Section P.5
Part 2

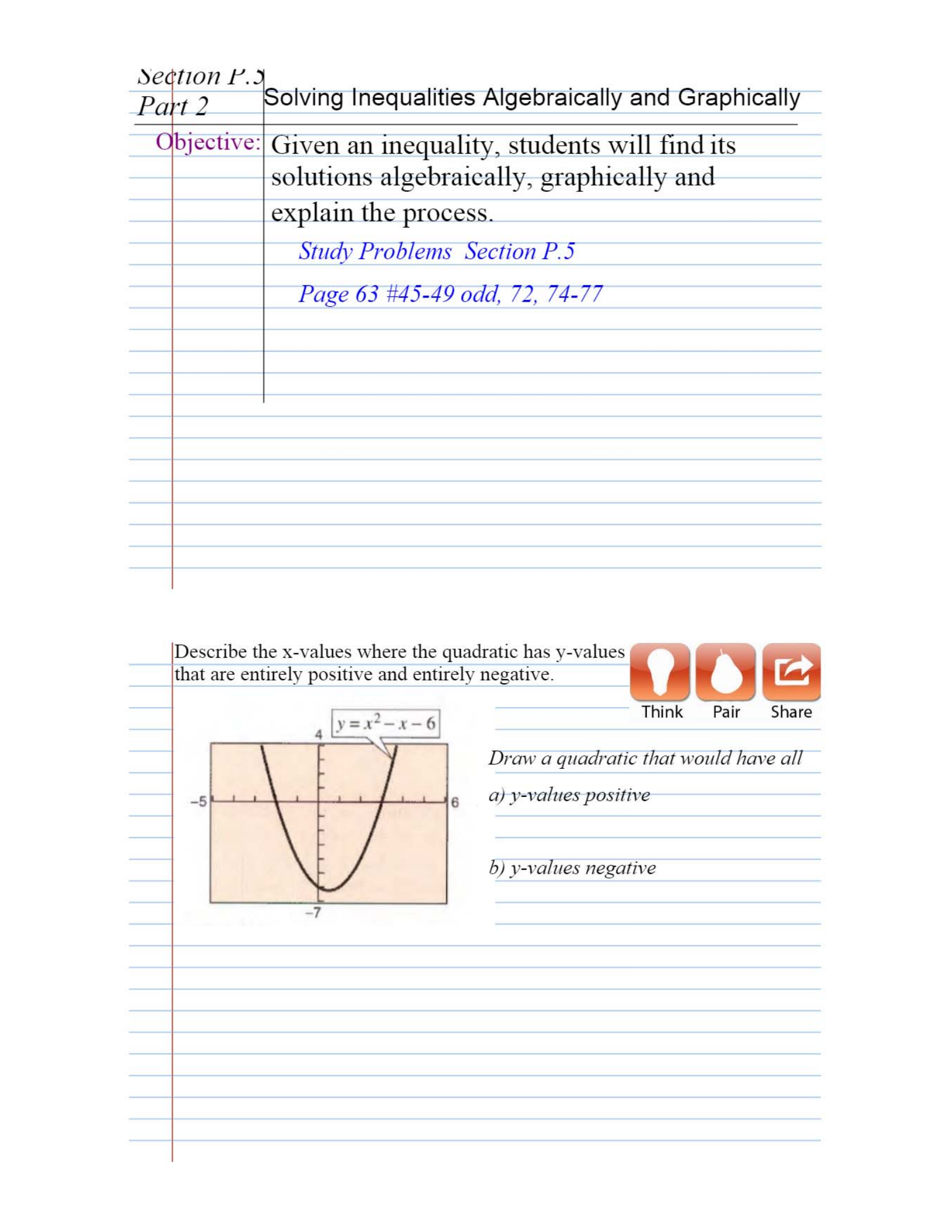
Solving Inequalities Algebraically and Graphically

Objective: Given an inequality, students will find its solutions algebraically, graphically and explain the process.

Study Problems Section P.5

Page 63 #45-49 odd, 72, 74-77

Describe the x-values where the quadratic has y-values that are entirely positive and entirely negative.

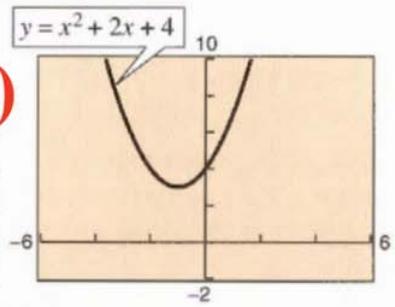


Draw a quadratic that would have all

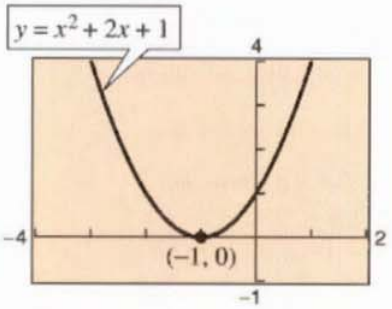
a) y-values positive

b) y-values negative

A)



B)



Explain *which quadratic has all*

a) y-values positive (a)

b) y-values positive but one (b)

Example 1

Find the solution set that makes the inequalities true.

$$x^2 - 3x - 4 > 0$$

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

$x > 4$, $x > -1$

Critical Point: $x = 4$, $x = -1$

TEST interval: $(-\infty, -1)$, $(-1, 4)$, $(4, \infty)$

$x = -3$: $(-3)^2 - 3(-3) - 4 = 14$ positive

$x = 2$: $(2)^2 - 3(2) - 4 = -6$ Negative

$x = 5$: $(5)^2 - 3(5) - 4 = 6$ positive

Solution Set: $(-\infty, -1) \cup (4, \infty)$

$x > 4$, $x > -1$

Are the solution of this inequality the same or different?

$$x^2 - 3x > 4$$

Example 2

Find the solution set that makes the inequalities true.

$2x^2+5x>12$

$2x^2+5x-12>0$

$(2x-3)(x+4)>0$

Critical values

$x=3/2$, $x=-4$

Test intervals: $(-\infty,-4)$, $(-4,3/2)$, $(3/2,\infty)$

$x=-5$: $2(-5)^2+5(-5)-12=13$ positive

$x=0$: $2(0)^2+5(0)-12=-12$ Negative

$x=2$: $2(2)^2+5(2)-12=6$ positive

Solution set $(-\infty,-4)\cup(3/2,\infty)$

$x>3/2$, $x>-4$

Example 3

Find the solution set that makes the inequalities true.

$x^3+7x^2+6x<0$

$x(x^2+7x+6)<0$

$x(x+6)(x+1)<0$

$x=0$, $x=-6$, $x=-1$

Test Int:

$(-\infty,-6)$, $(-6,-1)$, $(-1,0)$, $(0,\infty)$

$x=-7$ $(-7)^3+7(-7)^2+6(-7)=-42$

$x=-3$ $(-3)^3+7(-3)^2+6(-3)=42$ positive

$x=-.5$ $(-.5)^3+7(-.5)^2+6(-.5)=-1.38$ Nega

$x=1$ $(1)^3+7(1)^2+6(1)=14$ positive

Solution set

$(-6,-1)\cup(0,\infty)$

$x<0$, $x<-6$, $x<-1$