Math 1155, Fall 2009, Exam I

Name: **Section:**

Instructions: This is the first exam for Math 1155, Intensive Precalculus. You have 50 minutes to complete the test. Do not start until you are told to begin.

When you receive this booklet, count the pages to be sure that you have every page. There should be 8 pages, including this cover sheet. No notes or books are allowed on this exam. Scientific calculators are allowed, however, calculators with graphing capabilities may not be used. You should simplify all fractions and square roots when they appear in your answer. For decimal answers, round angles to at least 1 decimal place and other numbers to 3 significant figures.

I expect you to use notation correctly and may penalize you for failing to do so. In particular, an equal sign should appear between two things that are equal; an equal sign should not appear between two things that are not equal. For full credit on a problem you must show the final correct answer and give a reasonably neat and logical account of how you got that answer.

There are a total of 50 points, distributed among 9 problems. The problems are worth varying amounts. You must show your work for all problems. Little or no credit will be given for unsupported answers. Even if you can do the problems in your head, you must convince me that you know what you're doing. Good luck.

Problem	Points	Possible
1-5		20
6		5
7		5
8		8
9		12
Total		50

This is the multiple choice portion of the exam. Circle all answers that are correct. There may be more than one correct answer to a question; if this is the case, all correct answers must be circled for credit. No partial credit on these.

1. (4 points) Which angles have a sine of $\frac{1}{2}$?

(a) 30°

(b) 60°

(c) 120°

(d) 150°

(e) None of these

2. (4 points) Which angles have a cosine of $\frac{1}{2}$?

(a) 30°

(b) 60°

(c) 120°

(d) 150°

(e) None of these

3. (4 points) Assume that $\phi + \theta = 90°$. Which of the following statements are true? (Hint: draw a right triangle with angle θ.)

(a) $\sin\theta = \cos\phi$

(b) $(\sin\theta)^2 + (\cos\theta)^2 = 1$

(c) $\sin\phi = \sin\theta$

(d) $\cos\phi = -\cos\theta$

(e) None of these

4. (4 points) How many triangles result from the information $a = 8$, $c = 6$ and $C = 35°$?

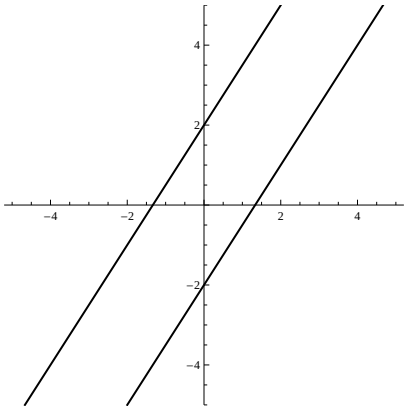
(a) 0

(b) 1

(c) 2

(d) None of these

5. (4 points) What symmetries does the following graph exhibit?



(a) x-axis

(b) y-axis

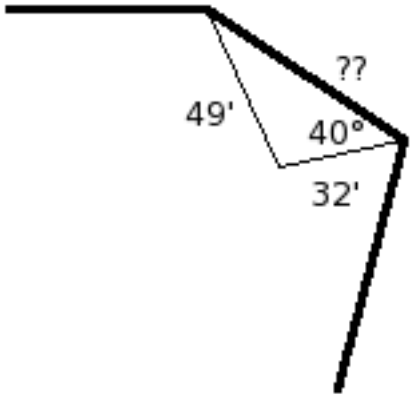
(c) origin

(d) None of these

6. (5 points) The shadow cast by a flagpole is 5 meters long when the sun is 25° above the horizon. How tall is the flagpole?

7. (5 points) Solve any triangles that may result from $A = 30^\circ$, $b = 4$, $c = 10$.

8. (8 points) A surveyor is measuring the boundary of a property. Because of various obstacles like hedges and a statue, the surveyor can only manage to collect the information below. Can you determine the length of the side of property in question? If so, do it; if not, find any possible lengths of the side.



9. (12 points) This problem will determine the exact value of $\sin 75°$. Decimal answers will not get full credit. (a) Draw a $45° - 60° - 75°$ triangle with a side of length 1 opposite the $60°$ angle. Find the exact length of the side opposite the $45°$ angle.

(b) Draw a new picture of the triangle, and split the $75°$ angle by drawing a line perpendicular to opposite side through the vertex of the angle. Find the exact length of this new line segment. (Hint: you now have two familiar triangles side by side.)

(c) Using your picture from part (b), find the exact lengths of the two parts of the side opposite the 75° angle. Add them up.

(d) You are now in a position to solve for $\sin 75^\circ$ exactly. Do so. (If you're confused here, look at your picture from part (a).)