Math 132
Test I
Oct. 12, 1973

Name KEY

Show work for full credit!

(25) 1. Solve the following. Express solution sets as intervals where possible.

a. $3x - 7 < 5$

$3x < 12$

$x < 4$

$(-\infty, 4)$

b. $|x-2| \leq 3$

$-3 \leq x-2 \leq 3$

$-1 \leq x \leq 5$

$[-1, 5]$

5 pts c. $|2x| > 3$

$2x > 3$ or $2x < -3$

$x > \frac{3}{2}$ or $x < -\frac{3}{2}$ $\quad (-\infty, -\frac{3}{2}) \cup (\frac{3}{2}, \infty)$

d. $-2x - 1 \geq 3$

$-2x \geq 4$

$x \leq -2$

$(-\infty, -2]$

e. $-3 < 2x - 7 \leq 2$

$4 < 2x \leq 9$

$2 < x \leq \frac{9}{2}$ $\quad (2, \frac{9}{2}]$

(15) 2. Find the midpoint and the length of the line joining the following pairs of points.

a. $(-1,2)$ and $(1,10)$

$\left(\frac{-1+1}{2}, \frac{2+10}{2}\right)$

$(0, 6)$

$d = \sqrt{(1-(-1))^2 + (10-2)^2}$

$= \sqrt{2^2 + 8^2} = \sqrt{4+64} = \sqrt{68} = 2\sqrt{17}$

b. $(-2,3)$ and $(5,-2)$

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

$\left(\frac{3}{2}, \frac{1}{2}\right)$

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

$= \sqrt{7^2 + 5^2} = \sqrt{49+25} = \sqrt{74}$

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3. Find the equation of each of the following:

a. Straight line through (1,2) and (2,5).

$$m = \frac{5-2}{2-1} = \frac{3}{1} = 3$$

$$\frac{y-2}{x-1} = 3 \qquad \text{or} \qquad \frac{y-5}{x-2} = 3$$

$$y-2 = 3(x-1) = 3x-3 \qquad y-5 = 3(x-2) = 3x-6$$

$$y = 3x-1 \qquad y = 3x-1$$

b. Straight line parallel to $y = 3x - 5$ which goes through (2,7).

$$m = 3$$

$$\frac{y-7}{x-2} = 3$$

$$y-7 = 3(x-2) = 3x-6$$

$$y = 3x+1$$

c. Circle with radius 5 and center (7,-2).

$$(x-7)^2+(y+2)^2 = 25$$

d. Vertical line through (5,-2).

$$x = 5$$

e. Parabola with vertex (1,1) and focus (3,1).

$$p = 2$$

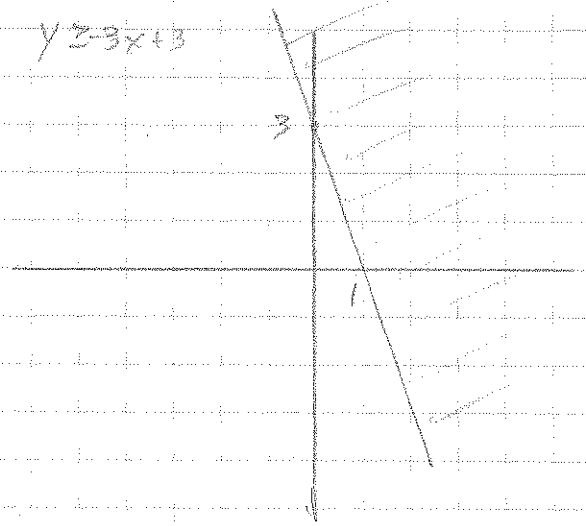
$$(y-k)^2 = 4p(x-h)$$

$$(y-1)^2 = 8(x-1)$$

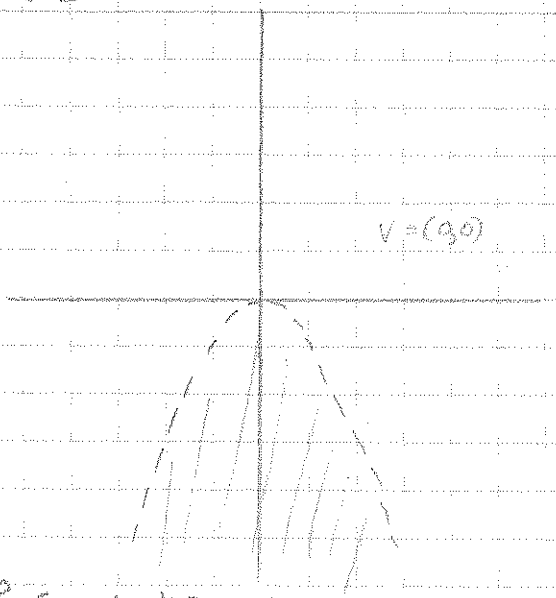
4. Graph each of the following in the ops as indicated. Give coordinates and label centers, vertices, intercepts, radii. Show work on next page, with problem number for each.

a. $3x + y \geq 3$

$y \geq -3x + 3$



b. $y < -x^2$



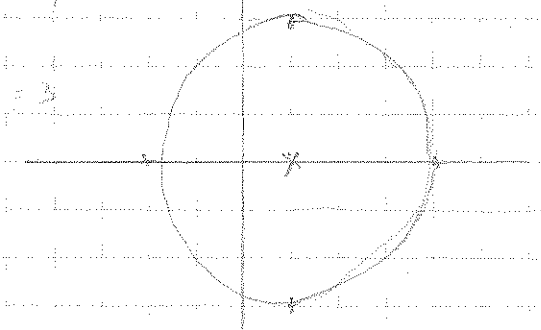
c. $x^2 + y^2 - 2x - 8 = 0$

$x^2 - 2x + 1 + y^2 = 8 + 1$

$(x-1)^2 + y^2 = 9$

circle

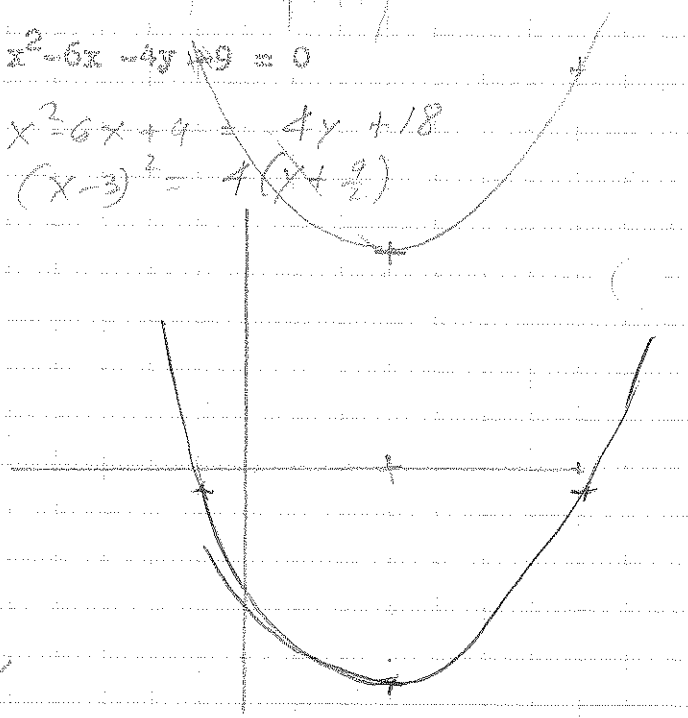
$(1, 0)$ r = 3



d. $x^2 - 6x - 4y + 9 = 0$

$x^2 - 6x + 9 = 4y + 18$

$(x-3)^2 = 4(y + \frac{9}{2})$



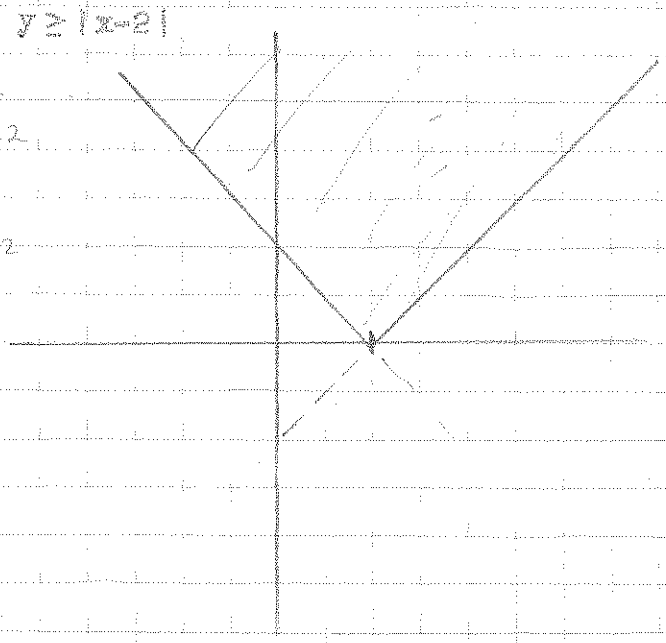
e. $y \geq |x-2|$

$x \geq 2$

$y \geq x - 2$

$x \leq 2$

$y \geq -x + 2$



a. $3x + y \geq 3$

b. $y < -x^2$

c. $x^2+y^2-2x-8 = 0$

d. $x^2-6x-4y+9 = 0$

e. $y \geq |x-2|$