Math 1120F - Fall 2014
Worksheet 11 - §2.1, 2.2

Name(s): KEY

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Work with partners in groups of 2-4. **This is required.**

1. Find the distance between the following points. Also find their midpoint.

(a) $(3,-4)$ and $(5,4)$

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

$= \sqrt{4+64} = \boxed{2\sqrt{17}}$

$M = \left(\frac{3+5}{2}, \frac{-4+4}{2}\right)$

$M = \boxed{(4,0)}$

(b) $(2,-3)$ and $(4,2)$

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

$= \sqrt{4+25} = \boxed{\sqrt{29}}$

$M = \left(\frac{2+4}{2}, \frac{-3+2}{2}\right)$

$M = \boxed{\left(3, -\frac{1}{2}\right)}$

(c) (a,b) and $(0,0)$

$d = \sqrt{(a-0)^2+(b-0)^2}$

$= \boxed{\sqrt{a^2+b^2}}$

$M = \left(\frac{a+0}{2}, \frac{b+0}{2}\right)$

$M = \boxed{\left(\frac{a}{2}, \frac{b}{2}\right)}$

2. Determine which of the given points are on the graph of the equation.

(a) Equation: $y^3 = x+1$
Points: (1,2); (0,1); (-1,0)

$(1,2)$: $2^3 \stackrel{?}{=} 1+1$

$8 \neq 2$

$(0,1)$: $1^3 \stackrel{?}{=} 0+1$

$1 = 1$ ✓

$(-1,0)$: $0 \stackrel{?}{=} -1+1$

$0 = 1$ ✓

$\therefore$ $(0,1)$ and $(-1,0)$ are on the graph of $y^3 = x+1$

(b) Equation: $y^2 = x^2+9$
Points: (0,3); (3,0); (-3,0)

$(0,3)$: $(3)^2 \stackrel{?}{=} 0+9$

$9 = 9$ ✓

$(3,0)$: $0^2 \stackrel{?}{=} 3^2+9$

$0 \neq 18$

$(-3,0)$: $0^2 \stackrel{?}{=} (-3)^2+9$

$0 \neq 18$

$\therefore$ $(0,3)$ is on the graph of $y^2 = x^2+9$

3. Find the intercepts of the following functions.

(a) $y = -x^2 + 4$

x-int:

$0 = -x^2 + 4$

$x^2 = 4$, $x = \pm 2$

y-int:

$y = 0 + 4$

$y = 4$

∴ the intercepts are $(2,0), (-2,0), (0,4)$

(b) $2x + 37 = 6$

$2x = -31$

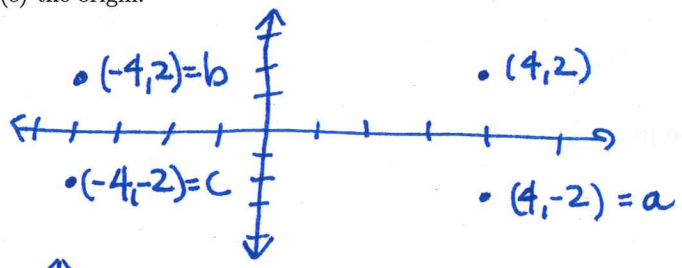
$x = -\frac{31}{2}$

This is a vertical line!

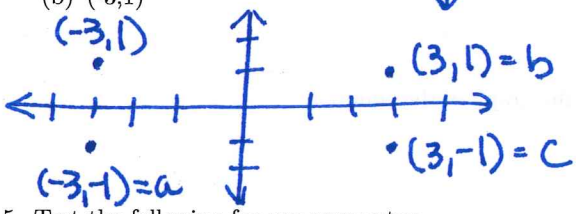
∴ the intercepts are $(-\frac{31}{2}, 0)$

4. Plot the following point. Then plot the point that is symmetric to it with respect to (a) the x-axis; (b) the y-axis; (c) the origin.

(a) (4,2)



(b) (-3,1)



5. Test the following for any symmetry.

(a) $y^2 = x + 9$

x-axis: $(-y)^2 = x + 9$

$y^2 = x + 9$ ✓

y-axis: $y^2 = -x + 9$ ✗

origin: $(-y)^2 = -x + 9$

$y^2 = -x + 9$ ✗

∴ it is symm wrt x-axis

(b) $y = x^3 - 27$

x-axis: $(-y) = x^3 - 27$

$-y = x^3 - 27$ ✗

y-axis: $y = (-x)^3 - 27 = -x^3 - 27$ ✗

origin: $(-y) = (-x)^3 - 27$

$-y = -x^3 - 27$

$y = x^3 + 27$ ✗

∴ it has no symmetry

(c) $4y^2 + x^2 = 4$

x-axis: $4(-y)^2 + x^2 = 4$

$4y^2 + x^2 = 4$ ✓

y-axis: $4y^2 + (-x)^2 = 4$

$4y^2 + x^2 = 4$ ✓

origin: $4(-y)^2 + (-x)^2 = 4$

$4y^2 + x^2 = 4$ ✓

∴ it has symm wrt x-axis, y-axis, and the origin