Study Questions for Precalculus

Please answer the Study Questions on notebook paper and file in your Course Notebook.

Section 2.1 Identifying and Relating Quantities
1. Qualities or characteristics of an object or situation are called attributes. What are attributes that can be measured called?
2. State three questions to ask about a quantity.
3. When speaking about a quantity, we should specify what two things to describe the quantity? Give an example.
4. A letter used as a variable represents what?
5. What does a formula tell us?
6. How do we compute the change in a variable?
7. What does the symbol \( \Delta \) represent?
8. Name one quantity that is represented by absolute value.
9. How can we illustrate graphically how the values of two variables are related?
10. In Figure 2-10, what does the straight line segment tell us?

Section 2.2 Proportional Reasoning
1. Two varying quantities are proportional when their _____ is constant. This constant is called the ______.
2. Two varying quantities are proportional when one is always a constant ______ of the other.
3. What is a scale factor? How is it related to proportionality?
4. Suppose two variables are proportional. If we add 1 unit to the first variable, how much will be added to the second variable?
5. If two variables are proportional, then their ______ are also proportional.
In Example 7, there are three methods for solving the problem:
6. The first method multiplies by a scale factor. What is it?
7. The second method solves a proportion. What is the proportion?
8. The third method scales the change in each quantity. What is that scale factor?

Section 2.3 Constant Rate of Change, Section 2.4 Average Speed
1. If two variables \( x \) and \( y \) are related by a constant rate of change, what two quantities are proportional?
2. What is the constant of proportionality in the previous question?
3. Describe the graph of \( y \) versus \( x \) from question 1.
4. Example 12 considers the formula \( l = -2t + 16 \). What do the parameters \((-2 \text{ and } 16)\) tell you about the scenario described?
5. Explain the difference between constant speed and average speed.
6. How do we compute average speed over a particular journey?
7. How is the average speed represented in Figure 2-24?
8. On p. 35, what does the formula \( 60 - 3.2t \) represent?

(continue → )
Section 2.6 Solving Equations and Inequalities
1. In Figure 2.40 on p. 46, what does the point \( \left( \frac{80}{7}, 6 \right) \) tell you?
2. Why is it not possible for \( x = 0 \) to be a solution of the equation \( \frac{14x + 3}{x} = k \), where \( k \) is a constant?
3. Explain why the graph of \( y = (3-x)(x+2) \) has two \( x \)-intercepts.
4. Explain how to solve the equation \( 5 = 3x^2 - x - 2 \) graphically.
5. Can you suggest two other graphs you could use in Question 4 above?

Sections 3.1-3.3 Functions
1. What are the three parts of a function?
2. On a graph, where are the domain and range values represented?
3. In Example 2 of Section 3.1, why must \( x \) be less than 4.25 inches?
4. Is the graph in Figure 3-10 a parabola? Why or why not?
5. In Figure 3-11, what do the variables \( x \) and \( w \) represent? What does the intersection point of the two graphs tell us?

Note: The Map Problem mentioned in the first paragraph of Section 3.2 is from Example 6 on p. 18.
6. Explain the notation \( d(n) \) in the first paragraph of Section 3.2.
7. What does the conclusion \( V(3.7) = 14.652 \) mean in Example 5 on p. 62?
8. Name four different ways to represent functions.
9. State two advantages of representing a function by a graph.
10. State two drawbacks of representing a function by a graph.

Section 3.7 Difference Quotient
1. What does the notation \( [x_1, x_2] \) mean?
2. What does the slope of the line through \( (x_1, f(x_1)) \) and \( (x_2, f(x_2)) \) represent?
3. If \( y = f(x) \), represent \( \Delta y \) with function notation and subscripts.
4. Sketch a graph that illustrates \( f(x+h) - f(x) \).
5. What can you say about the difference quotient of a linear function?

Section 3.4 Arithmetic of Functions
1. In the first paragraph of Section 3.4, what does \( C(7.4) \) represent?
2. In Example 10, How do we evaluate \( g(2) - f(2) \)?
3. What does \( g(2) - f(2) \) represent graphically?
4. If \( h = f + g \), how could you compute \( h(2) \)?
5. Define three functions whose product gives the volume of the box in Example 12.
6. Define two functions whose product gives the volume of the box in Example 12.
7. If we define a new function \( h \) as the sum or difference of two functions \( f \) and \( g \), what is the domain of \( h \)?
8. In Example 13b, why does the graph of \( k(x) \) have a vertical asymptote at \( x = 4 \)?