Name _____ Date _____ Class _____

LESSON 5-7

Problem Solving

Solving Quadratic Inequalities

The manager at Travel Tours is planning a fall tour to Australia. He works out the details and finds that the profit P for x persons is $P(x) = -28x^2 + 1400x - 3496$. The owner of Travel Tours has decided that the tour will be canceled if the profit is less than $10,000.

1. a. Write an inequality that you could use to find the number of people needed to make the tour possible.

$-28x^2 + 1400x - 3496 >$ _____

b. Solve the related equation to find the critical values.

_____

Solution:

Profit must be greater than 10,000.

$-28x^2 + 1400x - 3496 \geq 10{,}000$

$-28x^2 + 1400x - 3496 = 10{,}000$

$-28x^2 + 1400x - 13496 = 0$

Use quadratic formula.

$x = 13.04, 36.96$

c. Test an x-value in each interval.

x-value	Evaluate	$P \geq 10{,}000$?
10	$-28(10)^2 + 1400(10) - 3496$	
30		
40		

d. How many people will Travel Tours need to make the tour possible?

_____

The manager plans a tour to the Fiji Islands and determines that the profit P for x persons is $P(x) = -40x^2 + 1920x - 3200$. Choose the letter for the best answer.

3. In order to make $10,000 profit, how many people will it take for this tour to happen?

A Between 9 and 39 people

B Between 14 and 36 people

C At least 22 people

4. The owner thinks the company should make at least $15,000 profit on the Fiji Islands tour. How many people will it take for the tour to happen?

A Between 9 and 39 people

B Between 13 and 35 people

C At least 22 people

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1. a. Write an inequality that you could use to find the number of people needed to make the tour possible.

$-28x^2 + 1400x - 3496 >$ 10,000

b. Solve the related equation to find the critical values.

$x = 13.04, 36.96$

Solution:

Profit must be greater than 10,000.

$-28x^2 + 1400x - 3496 \geq 10{,}000$

$-28x^2 + 1400x - 3496 = 10{,}000$

$-28x^2 + 1400x - 13496 = 0$

Use quadratic formula.

$x = 13.04, 36.96$

c. Test an x-value in each interval.

x-value	Evaluate	$P \geq 10{,}000$?
10	$-28(10)^2 + 1400(10) - 3496$	no
30	13,304	yes
40	7704	no

d. How many people will Travel Tours need to make the tour possible?

From 14 to 36 people

The manager plans a tour to the Fiji Islands and determines that the profit P for x persons is $P(x) = -40x^2 + 1920x - 3200$. Choose the letter for the best answer.

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