

TASK 2.5.1: JET SKI RENTAL**Solutions**

Maria and her family are vacationing at the lake for a week. They want to rent a jet ski. It will cost \$25.00 for a deposit plus \$45.00 per hour.

1. Make a table of values for the situation.

| Number of Hours | Process | Total Cost in Dollars |
|-----------------|----------------|-----------------------|
| 1 | $25 + (45)(1)$ | 70 |
| 2 | $25 + (45)(2)$ | 115 |
| 3 | $25 + (45)(3)$ | 160 |
| 4 | $25 + (45)(4)$ | 205 |
| 5 | $25 + (45)(5)$ | 250 |
| \vdots | \vdots | \vdots |
| h | $25 + (45)(h)$ | $25+45h$ |

2. Write a sentence in words and a function rule for the total cost (t) in dollars for renting the jet ski for h hours.

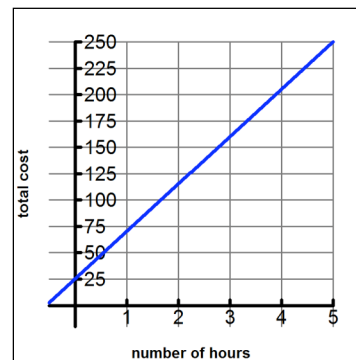
The total cost in dollars to rent a jet ski for h hours is a deposit of \$25.00 and \$45.00 for each hour the jet ski is rented.

$$t = 25 + (45)(h)$$

3. Create a scatter plot of the data. Now manually draw the graph of the linear function that models the data and/or using a graphing calculator. Label the axes appropriately. What is the slope of the line (including units)? What does the slope mean in this situation? What is the y -intercept of the line? What does the y -intercept mean in this situation?

$m = 45$ dollars per hour; this means that for every hour that I rent a jet ski, my cost increases by \$45

$b = 25$ dollars; this means that I incur a cost of \$25 at the beginning (time = 0) of my rental period



4. If the family has only \$250.00 to spend, how many hours can they rent the jet ski?

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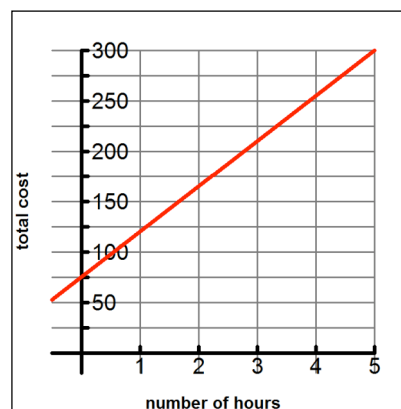
$$t = 25 + (45)(h); 250 = 25 + (45)(h); 225 = (45)(h); h = 9 \text{ hours}$$

5. Maria went to rent the jet ski and she is under 18. The deposit for someone under 18 is \$75.00. Predict how the line that models your data will change for the increased deposit. What did not change? After you have made your predictions, check yourself by graphing the function. What is the slope of the line including units? What does the slope mean in this situation? What is the y-intercept of the line? What does the y-intercept mean in this situation?

The line will move up 50 units vertically.
The slope of the line did not change.
The lines will be parallel.

$m = 45$ dollars per hour; this means that for every hour that I rent a jet ski, my cost increases by \$45

$b = 75$ dollars; this means that I incur a cost of \$75 at the beginning (time = 0) of my rental period

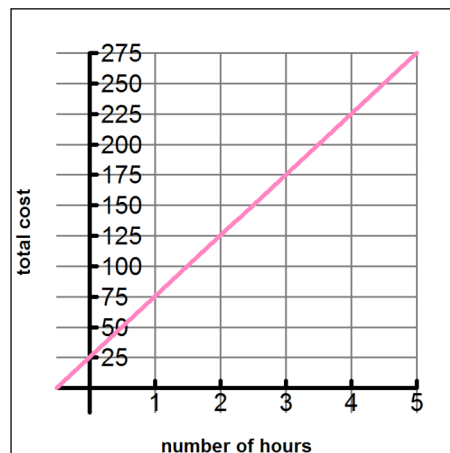


6. In the original problem, the company charged a \$25 deposit and an hourly rental rate of \$45. The company may decide to change the rental cost to \$50 per hour and keep the deposit at \$25.00. Predict how the graph of the line that models this situation will change from the original line. What will not change? After you have made your predictions, check yourself by graphing the function. What is the slope of the line including units? What does the slope mean in this situation? What is the y-intercept of the line? What does the y-intercept mean in this situation?

The slope of the line is greater.
The line is slightly steeper.
The y-intercept of the line remains (0, 25).

$m = \$50$ per hour; this means that for every hour that I rent a jet ski, my cost increases by \$50.

$b = \$25$; this means that I incur a cost of \$25 at the beginning (time = 0) of my rental period



7. Another proposed change from the company is to change the rental cost per hour to \$15.00 per hour while the deposit remains \$25.00. Predict how the graph of the line that models this situation will change from the original line. What will not change? After you

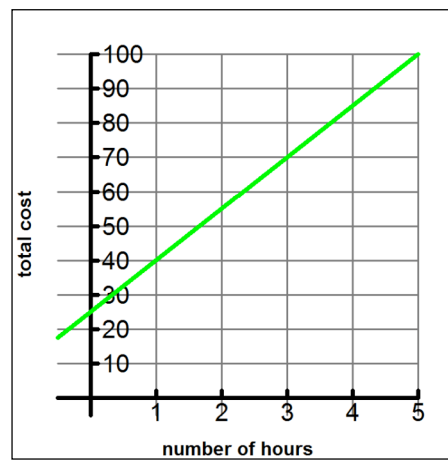
Algebra I: Strand 2. Linear Functions; Topic 5. Applications of Slope and Intercept; Task 2.5.1

have made your predictions, check yourself by graphing the function. What is the slope of the line including units? What does the slope mean in this situation? What is the y -intercept of the line? What does the y -intercept mean in this situation?

The slope of the line is less than the original slope where the rental cost is \$45.00 per hour. The h intercept does not change. The h -intercept is $(0, 25)$.

$m = \$15$ per hour; this means that for every hour that I rent a jet ski, my cost increases by \$15

$b = \$25$; this means that I incur a cost of \$25 at the beginning (time = 0) of my rental period



8. Looking back over the four problem situations, what situational changes resulted in a change in slope? How are these changes reflected in the table, graphs, and functions?

Change in the hourly rental rate changes the slope. In the function, this changes the m in the $y = mx + b$. In the table and on the graph, the rate of change is the slope. If the rental rate is increased, the line will be steeper and the table values will increase. If the rental rate is decreased, the line will be less steep and the table values will decrease.

9. Looking back over the 4 problem situations, what situational changes resulted in a change in y -intercept? How are these changes reflected in the table, graphs, and functions?

Change in the deposit required changes the y -intercept. In the function, this changes the b in the $y = mx + b$. In the table, the value associated with $h=0$ changes. On the graph, the intersection point of the line and the y -axis will either be higher if the deposit is increased, lower if the deposit is decreased.

10. Lakeland Marina rents jet skis for a \$50 initial fee and \$15.00 per hour. West Shore Marina rents jet skis for a \$25.00 initial fee and \$20.00 per hour. When is it a better choice to rent from West Shore? When is it a better deal to rent from Lakeland? Create a table of values for both marinas. Write a sentence and a function rule for each. Graph both functions that model the data on the same graph. Explain when each company is the better choice using the table, graph, and rule.

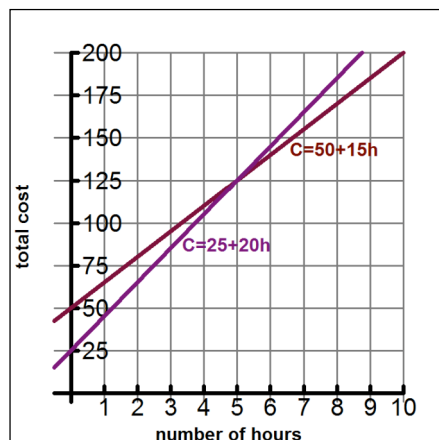
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Lakeland Marina

| Number of Hours | Process | Total Cost in Dollars |
|-----------------|----------------|-----------------------|
| 1 | $50 + (15)(1)$ | 65 |
| 2 | $50 + (15)(2)$ | 80 |
| 3 | $50 + (15)(3)$ | 95 |
| 4 | $50 + (15)(4)$ | 110 |
| 5 | $50 + (15)(5)$ | 125 |
| 6 | $50 + (15)(6)$ | 140 |
| 7 | $50 + (15)(7)$ | 155 |
| \vdots | \vdots | \vdots |
| h | $50 + (15)(h)$ | $50+15h$ |

West Shore Marina

| Number of Hours | Process | Total Cost in Dollars |
|-----------------|----------------|-----------------------|
| 1 | $25 + (20)(1)$ | 45 |
| 2 | $25 + (20)(2)$ | 65 |
| 3 | $25 + (20)(3)$ | 85 |
| 4 | $25 + (20)(4)$ | 105 |
| 5 | $25 + (20)(5)$ | 125 |
| 6 | $25 + (20)(6)$ | 145 |
| 7 | $25 + (20)(7)$ | 165 |
| \vdots | \vdots | \vdots |
| h | $25 + (20)(h)$ | $25+20h$ |



The total cost in dollars to rent a jet ski for h hours from Lakeland Marina is a deposit of \$50.00 and \$15.00 for each hour the jet ski is rented.

$$t_L = (15)h + 50$$

Algebra I: Strand 2. Linear Functions; Topic 5. Applications of Slope and Intercept; Task 2.5.1

The total cost in dollars to rent a jet ski for h hours from West Shores Marina is a deposit of \$25.00 and \$20.00 for each hour the jet ski is rented.

$$t_{ws} = 20h + 25$$

To determine the better deal from the two tables, compare the cost for the same number of hours. The cost to rent the jet ski for 5 hours is the same for both marinas. We can see that the cost is less for West Shore if we rent for less than 5 hours and more for more than 5 hours. Thus, if the jet ski is rented for less than 5 hours, then it is better to rent the jet ski from West Shore Marina. If the jet ski is rented for more than 5 hours, then the better deal is to rent it from Lakeland Marina. If the jet ski is rented for exactly 5 hours, the cost is equal so either marina would be a good choice.

To determine the better deal from the graph, determine the intersection of the graphs of the two functions. The two graphs intersect at the point (5,125). That is, the cost to rent a jet ski from both marinas is the same for 5 hours. We can see that the cost is less for Lakeland for 5 hours or less and more for 5 or more hours. Thus, if the jet ski is rented for less than 5 hours, then it is better to rent the jet ski from West Shore Marina. If the set ski is rented for more than 5 hours, then the better deal is to rent it from Lakeland Marina.

To determine the better deal using the function rules, write an equation for the two function rules; that is set the function rule for Lakeland Marina equal to the function rule for West Shore Marina.

$$(15)h + 50 = (20)h + 25$$

$$25 = (5)h$$

$$5 = h$$

For fewer than 5 hours, the more economical choice is to rent the jet ski from West Shore. If the jet ski is rented for more than five hours, then the better choice is to rent from Lakeland.

TASK 2.5.1: JET SKI RENTAL

Maria and her family are vacationing at the lake for a week. They want to rent a jet ski. It will cost \$25.00 for a deposit plus \$45.00 per hour.

1. Make a table of values for the situation.

| Number of Hours | Process | Total Cost in Dollars |
|-----------------|---------|-----------------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| ⋮ | ⋮ | ⋮ |
| h | | |

2. Write a sentence in words and a function rule for the total cost (t) in dollars for renting the jet ski for h hours.
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Algebra I: Strand 2. Linear Functions; Topic 5. Applications of Slope and Intercept; Task 2.5.1

change from the original line. What will not change? After you have made your predictions, check yourself by graphing the function. What is the slope of the line including units? What does the slope mean in this situation? What is the y -intercept of the line? What does the y -intercept mean in this situation?

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Algebra I: Strand 2. Linear Functions; Topic 5. Applications of Slope and Intercept; Task 2.5.1

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Lakeland Marina

| Number of Hours | Process | Total Cost in Dollars |
|------------------------|----------------|------------------------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
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| h | | |

West Shore Marina

| Number of Hours | Process | Total Cost in Dollars |
|------------------------|----------------|------------------------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
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