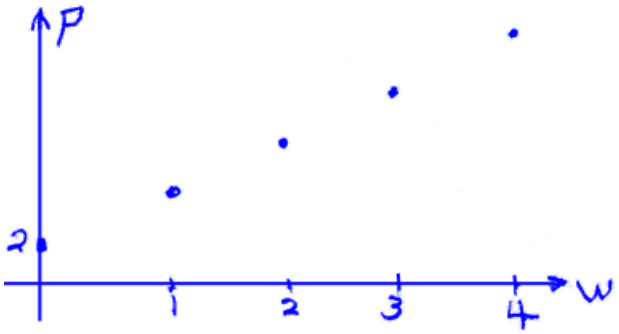
Unit 5: Lesson 06 — Graphical representations of functions
Independent and dependent variables

Example 1: For the function p(w) = 3w + 2, produce the *p* values (the range) when the domain is { 0, 1, 2, 3, 4 }. Plot the resulting points on a coordinate plane.

w	p(w) = 3w + 2
0	$p = 3(0) + 2 = 2$
1	$p = 3(1) + 2 = 5$
2	$p = 3(2) + 2 = 8$
3	$p = 3(3) + 2 = 11$
4	$p = 3(4) + 2 = 14$



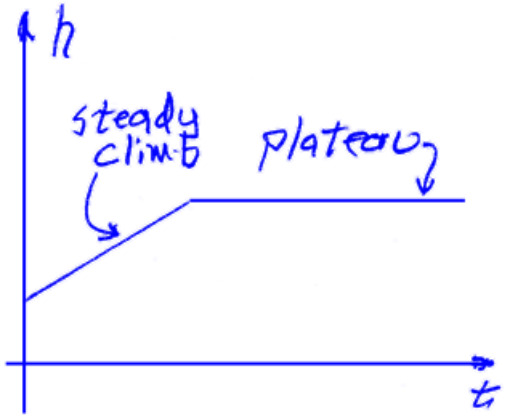
In reference to Example 1 above, fill in the following blanks.

The value of __*p*__ **depends** on the value of __*w*__.

The **dependent** variable_*p*_**depends** on the **independent** variable _*w*_

_*p*_ is a function of _*w*_ . The functional notation is __*p(w)*__.

Example 2: Consider a truck climbing steadily up a hill to a level plateau. Sketch and label the graph of the height of the truck as it climbs and then proceeds on level ground. Label and explain the meanings of the various parts of the graph.



Which is the dependent variable?

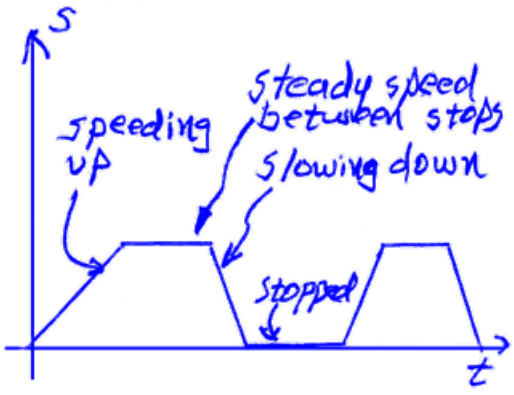
h... height

Which is the independent variable?

t... time

The _*height*_ is a function of _*time*_
and the functional notation is __*h(t)*__

Example 3: Sketch a graph of the speed of a car in stop and go traffic. Label and explain the meanings of the various parts of the graph.



Which is the dependent variable?

s … speed

Which is the independent variable?

t … time

The _*speed*_ is a function of _*time*_ and the functional notation is __*s(t)*__

Assignment:

1. Sketch the temperature of a cold object as it warms up after being dropped into a warm swimming pool. Label and explain the meanings of the various parts of the graph.

Which is the dependent variable?

Which is the independent variable?

The _____ is a function of _____
and the functional notation is _____

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2. A caveman notices that when a rock is dropped on his foot, the pain it causes is related to how high the rock was before being dropped. Make a sketch of the pain factor as it is related to the height of the rock. Label and explain the meanings of the various parts of the graph.

Which is the dependent variable?

Which is the independent variable?

The _____ is a function of _____
and the functional notation is _____

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3. In problem 2 above, does pain depend on height or does height depend on pain? Why?

4. Are the relations in problems 1 and 2 functions? Why?

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5. Using a graph, describe the income of a person from birth through the end of a retirement. Start with an allowance as a child, assume that low paying jobs are available in the younger years, and upon graduating from college, a higher paying job is taken with steady raises until retirement. At retirement, only the lower (but steady) retirement pay is available. Label and explain the meanings of the various parts of the graph.

Which is the dependent variable?

Which is the independent variable?

The _____ is a function of _____
and the functional notation is _____

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6. Consider the temperature of a cold house in winter. After sleeping in the cold house all night you get up in the morning, set the thermostat for heat, and wait a few hours for the house to heat up to a comfortable temperature that is maintained for the rest of the day. Sketch the graph of the temperature of the house throughout the cold night and until the end of the next day. Label and explain the meanings of the various parts of the graph.

Which is the dependent variable?

Which is the independent variable?

The _____ is a function of _____
and the functional notation is _____

7. A man jumps off a bridge with a bungee cord, hits the end of the cord, and then bobs up and down while slowly coming to a stop. Sketch a graph of the man's height in relation to the ground and the bridge as this all happens. Label and explain the meanings of the various parts of the graph.

Which is the dependent variable?

Which is the independent variable?

The _____ is a function of _____

and the functional notation is _____

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8. Billy Bob sucks in a big lung-full of air and begins blowing up his balloon. He breathes in again and continues blowing up the balloon, but at a reduced rate. All of a sudden a prankster pops his balloon. Sketch a graph of the volume of the balloon over the time span of these events. Label and explain the meanings of the various parts of the graph.

Which is the dependent variable?

Which is the independent variable?

The _____ is a function of _____
and the functional notation is _____

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9. Is the independent variable normally the horizontal or vertical axis when graphing a function?

10. "The grades on a test are generally related to the difficulty level of the questions on the test." From this statement, define two variables and label each as either dependent or independent. Write the functional notation relating these two variables.

11. "The quality of the party determines the number of nerds that will be present." From this statement, define two variables and label each as either dependent or independent. Write the functional notation relating these two variables.

12. Is the dependent variable normally associated with the x-axis or the y-axis?