MATH 1113 Precalculus
Eric Perkerson

Name: Solutions
Date: June 8, 2017

Quiz No. 1

Show all of your work, label your answers clearly, and do not use a calculator.

Problem 1 (25 points)

a Find the distance between the points $(4, -5)$ and $(-2, -1)$.

$$d = \sqrt{(-2-4)^2 + (-1+5)^2} = \sqrt{36+16} = \sqrt{52}$$

b Find the midpoint between the points $(4, -5)$ and $(-2, -1)$.

$$M = \left(\frac{4+(-2)}{2}, \frac{-5+(-1)}{2}\right)$$

$$= \left(\frac{2}{2}, \frac{-6}{2}\right)$$

$$= (1, -3)$$

Problem 2 (25 points) Find all x-intercepts and y-intercepts of the following equations:

a $y = 5x - 10$

x-int: Set $y = 0$

$\Rightarrow \quad 0 = 5x - 10$

$10 = 5x$

$\frac{10}{5} = x$

$2 = x$

y-int.: Set $x = 0$

$y = 5(0) - 10$

$y = -10$

b $y = 3x^2 - 10$

x-int.: Set $y = 0$

$0 = 3x^2 - 10$

$10 = 3x^2$

$\frac{10}{3} = x^2$

$\sqrt{\frac{10}{3}} = \sqrt{x^2}$

$\sqrt{\frac{10}{3}} = |x|$

$x = \pm\sqrt{\frac{10}{3}}$

y-int.: Set $x = 0$

$y = 3(0^2) - 10$

$y = -10$

b $y^2 = x + 3$

x-int.: Set $y = 0$

$0^2 = x + 3$

$-3 = x$

y-int.: Set $x = 0$

$y^2 = 0 + 3$

$y^2 = 3$

$\sqrt{y^2} = \sqrt{3}$

$|y| = \sqrt{3}$

$y = \pm\sqrt{3}$

Problem 3 (25 points) The equation $x^2 + y^2 + 6x - 2y = -1$ defines a circle. Put this equation for a circle in standard form.

$$x^2 + 6x + y^2 - 2y + 1 = 0$$

$(x - x_0)^2 = x^2 - 2x_0x + x_0^2$, set $6x = -2x_0x$

$\Rightarrow 6 = -2x_0$

$\frac{6}{-2} = x_0$

$x_0 = -3$

$\Rightarrow x^2 + 6x = x^2 + 6x + (-3)^2 - (-3)^2 = (x - (-3))^2 - 9$

$(y - y_0)^2 = y^2 - 2y_0y + y_0^2$, set $-2y = -2y_0y$

$\Rightarrow -2 = -2y_0$

$1 = y_0$

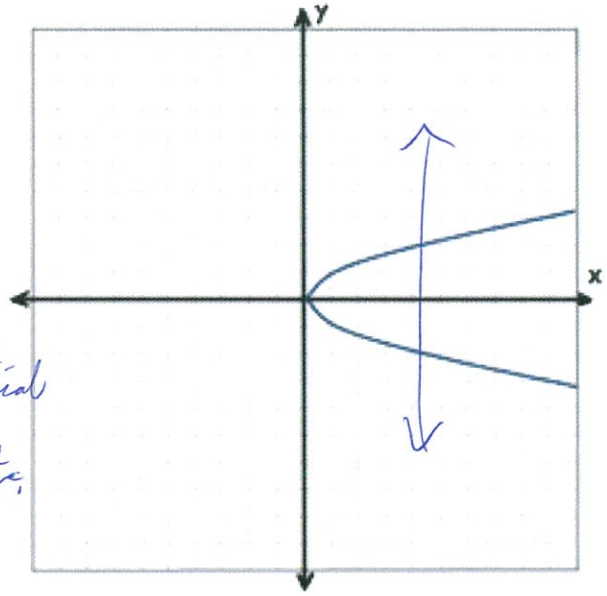
$\Rightarrow y^2 - 2y = y^2 - 2y + 1^2 - 1^2 = (y - 1)^2 - 1$

$\Rightarrow x^2 + 6x + y^2 - 2y + 1 = 0$

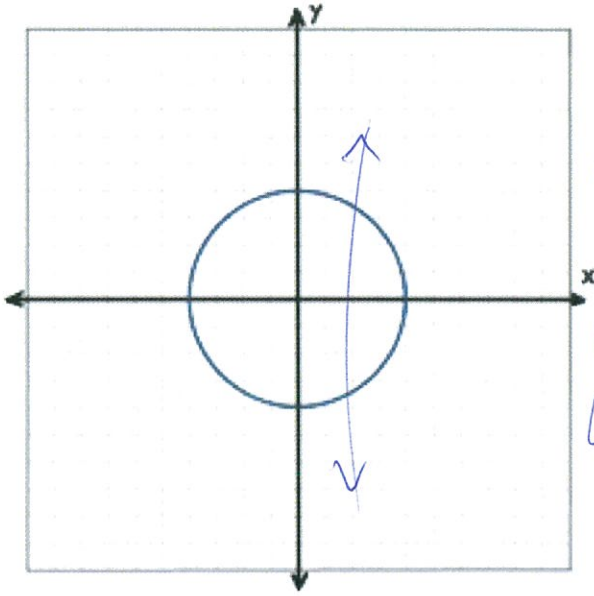
$\Rightarrow (x - (-3))^2 - 9 + (y - 1)^2 - 1 + 1 = 0$

$\Rightarrow (x + 3)^2 + (y - 1)^2 = 3^2$

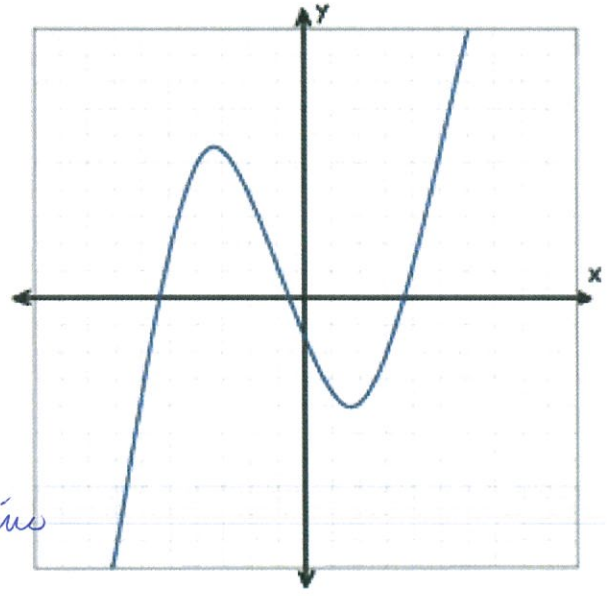
Problem 4 (25 points) Given the graphs below, explain for each whether or not the equation could be written with y as a function of x:



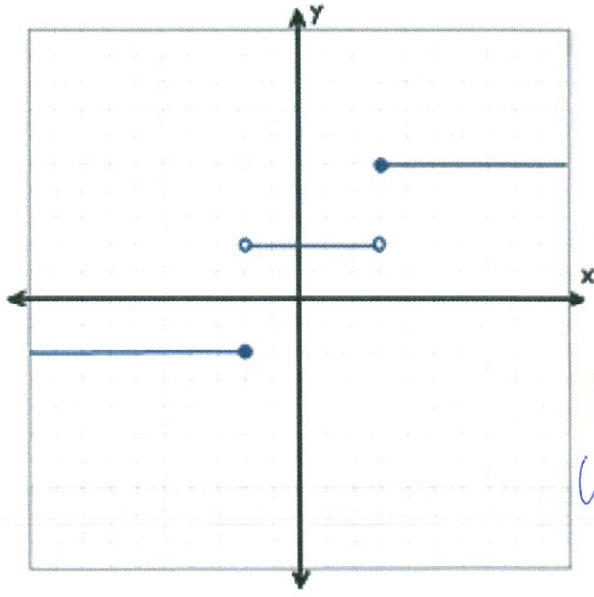
No, fails vertical line test.



No, fails vertical line test



Yes, passes vertical line test.



Yes, passes vertical line test.