

# EXAM 1 - MTH 122-201 SPRING 2010

Math 122-201

12 February, 2010

Instructor: Thomas Cuchta

Total points: 100 (7 each, 2 free)

Name: \_\_\_\_\_

**Read all of the following information before starting the exam:**

- Show all work, clearly and in order, if you want to get full credit. I reserve the right to take off points if I cannot see how you arrived at your answer (even if your final answer is correct).
- To ensure full credit, justify everything in your answers with an argument. When you do use your calculator, write down what you are computing along with its answer, so I understand your calculation.
- Circle or otherwise indicate your final answers.
- Please keep your written answers brief; be clear and to the point.
- Good luck!

**1.** (7 points) Find the measure of each unknown angle.

There will be an image here of two complementary angles, one of which is  $(4y)^\circ$  and the other is  $(2y)^\circ$ .

**2.** (7 points) Find the measure of each unknown angle.

There will be an image here of two supplementary angles one of which has  $(20x + 10)^\circ$  and the other has  $(3x + 9)^\circ$ .

**3.** (7 points) Compute.

a.)  $62^\circ 18' - 21^\circ 41'$

b.)  $26^\circ 30' + 360^\circ$

**4.** (7 points) A turntable in a shop makes 45 revolutions per minute. How many revolutions does it make per second?

**5.** (7 points) Find the measure of each marked angle.  
There will be an image here that shows two vertical angles, one of which measuring  $(5x - 129)^\circ$  and the other measuring  $(2x - 21)^\circ$ .

**6.** (7 points) Find the measure of each marked angle.

There will be an image of a triangle here with angles measured at  $(2x + 16)^\circ$ ,  $(5x - 50)^\circ$ , and  $(3x - 6)^\circ$ .

**7.** (7 points) The lighthouse in the figure (not yet drawn) casts a shadow 28 meters long at 7 P.M. At the same time, the shadow of the lighthouse keeper, who is 1.75 meters tall, is 3.5 meters long. How tall is the light house?

Included will be a labelled diagram of the lighthouse, its shadow, and the keeper's shadow.

**8.** (7 points) Decide whether the given expressions are equal to 0, 1,  $-1$ , or are undefined.

a.)  $\tan((2n + 1) \cdot 90^\circ)$

b.)  $\sin(n \cdot 180^\circ)$

**9.** (7 points) Identify the quadrant(s) of an angle  $\theta$  that satisfies the given conditions.

a.)  $\cos\theta > 0$ ,  $\sec\theta > 0$

b.)  $\cos\theta < 0$ ,  $\sin\theta < 0$

**10.** (7 points) Derive the identity  $1 + [\cot(\theta)]^2 = [\csc(\theta)]^2$  from the equation  $x^2 + y^2 = r^2$  (which itself comes from Pythagorean Theorem).

**11.** (7 points) Solve the equation  $\tan(3\theta - 4) = \frac{1}{\cot(5\theta - 8)}$ .

**12.** (7 points) Which of the following ARE coterminal with  $r^\circ$ .

- a.)  $360^\circ + r^\circ$
- b.)  $r^\circ - 360^\circ$
- c.)  $360^\circ - r^\circ$
- d.)  $r^\circ + 180^\circ$

**13.** (7 points) Classify each triangle as acute, right, or obtuse. ALSO classify each as equilateral, isosceles, or scalene.

- a.) image of an obtuse scalene triangle
- b.) image of obtuse isosceles triangle
- c.) image of acute equilateral triangle

**14.** (7 points) Use the appropriate reciprocal identity to find each function value.

- a.)  $\sec\theta$ , given that  $\cos\theta = \frac{2}{3}$
- b.)  $\cot\theta$ , given that  $\tan\theta = 18$

**Bonus Question (2 Extra Credit Points):** Can a triangle have two obtuse angles? Explain your reasoning.

**Bonus Question (2 Extra Credit Points):** True or false. For all angles  $\theta$ ,  $\sin\theta + \cos\theta = 1$ . If false, give an example showing why it is false.