

MATH 110-003, QUIZ 1

September 20, 2016

Time: 15 minutes

Show all your work. No calculators, no books/notes are allowed.

Name (please print): _____

Student number: _____

1. The line ℓ has the equation $3x + 2y = 12$.

a) Which of the following points lies on the line ℓ . Show your work.

(I) (3, 2)

(II) (-2, 9)

b) Find slope and y-intercept of this line.

c) Find the equation of the line that is perpendicular to ℓ and passes through (2, 0).

a) plug in x and y into the equation and if it satisfies the equation then it is on the line.

I. (3, 2) $\xrightarrow{3x+2y=12} (3 \times 3) + (2 \times 2) = 9 + 4 = 13 \neq 12 \Rightarrow$ NOT on the line

II. (-2, 9) $\longrightarrow (3 \times (-2)) + (2 \times 9) = -6 + 18 = 12 = 12 \checkmark \Rightarrow$ ON on the line.

b) 1st method: simplify the equation to make it of the form $y = mx + b$

$$3x + 2y = 12$$

$$\Rightarrow 2y = 12 - 3x \xrightarrow{\div 2} y = \frac{12}{2} - \frac{3}{2}x \Rightarrow y = 6 - \frac{3}{2}x$$

y-int = 6 \rightarrow slope = $-\frac{3}{2}$

2nd method: find two points on

the line and find the slope by $m = \frac{y_2 - y_1}{x_2 - x_1}$

and y-intercept is when $x = 0$.

(-2, 9) from (a)

$$\Rightarrow m = \frac{9 - 0}{-2 - 4} = \frac{9}{-6} = -\frac{3}{2}$$

and $y = 0 \Rightarrow 3x = 12 \Rightarrow x = 4 \Rightarrow (4, 0)$

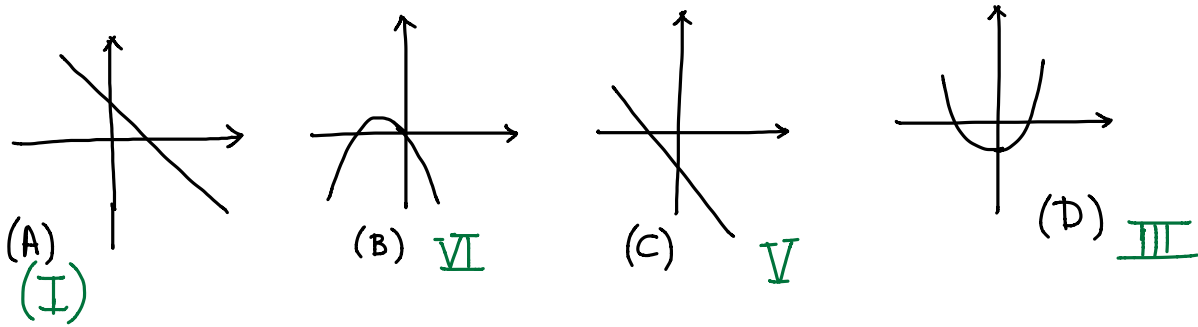
$$\text{y-int } \xrightarrow{x=0} 2y = 12 \Rightarrow y = 6 = \text{y-int}$$

c) $m_{\text{per}} = -\frac{1}{m_{\ell}} = +\frac{2}{3}$ $\xrightarrow{(2, 0)}$ $y - y_0 = m(x - x_0) \rightarrow y - 0 = \frac{2}{3}(x - 2) \Rightarrow y = \frac{2}{3}x - \frac{4}{3}$

2. Match each equation to its graph. (There are extra equations.)

- (I) $y = -2x + 1$
- (II) $y = x$
- (III) $y = 2x^2 - 1$
- (IV) $y = -x^2 + x - 2$
- (V) $y = -2x - 2$
- (VI) $y = -x^2 - x$

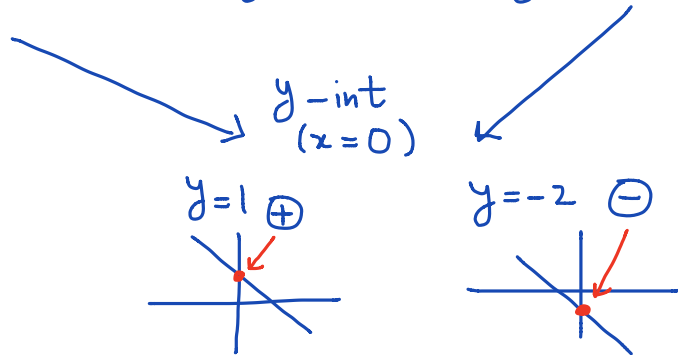
* You don't need to do detailed calculations to find points for the graph of each equation. We just check the key features for each.



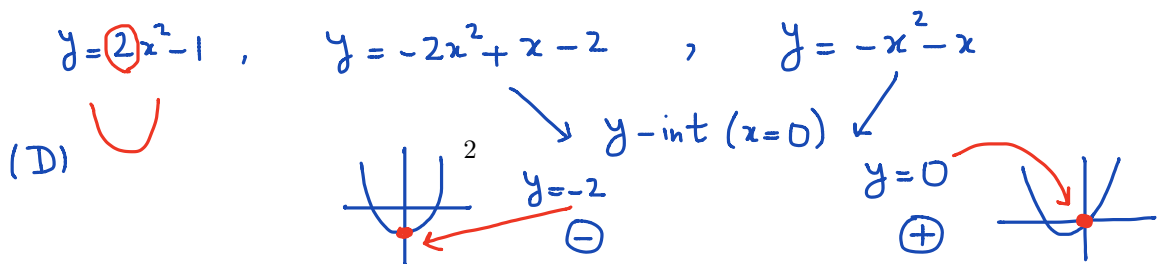
Features.

For lines: 1. Check the slope $\left\{ \begin{array}{l} \ominus \text{ slope} \\ \oplus \text{ slope} \end{array} \right.$

$y = -2x + 1$, ~~$y = x$~~ , $y = -2x - 2$



Parabolas: $y = ax^2 + bx + c \rightarrow \begin{cases} a > 0 & \cup \\ a < 0 & \cap \end{cases}$



3. Sketch the graph of the following function. (Show your work)

$$f(x) = \begin{cases} -x + 1 & \text{if } x \leq 2 \\ x^2 - 4x + 3 & \text{if } x > 2 \end{cases}$$

we look at the left and right of 2 and choose the graph given.

$$y = -x + 1$$

Find two points:

x	y
0	0+1=1
1	-1+1=0

$$y = x^2 - 4x + 3$$

$$\text{vertex: } x = \frac{-b}{2a} = \frac{-(-4)}{2 \times 1} = \frac{4}{2} = 2$$

$$\xrightarrow{\text{plug in}} 2^2 - 4 \times 2 + 3 = 4 - 8 + 3 = -1$$

$$\Rightarrow \text{vertex: } (2, -1)$$

$$y\text{-int: } x=0 \Rightarrow y=3 \Rightarrow (0, 3)$$

We have two points of the parabola, we can use the symmetry to complete the graph.

OR

Use table of values for some points on the parabola.

