

# Math 1111 Sample Test 2 Solutions

---

$$1) P_1 = \begin{matrix} x_1 & y_1 \\ (4, -4) \end{matrix}$$

$$P_2 = \begin{matrix} x_2 & y_2 \\ (5, 3) \end{matrix}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(5 - 4)^2 + (3 - (-4))^2}$$

$$= \sqrt{1^2 + (7)^2}$$

$$= \sqrt{1 + 49} = \sqrt{50} = \sqrt{25 \cdot 2}$$

$$= \boxed{5\sqrt{2}}$$

---

$$2) P_1 = \begin{matrix} x_1 & y_1 \\ (-4, 2) \end{matrix}$$

$$P_2 = \begin{matrix} x_2 & y_2 \\ (5, 0) \end{matrix}$$

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$= \left( \frac{5 + (-4)}{2}, \frac{0 + 2}{2} \right)$$

$$= \boxed{\left( \frac{1}{2}, 1 \right)}$$

---

$$3) y^2 = x^2 + 100$$

on the graph?

$$(0, 10) \quad \text{yes}$$

$$10^2 = 0^2 + 100$$

$$100 = 100 \checkmark$$

$$(10, 0) \quad \text{no}$$

$$0^2 = 10^2 + 100$$

$$0 \neq 200$$

$$(-10, 0) \quad \text{no}$$

$$0^2 = (-10)^2 + 100$$

$$0 \neq 200$$

4)  $y = -5x^2 + 5$

X int (y=0)

$$0 = -5x^2 + 5$$

$$5x^2 = 5$$

$$x^2 = 1$$

$$x = \pm 1$$

$(1, 0)$   
 $(-1, 0)$

Y int (x=0)

$$y = -5(0)^2 + 5$$

$$y = 5$$

$(0, 5)$

graph

choice **(D)**

5)  $x^2 + y - 25 = 0$

X int (y=0)

$$x^2 + 0 - 25 = 0$$

$$x^2 = 25$$

$$x = \pm 5$$

$(5, 0)$   $(-5, 0)$

Y int (x=0)

$$0^2 + y - 25 = 0$$

$$y = 25$$

$(0, 25)$

X axis symmetry?

$(y \rightarrow -y)$

$$x^2 + y - 25 = 0 \quad \text{orig}$$

$$x^2 + (-y) - 25 = 0$$

$$x^2 - y - 25 = 0 \quad \text{new}$$

orig  $\neq$  new **(NO)**

Y axis symmetry?

$(x \rightarrow -x)$

**(yes)**

$$x^2 + y - 25 = 0 \quad \text{orig}$$

$$(-x)^2 + y - 25 = 0 \quad \text{orig} = \text{new}$$

$$x^2 + y - 25 = 0 \quad \text{new}$$

origin symmetry?

$(x \rightarrow -x) \wedge (y \rightarrow -y)$

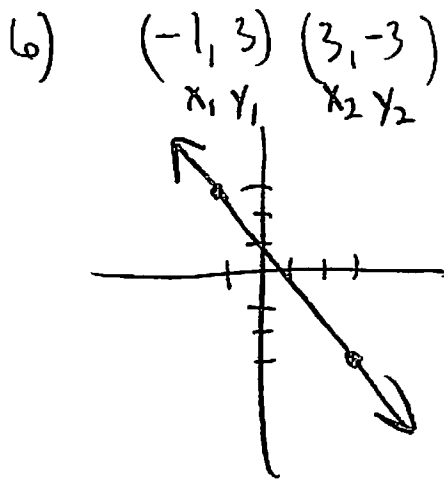
orig  $\neq$  new

$$x^2 + y - 25 = 0 \quad \text{orig}$$

$$(-x)^2 + (-y) - 25 = 0$$

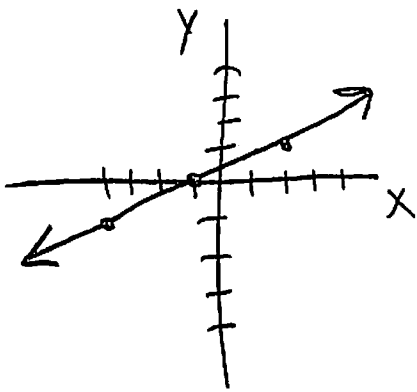
$$x^2 - y - 25 = 0 \quad \text{new}$$

**(NO)**



$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 3}{3 - (-1)} = \frac{-6}{4} = \frac{-3}{2}$$

7)  $(-4, -1)$   $m = \frac{1}{3}$   $\frac{\text{rise}}{\text{run}}$



8)  $(-3, -3)$  P  
 $(-1, -2)$  Q  
 $x_1, y_1$   $x_2, y_2$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - (-3)}{-1 - (-3)} = \frac{1}{2}$$

$$y - y_1 = m(x - x_1)$$

$$y - (-3) = \frac{1}{2}(x - (-3))$$

$$y + 3 = \frac{1}{2}(x + 3)$$

$$y + 3 = \frac{1}{2}x + \frac{3}{2}$$

$$\frac{3}{2} - \frac{3}{2} = \frac{1}{2}$$

$$\frac{3-6}{2} = \frac{-3}{2}$$

$$y = \frac{1}{2}x - \frac{3}{2}$$

9)  $m = -2$   $y\text{-int} = 4$

$$y = mx + b$$

$$y = -2x + 4$$

10)  $m = \text{undefined}$

so vertical line

then equation is  $x = \#$

$(3, -1)$  answer  $x = 3$

11) parallel  $5x - y = -10 \Rightarrow -y = -5x - 10$

point  $(0, 0)$

$$y = 5x + 10 \quad m = 5$$

remember parallel lines have same slope!

$$y - y_1 = m(x - x_1)$$

$$y - 0 = 5(x - 0)$$

$$y = 5x$$

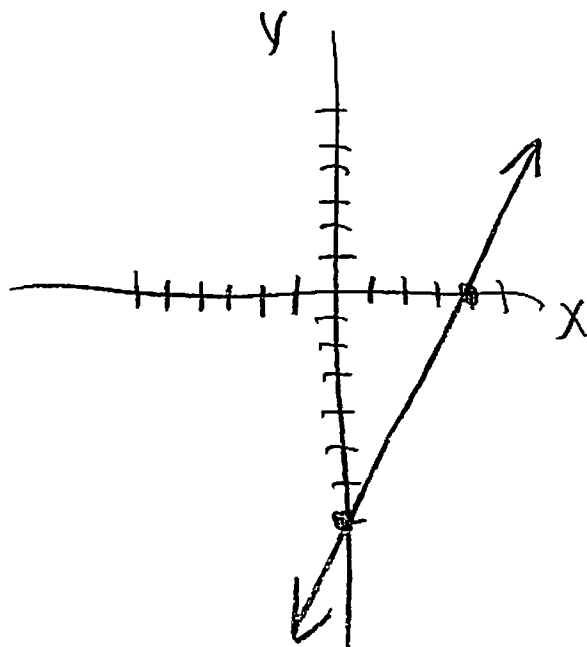
$$12) 7x - 4y = 28$$

solve for  $y$ !

$$\frac{-4y}{-4} = \frac{-7x + 28}{-4} \frac{-4}{-4}$$

$$y = \frac{7}{4}x - 7$$

$$m = \frac{7}{4} \quad y\text{-int } (0, -7)$$



$$13) f(x) = \frac{4x+7}{5x-7}$$

$$a) f(-4) = \frac{4(-4)+7}{5(-4)-7} = \frac{-16+7}{-20-7} = \frac{-9}{-27} = \frac{9}{27} = \left(\frac{1}{3}\right)$$

$$b) f(-x) = \frac{4(-x)+7}{5(-x)-7} = \frac{-4x+7}{-5x-7}$$

$$c) -f(x) = -\left(\frac{4x+7}{5x-7}\right)$$

$$d) f(x+h) = \frac{4(x+h)+7}{5(x+h)-7} = \frac{4x+4h+7}{5x+5h-7}$$

14) find the domain

$$g(x) = \frac{7x}{x^2 - 36}$$

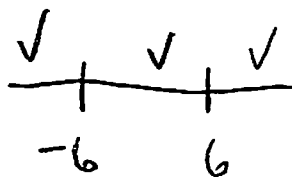
for a fractional function  
the denominator  $\neq 0$ !

so  $x^2 - 36 \neq 0$ ?

$$x^2 \neq 36$$

$$x \neq \pm 6$$

$$(-\infty, -6) \cup (-6, 6) \cup (6, \infty)$$



15)  $f(x) = x - 8$        $g(x) = 3x^2$

a)  $(f+g)(1) = f(1) + g(1)$   
 $= ((1) - 8) + (3(1)^2)$   
 $= -7 + 3 = -4$

$$(f+g)(x) = f(x) + g(x)$$
$$= (x-8) + (3x^2)$$
$$= 3x^2 + x - 8$$

$$\text{domain } (-\infty, \infty)$$

b)  $(f \cdot g)(x) = f(x) \cdot g(x)$

$$= (x-8)(3x^2)$$

$$= 3x^3 - 24x^2$$

$$\text{domain } (-\infty, \infty)$$

$$(f \cdot g)(5) = f(5) \cdot g(5)$$

$$= (5-8)(3(5)^2)$$

$$= (-3)(75) = -225$$

16) VLT yes is a function!

a)  $D = (-\infty, 0)$

$R = (-\infty, \infty)$

b)  $x$  int ( $y=0$ )     $y$  int ( $x=0$ )

$(-1, 0)$

none

c) not symmetrical  
to  $x$  axis,  $y$  axis  
or origin  
(look at graph)

17)  $f(x) = 3x^2 - x - 2$

a)  $(2, 8)$  on graph?

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

$8 = 3(2)^2 - 2 - 2$  ?

$8 = 12 - 2 - 2$

$8 = 10 - 2$

$8 = 8 \checkmark$

yes

b)  $x = -1$

$f(x) = 3(-1)^2 - (-1) - 2$

$= 3 + 1 - 2$

$= 2$

$(-1, 2)$

c)  $f(x) = -2$

$x = ?$

$-2 = 3x^2 - x - 2$

$0 = 3x^2 - x$

$x(3x - 1) = 0$

$x = 0$

$x = \frac{1}{3}$

points  
 $(0, -2)$   
 $(\frac{1}{3}, -2)$

d)  $D = (-\infty, \infty)$  quadratic  
all real #s function

e)  $x$  int  $y=0$

$3x^2 - x - 2 = 0$

$(3x - 2)(x + 1) = 0$

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

$x = -1$

f)  $y$  int ( $x=0$ )

$f(0) = 3(0)^2 - 0 - 2$

$y = -2$

$(0, -2)$

18) Inc  $(-7, 7)$

up to right ↗

19) local max @  $x=4$

yes

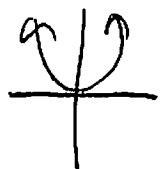
16

20) horizontal line

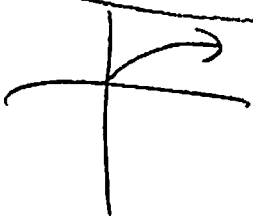
constant function

$y$  at a fixed (constant) value!

21) square function

$y = x^2$   basic

22) Square root function

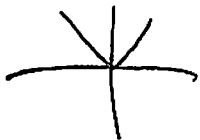
 basic

23)  $f(x) = 3x^3$

x	y
0	0
1	3
-1	-3

choice (B)

24) basic graph  $f(x) = |x|$



shift left 3

reflect x-axis

$y = -|x+3|$

25)  $y = |x|$  left 8 units


$y = |x+8|$

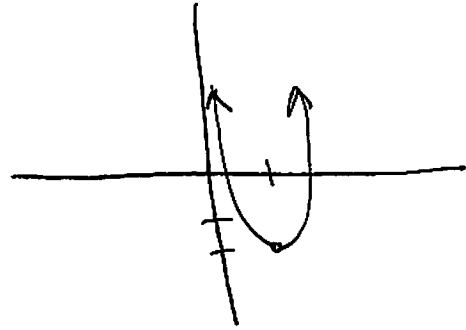
26)  $y = \sqrt{x}$

$y = -\sqrt{x+7} + 6$

---

27  $f(x) = 4(x-1)^2 - 2$

basic graph  $y = x^2$   




shift right 1, down 2 & narrow (because of 4 outfront)

choice D