Name _____

Student ID #_____   Section _____

HONOR STATEMENT

"I affirm that my work upholds the highest standards of honesty and academic integrity at the University of Washington, and that I have neither given nor received any unauthorized assistance on this exam."

SIGNATURE:_____

1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

- Please check that your exam contains 5 problems on 5 pages.

- Please turn your cell phone OFF and put it away for the duration of the exam.

- Unless otherwise indicated, you must show your work. The correct answer with no supporting work may result in no credit.

- If you use a guess-and-check method when an algebraic method is available, you may not receive full credit.

- Put your name on your sheet of notes and turn it in with the exam.
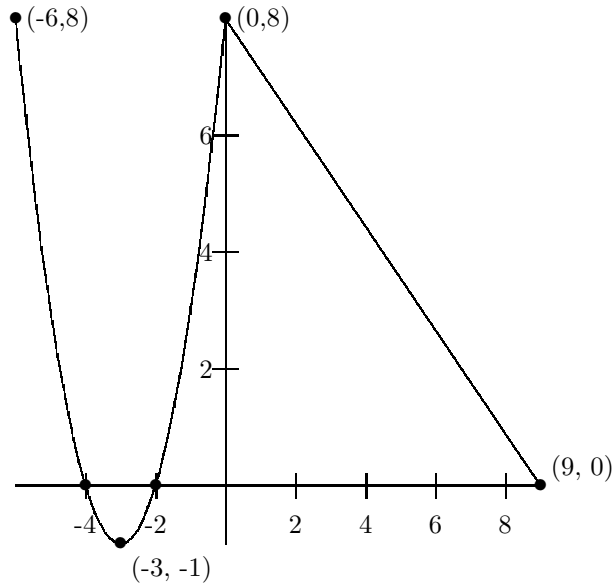
GOOD LUCK!

1. (10 points) Let $u(t)$ be the basic step function:

$$u(t) = \begin{cases} 0, & \text{if } t < 0 \\ 1, & \text{if } 0 \leq t \leq 1 \\ 0, & \text{if } t > 1 \end{cases}$$

Give the multi-part rule for the function $w(t) = u(t-5) + t^2 \cdot u(t+2)$.

2. (10 points) Below is the graph of a multi-part function $f(x)$, whose graph consists of part of a parabola and a line segment.


Sketch the graph of the function $g(x) = -\frac{1}{4}f(2x) + 3$. Put your final answer on its own set of axes and draw a big box around it. Label the coordinates of at least 4 points on your final graph of $g(x)$.

3. (10 points) Pam is on a piazza in Rome, studying a tall statue. The base of the statue is level with Pam's eyes. Pam measures the angle from horizontal to the top of the statue to be 49 degrees. After moving 7 feet closer to the statue, she measures again and finds the angle to be 55 degrees. How tall is the statue?

statue

49° 55°

7 feet
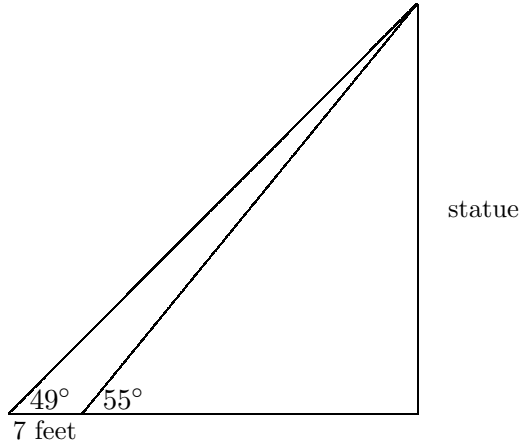
4. (10 points) Elena is practicing her pole vaulting. After training for 50 hours, she can clear a height of 3.85 meters. After training for 200 hours, she can clear a height of 4.7 meters. With unlimited training, she will approach (but never exceed) the world record of 5 meters. Find a **linear-to-linear** rational function $h(t)$ that models Elena's pole vaulting height after t hours of training.

5. (10 points) Pete runs 6 miles per hour in a counter-clockwise direction around a circular track with radius 200 feet, starting at the point P.
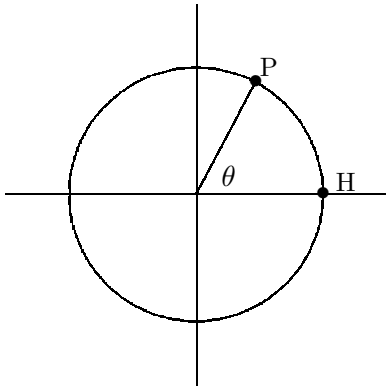
(a) After running for 2 minutes, Pete passes the point H for the first time. Find the angle θ in radians.

(b) After running for a total of one hour, Pete stops and walks in a straight line back to the point P (where he left his warm-up jacket). How far does he walk?