

P-30 Sketch each pair of functions, find any intersection points and shade in the region between them (if such a region exists).

1. $y = -2x + 3$ and $y = x^2$

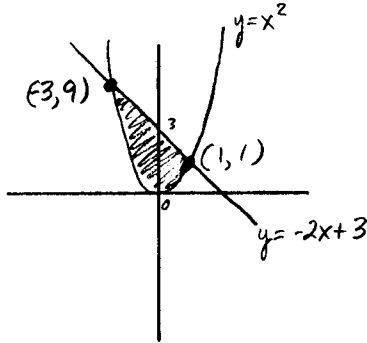
$$-2x + 3 = x^2$$

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

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

$$x = -3 \text{ a } x = 1$$

$$y = 9 \quad y = 1$$



4. $y = 2$ and $y = 2x^2 - 4x + 4 = 2(x-1)^2 + 2$

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

$$0 = 2x^2 - 4x + 2$$

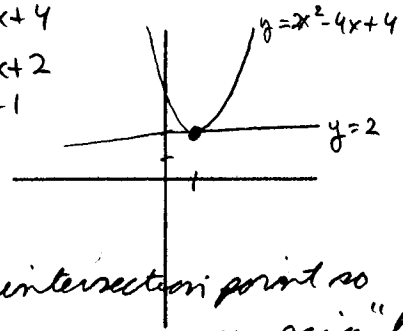
$$0 = x^2 - 2x + 1$$

$$0 = (x-1)^2$$

$$x = 1$$

$$y = 2$$

only one intersection point so
no region "between"



2. $y = -x$ and $y = x^2 + 4x + 4 = (x+2)^2$

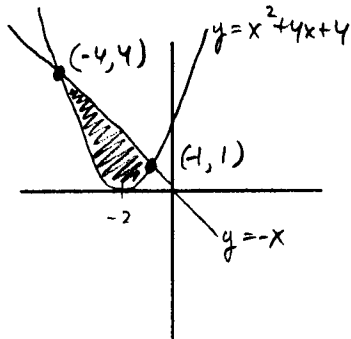
$$-x = x^2 + 4x + 4$$

$$0 = x^2 + 5x + 4$$

$$0 = (x+4)(x+1)$$

$$x = -4 \text{ a } x = -1$$

$$y = 4 \quad y = 1$$



5. $y = 2x + 9$ and $y = -x^2 - 8x - 7 = -(x+7)(x+1)$

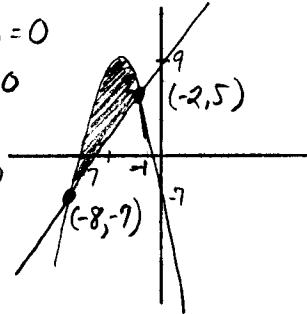
$$2x + 9 = -x^2 - 8x - 7$$

$$x^2 + 10x + 16 = 0$$

$$(x+8)(x+2) = 0$$

$$x = -2 \text{ a } x = -8$$

$$y = 5 \quad y = -7$$



3. $y = x^2 + 1$ and $y = -x^2 + 51$

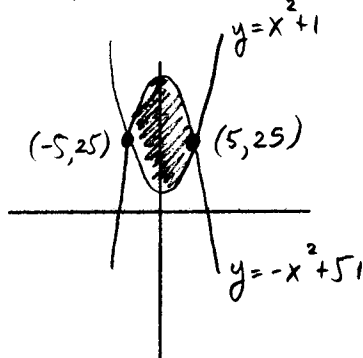
$$x^2 + 1 = -x^2 + 51$$

$$2x^2 = 50$$

$$x^2 = 25$$

$$x = -5 \text{ a } x = 5$$

$$y = 25 \quad y = 25$$



6. $y = -6x + 6$ and $y = 3x^2 - 12x + 9 = 3(x-3)(x-1)$

$$-6x + 6 = 3x^2 - 12x + 9$$

$$0 = 3x^2 - 6x + 3$$

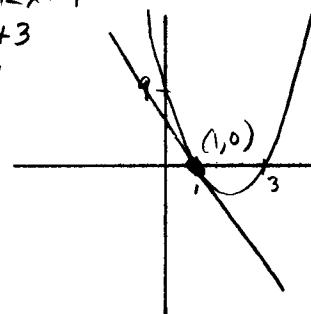
$$0 = x^2 - 2x + 1$$

$$0 = (x-1)^2$$

$$x - 1 = 0$$

$$x = 1$$

$$y = 0$$



only one intersection point so
no region "between"