

Key

Algebra II Academic  
Study Guide - Sections 5.7 and 5.8  
Solving Quadratic Inequalities  
Quadratic Regression

Name \_\_\_\_\_  
Date \_\_\_\_\_ Period \_\_\_\_\_

ROUND TO THE THOUSANDTHS PLACE WHEN NECESSARY.

1. The median household income for all households in the United States for the years 1994-1998 is shown in the table.

Years Since 1993	1	2	3	4	5
Income (Dollars)	32,264	34,076	35,492	37,005	38,885

A. Using your calculator, find a quadratic model for the data.

$$y = 16.643x^2 + 1517.243x + 30809.6$$

B. According to the model, what was the median household income in 1993? ( $x=0$ )

$$y = \$30,809.6$$

2. The table below shows the average years of life left.

Age (Years)	Life Left (Years)
0	76.5
5	71.7
10	67.7
15	62.8
20	58.0
25	53.3
30	48.5
35	43.8
40	39.2
45	34.6
50	30.1
55	25.8
60	21.8
65	18.1
70	14.6
75	11.5
80	8.8
85	6.5

A. Using your calculator, find a quadratic model for the data.

$$y = .003x^2 - 1.071x + 77.672$$

B. Using your model, if someone is 42 years old, estimate the number of years they have left.  $x=42$

$$y = 37.222 \text{ years left}$$

C. Using your model, estimate how old someone is if they have 65 years left.  $y=65$

$$x = 12.192 \text{ years old}$$

Solve each of the following quadratic inequalities by factoring.

1.  $6x^2 + 29x - 42 \leq 0$

$$6x^2 + 29x - 42 = 0$$

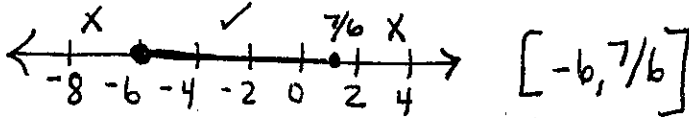
$$\begin{array}{l} P(-252) \mid S(29) \\ 36, -7 \mid \checkmark \end{array} \quad (6x^2 + 36x)(-7x - 42) = 0$$

$$6x(x+6) - 7(x+6) = 0$$

$$(6x-7)(x+6) = 0$$

$$6x-7=0 \mid x+6=0$$

$$x=7/6 \mid x=-6$$



2.  $4p^2 - 7p > -3$

$$4p^2 - 7p + 3 = 0$$

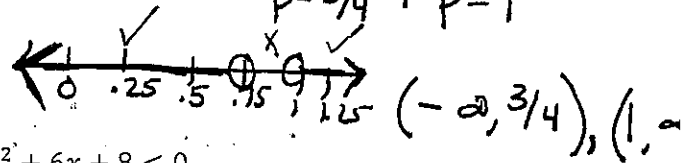
$$\begin{array}{l} P(12) \mid S(-7) \\ -4, -3 \mid \checkmark \end{array} \quad (4p^2 - 4p)(-3p + 3) = 0$$

$$4p(p-1) - 3(p-1) = 0$$

$$(4p-3)(p-1) = 0$$

$$4p-3=0 \mid p-1=0$$

$$p=3/4 \mid p=1$$



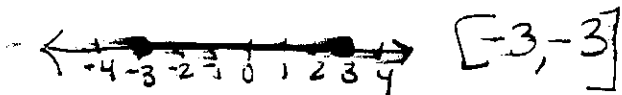
3.  $0 \geq x^2 - 9$

$$x^2 - 9 = 0$$

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

$$x+3=0 \mid x-3=0$$

$$x=-3 \mid x=3$$



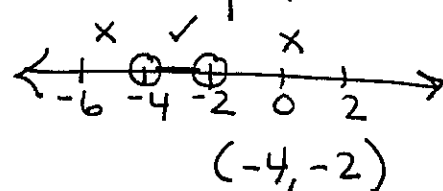
4.  $x^2 + 6x + 8 < 0$

$$x^2 + 6x + 8 = 0$$

$$(x+4)(x+2) = 0$$

$$x+4=0 \mid x+2=0$$

$$x=-4 \mid x=-2$$



Solve each of the following quadratic inequalities using Quadratic Formula.

5.  $2x^2 - 7x - 2 < 2$

$$2x^2 - 7x - 4 < 0 \quad a=2$$

$$2x^2 - 7x - 4 = 0 \quad b=-7$$

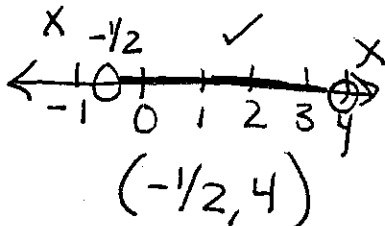
$$c=-4$$

$$x = \frac{7 \pm \sqrt{(-7)^2 - 4(2)(-4)}}{2(2)}$$

$$x = \frac{7 \pm \sqrt{81}}{4}$$

$$x = \frac{7+9}{4} = 4$$

$$x = \frac{7-9}{4} = -1/2$$



6.  $3x^2 + 5 \leq 53$

$$3x^2 - 48 \leq 0 \quad a=3$$

$$3x^2 - 48 = 0 \quad b=0$$

$$c=-48$$

$$x = \frac{0 \pm \sqrt{0^2 - 4(3)(-48)}}{2(3)}$$

$$x = \frac{0 \pm \sqrt{576}}{6}$$

$$x = \pm \frac{24}{6}$$

$$x = -4$$

$$x = 4$$

