4.) a.) Plot in calc

b.) $P(x) = -0.31x^2 + 295.86x - 20,042.52$ (use STAT → CALC → Quad Reg)

c.) graph $P(x) \geq 30{,}000$ Graph + state region where $P(x) \geq 30{,}000$

$220 \leq x \leq 735$ lbs

d.) $x = \frac{-b}{2a} = \frac{-295.86}{2(-.31)} = 477$ $y_1 = P(x)$, $y_2 = 30{,}000$

or find x-coord of max of $P(x)$

c.) $P(477) = \$50{,}549$ or y-coord of max of $P(x)$

1.) $x \leq 4x + 12$ → inequality is not strict ($\geq$ or $\leq$)

① $x^2 - 4x - 12 \leq 0$ rearrange so 0 on (R) side

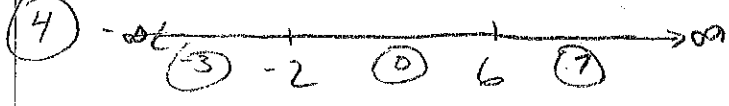
② $x^2 - 4x - 12 = 0$ Find zeros by solving the equ.

$(x-6)(x+2) = 0$

$x = 6, x = -2$

③ $(-\infty, -2)$; $(-2, 6)$; $(6, \infty)$ use #'s found in step 2 to separate real # line into intervals

④



$f(-3) = 9$	$f(0) = -12$	$f(7) = 9$
+	−	+

Choose #'s in each interval + evaluate f at each #

a.) If $f(x)$ is pos., then $f(x) > 0$ for all #'s x in the interval

b.) If $f(x)$ is neg. then $f(x) < 0$ for all #'s x in the interval

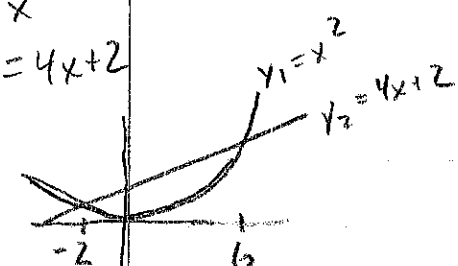
$[-2, 6]$ or $\{x \mid -2 \leq x \leq 6\}$ ← not strict

* If interval is not strict ($\geq$ or $\leq$), include solutions $f(x) = 0$ in the solution set, but be careful not to include values of x where the expression is undefined

graph

$y_1 = x^2$

$y_2 = 4x + 2$



* Graph + find points of intersection

* y_1 is below y_2 b/w -2 + 6, thus solution is $[-2, 6]$

2.) $x^4 > x$

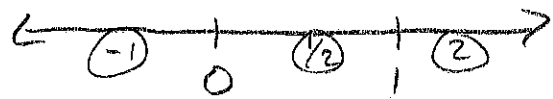
(1) $x^4 - x > 0$

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

$x = 0, \quad x = 1$

(3) $(-\infty, 0), (0, 1), (1, \infty)$

(4)



$f(-1) = 2$ | $f(1/2) = -\frac{7}{16}$ | $f(2) = 14$

$+$ | $-$ | $+$

$\{x \mid x < 0 \text{ or } x > 1\}$ OR $(-\infty, 0)$ or $(1, \infty)$

3.) $\frac{4x+5}{x+2} \geq 3$

(1) $\frac{4x+5}{x+2} - 3 \geq 0$

(2) mult 3 by $\frac{x+2}{x+2}$ to get common denom. So you can combine in numer.

$\frac{4x+5}{x+2} - 3\left(\frac{x+2}{x+2}\right) = 0$

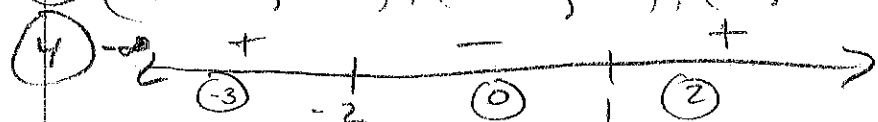
$\frac{4x+5 - 3x - 6}{x+2} = \frac{x-1}{x+2} = 0$

zero at $x = 1$

und at $x = -2$

(3) $(-\infty, -2), (-2, 1), (1, \infty)$

(4)



* we want to know where $f(x)$ is pos.

$(-\infty, -2)$ or $[1, \infty)$