

**MTH 151**

**Quiz 1**

**Fall 2011**

Show all work in a neat and organized fashion. Clearly indicate your answers.  
20 points possible.

1. (5 pts.) On the attached page, the graph of a function  $f$  is given.

(a) For what values of  $x$  is  $f(x) = 2$ ?

(b) State the domain and range of  $f$ .

(c) On what interval is  $f$  increasing?

2. (5 pts.) A weight attached to a vertical spring is bouncing up and down. Its distance from the floor is given by a transformed sine or cosine graph. A stopwatch is started at time  $t = 0$  when the weight is at its high point, 70 cm above the floor. At a time 2.4 seconds later, the weight reaches its next low point, 30 cm above the floor. Find a function that models the distance from the floor to the weight as a function of time.

3. (5 pts.) Given  $F(x) = \sin^5(x^3)$ , find functions  $f$ ,  $g$ , and  $h$  such that  $F = f \circ g \circ h$ .

4. (5 pts.) A tank holds 500 gallons of water, which drains from the bottom of the tank in half an hour. The values in the table show the volume  $V(t)$  of water remaining in the tank (in gallons) after  $t$  minutes.

$t$ (min)	5	10	15	20	25	30
$V(t)$ (gal)	347	222	125	56	14	0

(a) Find the average rate at which the volume  $V$  changed from  $t = 5$  to  $t = 25$ . Include the units in your answer.

(b) Use the data in the table (without graphing) to estimate the rate at which the volume was changing at  $t = 8$ . Include the units in your answer.