**Writing an equation of a line given two points.**

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**Investigation.**

A ski resort rents snowboards by the day. There is a flat insurance cost, plus a daily rental fee. *{\*Is it a partial or direct variation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\*}* Two friends, Juan and Curtis, have used the rental service before. They compare the costs.

Juan: ”For 3 days, the snowboard rentals cost me $85.”

Curtis: “I rented a board for a full week, and it cost me $165.”

Evan has $120. Can he go snowboarding for 5 days?



**➀** Identify the independent and dependent variables and label your axes on the grid.

**➁**

1. Plot the points (3, 85) and (7, 165) and explain what they mean.
2. Draw a line through these points. Extrapolate the line so that it crosses the vertical axis.

**➂**

1. Find the slope of this line and explain what it means.
2. Find the *C*-intercept and explain what it means.

**➃**

Write an equation of the line in form *C = md + b*, where *m* is the slope and *b* is the *C*-intercept.

**➄**

1. Use the graph to find the cost of renting a snowboard for 5 days.
2. Use your equation from step ➃ to find the cost of renting a snowboard for 5 days.
3. Are these answers the same? Explain.

**LEARNING GOAL**:

🗌 I can write an equation of a line given **two points**.

To write the equation of a line we ALWAYS need \_\_\_\_\_\_\_ pieces of information, the and the .

**Example A)** Find the equation of a line passing through these pair of points.

1. *Find the slope of the line using the two points and* $m=\frac{y\_{2}-y\_{1}}{x\_{2}-x\_{1}}$ *.*
2. *Use* ***one*** *of the points* $(x,y)$ *and* $m$ *, substitute into* $y=mx+b$ *to find the value of* $b.$
3. *State the final equation using m and b.*

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| 1. $\left(-2,6\right)$ $and$ $(4,-8)$
 | 1. $(4,-3)$ $and$ $(-4,-3)$
 | 1. $\left(5,3\right)$ $ and$ $\left(5,-9\right)$
 | 1. $(4,6) and (8,8)$
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**Example B)** The price of a cup of coffee depends on the size of the cup. The relation between the P of a cup of coffee and the size, s, of the cup is linear. The 8 ounce cup costs $2.10, but the larger 20-ounce cup costs $3.30.

* 1. Identify the independent and dependent variables.
	2. Represent the given information as two points on the graph.
	3. Write an equation for the line that passes through the two points.
	4. What is the price of a 10-ounce cup?

**Example C)** Malvern music band is coming home from a music trip. The bus driver is using cruise control and their speed is constant. After 3 h, they are 350 km from home. After 5 h, they are 130 km from home. After how many hours will they get home?