Name _____ Date _____ Class _____

**TEKS** 2A.8.D

LESSON 5-7

# Problem Solving

## *Solving Quadratic Inequalities*

**The manager at Travel Tours is proposing a fall tour to Australia and New Zealand. 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. _____

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

**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? _____

**2.** A year later, the owner of Travel Tours decides that the Australia/New Zealand tour will have to make a profit of at least $12,000 for the tour to be possible. What effect will this have on the range of people able to take this tour?

_____

**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

**D** At least 30 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

**D** At least 35 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.

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

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

$x = 13.04, 36.96$

**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

**2.** A year later, the owner of Travel Tours decides that the Australia/New Zealand tour will have to make a profit of at least $12,000 for the tour to be possible. What effect will this have on the range of people able to take this tour?

Possible answer: The range is narrower. There must be between 17 and 33 people to take the tour.

**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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