

ICNS100 Intensive Mathematics
Quiz 1 (10%)

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|------------------|
| |
| out of 20 points |

Name: _____ Student ID _____

1. Consider the graph of the equation

$$y^3 = x - x^3.$$

- (a) The graph is symmetric about (tick or cross) (4 points)
- the x -axis
 the y -axis
 the origin
 the line $y = x$.

$$\begin{aligned}
 -y^3 &= -x + x^3 \\
 \hookrightarrow y^3 &= x - x^3
 \end{aligned}$$

- (b) Find the x -intercepts. (1 point)

$$\begin{aligned}
 0 &= x - x^3 = x(1 - x^2) \\
 x &= 0 \text{ or } x^2 = 1 \Rightarrow x = 1, -1
 \end{aligned}
 \left. \vphantom{\begin{aligned} 0 &= x - x^3 \\ x &= 0 \text{ or } x^2 = 1 \end{aligned}} \right\} x\text{-int} = \boxed{0, 1, -1}$$

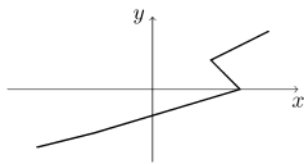
- (c) Find the y -intercepts. (1 point)

$$y\text{-int} = \boxed{0}$$

2. Find the slope and y -intercept of a straight line given by $-x = -5y + 1$. (2 points)

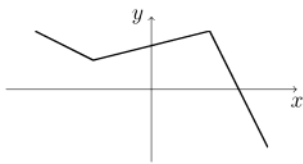
$$\begin{aligned}
 5y &= x + 1 \\
 y &= \frac{1}{5}x + \frac{1}{5}
 \end{aligned}
 \left. \vphantom{\begin{aligned} 5y &= x + 1 \\ y &= \frac{1}{5}x + \frac{1}{5} \end{aligned}} \right\}
 \begin{aligned}
 \text{slope} &= \boxed{1/5} \\
 y\text{-int} &= \boxed{1/5}
 \end{aligned}$$

3. For each of the following graphs, determine whether it is a graph of a function or one-to-one function. (4 points)

(a) 

Function (yes/no)? NO

One-to-one function (yes/no)? NO

(b) 

Function (yes/no)? Yes

One-to-one function (yes/no)? NO

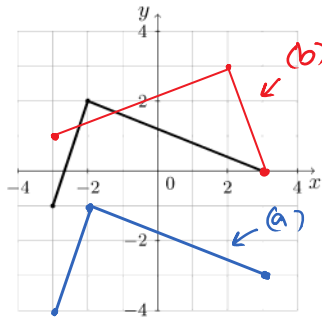
4. The line L is given by the equation $2y - 4 = 5x + 1$. The line K is given by the equation $2x + 5y - 10 = 0$. Determine whether the lines L and K are parallel, perpendicular, or neither. Justify your answer.

$L: 2y = 5x + 5$
 $y = \frac{5}{2}x + \frac{5}{2}$
 $\therefore \text{slope} = 5/2$

$K: 5y = -2x + 10$
 $y = -\frac{2}{5}x + 2$
 $\therefore \text{slope} = -\frac{2}{5}$

Since product of slopes
 $= \left(\frac{5}{2}\right)\left(-\frac{2}{5}\right) = -1$
 $\therefore L \text{ \& } K \text{ are perpendicular}$

5. A function $y = f(x)$ has the following graph (2 points)



Draw (on the same picture) the graphs of

(a) $y = f(x) - 3$ $\downarrow 3$

(b) $y = f(-x) + 1$ \leftarrow $\uparrow 1$

Label your answers with (a) and (b) accordingly.

6. Sketch the graph of the following case-defined function (3 points)

$$f(x) = \begin{cases} 3 & , x < -2 \\ 1 - x & , -2 \leq x < 0 \\ -1 & , 0 \leq x \leq 4. \end{cases}$$

