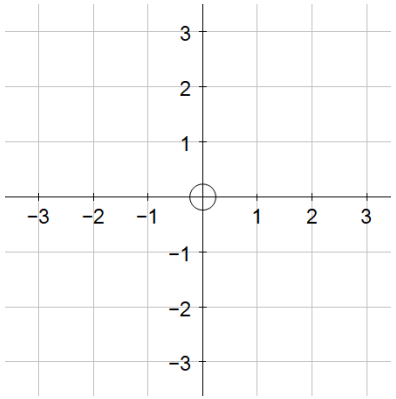	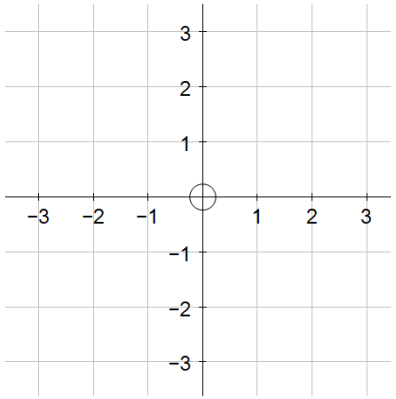
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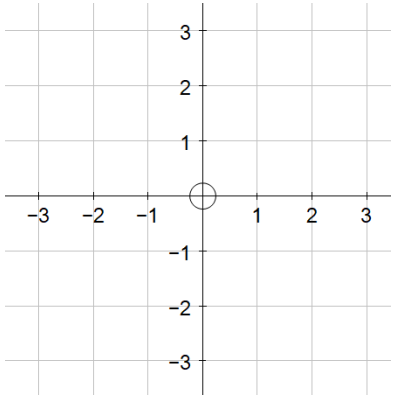	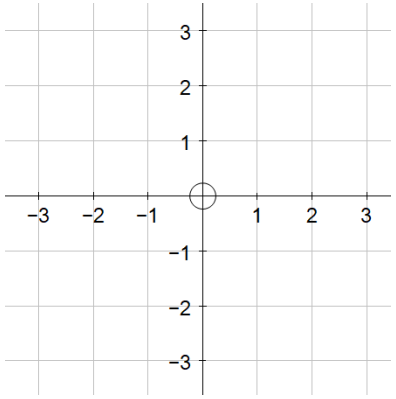	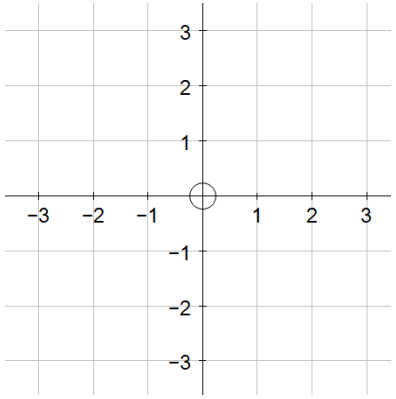

Which of these are functions?

Consider the Modulus - answers

Decide which symbol to place in the middle to make each equation always true

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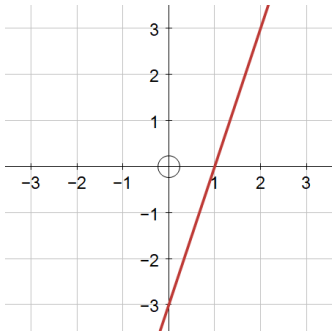
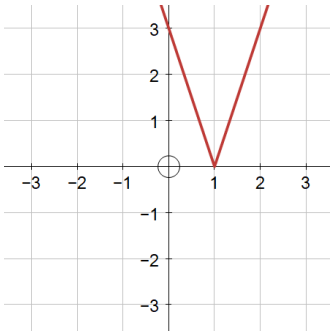
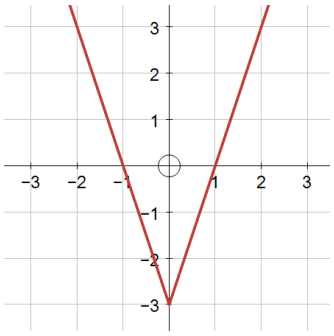
$$|a + b| \geq \big||a| - |b|\big|$$

Where a, b are real numbers.

Sketch…

$\boldsymbol{y = 3x - 3}$	$\boldsymbol{y = \lvert 3x - 3 \rvert}$	$\boldsymbol{y = 3\lvert x \rvert - 3}$
		
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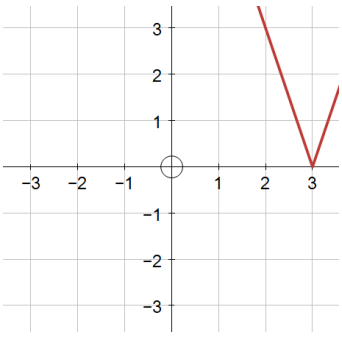
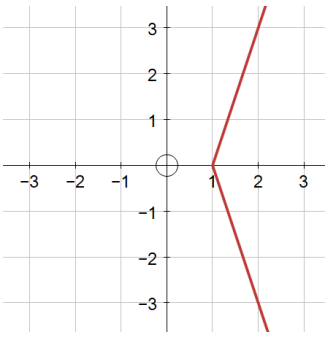
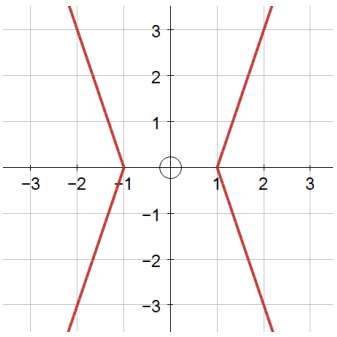
		

The bold relationships above are functions because they are either one-one or many-one and have defined $f(x)$ across the domain.

Solve these…

1) $|2x-3|=2$
2) $|5x+3|=2$
3) $|2x-3|=|5x+3|$
4) $|2x-3|=|2x+3|$
5) $|2x-3|=x^2$

Sketch these…

1) $y=|x^2-4|$
2) $y=|sinx|$
3) $y=sin|x|$
4) $y=(sinx)(sin10x)$
5) $y=sinx+0.1sin10x$
6) $y=|lnx|$
7) $y=x+|x|$
8) $|y|=2x+6$

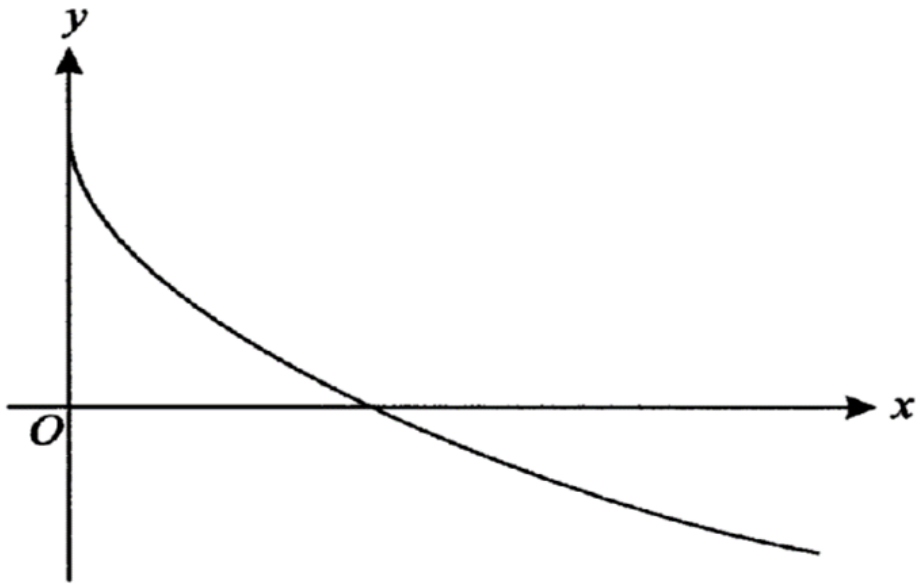
Solve these, with answers in set notation please…

1) $|x^2-4|=2$
2) $|2x-3|<2$
3) $|5x+3|>2$
4) $|2x-3|<|5x+3|$

Try these…

1) For what values of k does the equation $|x^2-4|=k$ have 0, 1, 2, 3, or 4 solutions?
2) For what values of m does the graph $y=mx+2$ intersect the line $y=|2x+4|$ exactly once
3) Sketch the graph $y=|2x+4|+|x-3|$, giving coordinates of any key features.

Try this…



The function f is defined by $f(x) = 2 - \sqrt{x}$ for $x \geqslant 0$. The graph of $y = f(x)$ is shown above.

(i) State the range of f. [1]

(ii) Find the value of ff(4). [2]

(iii) Given that the equation $|f(x)| = k$ has two distinct roots, determine the possible values of the constant k. [2]