Name: _____ Date: _____

Learning Goal 1.1	Understanding new ideas about functions and applying that to previously knowledge.

1. Determine whether the function is even, odd or neither.

a. $f(x) = x^2 + 4$

$f(-x) = (-x)^2 + 4$
$= x^2 + 4$
$= f(x)$
even

b. $g(x) = x^3 - 2x$

$g(-x) = (-x)^3 - 2(-x)$
$= -x^3 + 2x$
$= -(x^3 - 2x)$
$= -g(x)$
odd

c. $h(x) = x^2 - 3x + 4$

$h(-x) = (-x)^2 - 3(-x) + 4$
$= x^2 + 3x + 4$
$\neq h(x)$
$\neq -h(x)$
neither

d. $f(x) = x^3 - x^2 + 4x + 2$

$f(-x)$
$= (-x)^3 - (-x)^2 + 4(-x) + 2$
$= -x^3 - x^2 - 4x + 2$
$\neq f(x)$
$\neq -f(x)$
neither

e. $g(x) = -x^2 + 10$

$g(-x) = -(-x)^2 + 10$
$= -x^2 + 10$
$= g(x)$
even

f. $h(x) = x^3 + 4x$

$h(-x) = (-x)^3 + 4(-x)$
$= -x^3 - 4x$
$= -(x^3 + 4x)$
$= -h(x)$
odd

g. $f(x) = -x^3 + 5x - 2$

$f(-x)$
$= (-x)^3 - (-x)^2 + 4(-x) + 2$
$= -x^3 - x^2 - 4x + 2$
$\neq f(x)$
$\neq -f(x)$
neither

h. $g(x) = \sqrt{x^4 - x^2} + 4$

$g(-x) = \sqrt{(-x)^4 - (-x)^2} + 4$
$= \sqrt{x^4 - x^2} + 4$
$= g(x)$
even

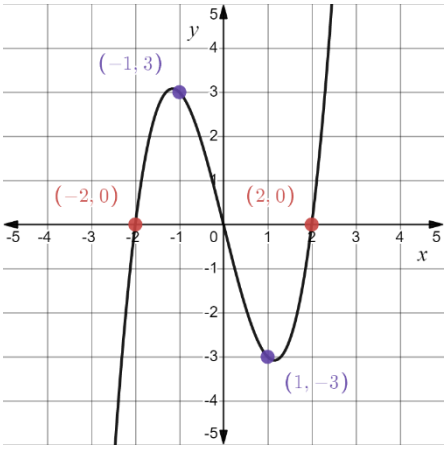
i. $h(x) = |x + 4|$

$h(-x) = |(-x) + 4|$
$= |-(x - 4)|$
$\neq h(x)$
$\neq -h(x)$
neither

Assignment p. # 57 – 66 Quiz Next Day!
4, 9 – 18, 47 – 55

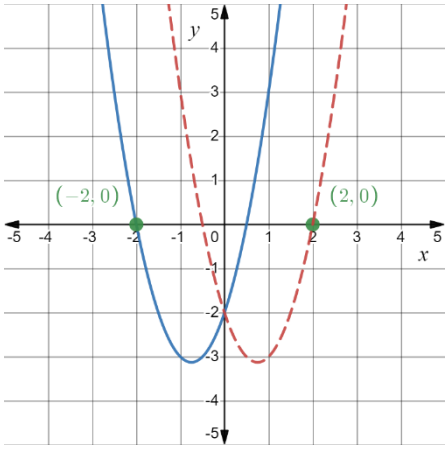
2. Graphically determine whether the following functions are even, odd or neither.

a. odd



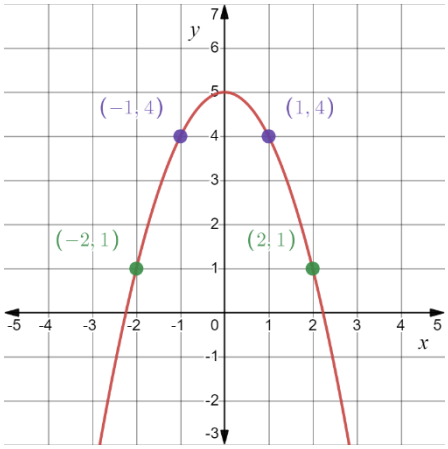
The coloured points are negatives of eachother in both directions.

b. neither



The green points are not both on the graph (not odd).
The red curve is the original reflected over the $y-$ axis (not even).

c. even



The coloured points are reflections of eachother over the $y-$ axis.

3. Evaluate the difference quotient for the following functions. Simplify your answer.

a. $f(x) = -x^2 + 10$

$$\frac{(-(x+h)^2+10)-(-x^2+10)}{h}$$

$$= \frac{(-(x^2+2xh+h^2)+10)-(-x^2+10)}{h}$$

$$= \frac{-x^2-2xh-h^2+10+x^2-10}{h}$$

$$= \frac{-x^2-2xh-h^2+10+x^2-10}{h}$$

$$= \frac{-2xh-h^2}{h}$$

$$= -2x-h$$

b. $y = x^3 + 4x$

$$\frac{\left((x+h)^3+4(x+h)\right)-(x^3+4x)}{h}$$

$$= \frac{\left((x^3+3x^2h++3xh^2+h^3)+4x+4h\right)-(x^3+4x)}{h}$$

$$= \frac{x^3+3x^2h++3xh^2+h^3+4x+4h-x^3-4x}{h}$$

$$= \frac{3x^2h+3xh^2+h^3+4h}{h}$$

$$= 3x^2+3xh+h^2+4$$