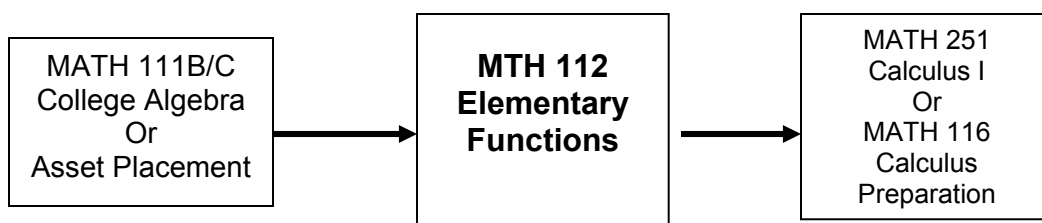


**Portland Community  
College**

**MATH 112**

**Elementary Functions**



**ARE YOU PREPARED?**

- ✓ This mini quiz is meant to serve only as an indicator of a few of the math skills that you are expected to know at the beginning of this course. Do not use these problems as a study guide thinking that they will adequately prepare you for the course.
- ✓ These example problems are merely representative of some of the most important concepts that are taught in the prerequisite courses.
- ✓ The course will offer little or no time for any type of review; it assumes that you are prepared to do the work the first day of class.

**Listed below are some of the major topics covered in MATH 112**

1. Right triangle trigonometry
2. Law of Sines and Law of Cosines and their applications
3. Solutions to trigonometric equations
4. Applications
  - A. Vectors
  - B. Parametric equations
  - C. Polar coordinates and graphs
  - D. Complex numbers

To be successful studying the topics covered in this course, students should be appropriately prepared by: #1 Taking the prerequisite math course within the last three years with a passing grade of A or B, or within the last one year with a passing grade of C, **or** #2 placing into the course by the ASSET placement test.

**Below is a sample of some skills you should have BEFORE entering MTH 112.  
You MAY use a calculator**

1. Find the inverse function for  $f(x) = 2^{3-x}$ .
2. If an initial sample of 50 mg of a radioactive substance decays to 40 mg in 235 years, find the half-life of the substance.
3. Solve  $\ln x + \ln(x-2) = 3$ .
4. On January 1, 1995, a park ranger estimates that there are 65 wolves in a wilderness area and that the wolf population is growing at an annual rate of 2.3%. When will there be 100 wolves in the area?
5. Draw a graph of a 5<sup>th</sup> degree polynomial with a negative leading coefficient, three single zeroes and a double zero.
6. Graph  $g(x) = \frac{4-x^2}{x^2-9}$  and label all asymptotes and intercepts.
7. Given  $h(x) = 2x^3 - 5x^2 - 14x + 8$ , a) find intervals where h is increasing and intervals where h is decreasing.  
Solve for  $x$  if  $h(x) = 10$ .

8. Solve for  $x$  given the similar triangles shown in Figure 1.

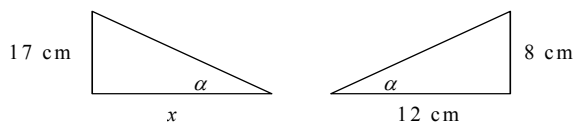


Figure 1: Triangles for #8

9. Given the function  $y = f(x)$  in Figure 2, graph the following transformations:
  - a)  $y = f(x) + 2$
  - b)  $y = f(x - 3)$
  - c)  $y = -2f(x)$

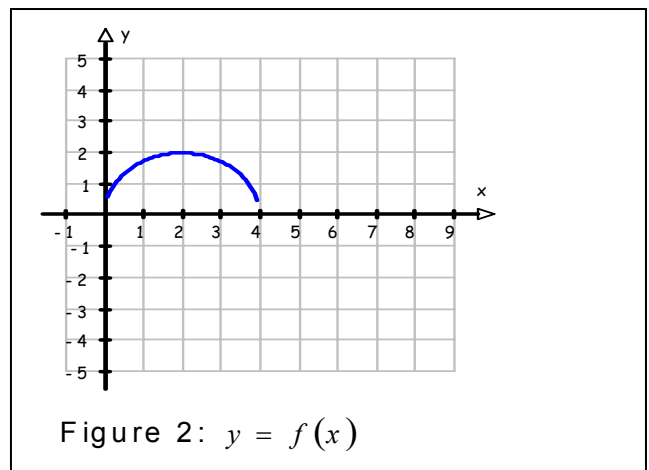


Figure 2:  $y = f(x)$

10. From a common location, Car A heads north at 55 mph at the same time as Car B heads east at 45 mph. Assuming the roads are straight, how far apart are the two cars after 20 minutes?

# ANSWERS

1.  $f^{-1}(x) = 3 - \log_2 x$

2. The half life is almost 730 years ( $\approx 729.977$ )

3.  $x \approx 5.592$

4. There will be 100 wolves in December of 2013.

5.

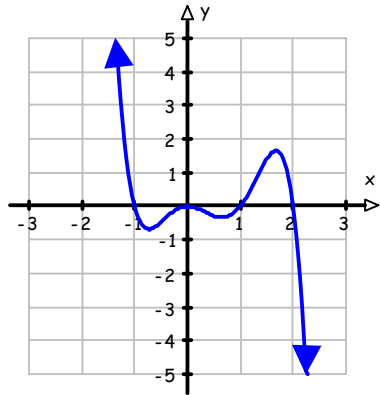


Figure 3: A Solution to #5

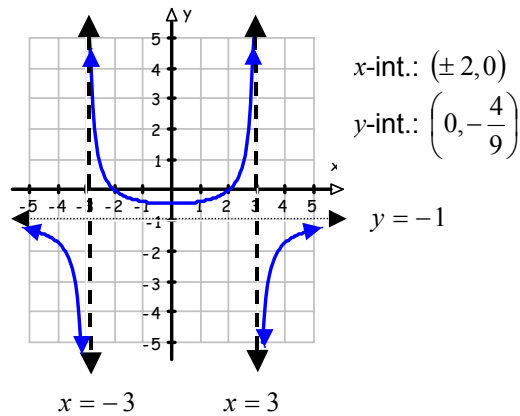


Figure 4:  $y = \frac{4 - x^2}{x^2 - 9}$

7. a)  $h$  is increasing on  $(-\infty, -0.907) \cup (2.573, \infty)$

$h$  is decreasing on  $(-0.907, 2.573)$

b)  $h(x) = 10$  when  $x \approx -1.565, -0.152, \text{ or } 4.216$

8.  $x = 25.5\text{cm}$

9.

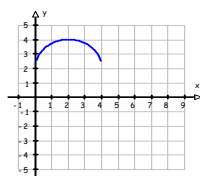


Figure 5:  $y = f(x) + 2$

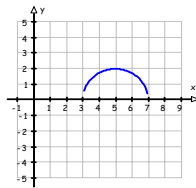


Figure 6:  $y = f(x - 3)$

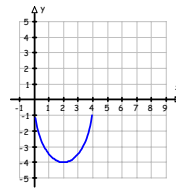


Figure 7:  $y = -2f(x)$

10. The cars are approximately 23.688 miles apart in 20 minutes.

How many of these problems can you miss and still succeed in MATH 112?

Ideally, NONE.

These problems are just a sample of the larger number of skills that you should be familiar with **BEFORE** taking this course.

If some of these ideas are not familiar to you, you should consider enrolling in the prerequisite course (MATH 111B or MATH 111C)