

**You may keep this page of questions.** Turn in your answers with all of your work on the tan paper and orange paper. You are **NOT** allowed to use calculators on questions #1 – 5. Work these questions on the tan paper. After you have finished these first five questions, turn in the first part of the exam and receive orange paper to use for the last five questions.

(1) 10 Points. Find exact values for the other five trigonometric functions at the angle  $\theta$  if  $\theta$  is an angle in standard position whose terminal side is in the fourth quadrant and  $\tan \theta = -\frac{2}{3}$ .

(2) 10 Points. Evaluate exactly, using reference angles where appropriate.

$$\text{(a)} \tan\left(\frac{5\pi}{6}\right) \quad \text{(b)} \cos\left(\frac{7\pi}{4}\right).$$

(3) 10 Points. Solve the equation  $\log_3(x) + \log_3(2x + 3) = 2$ .

(4) 10 Points. Sketch a graph of the equation  $y = 1 - 2 \sec(\pi x)$ . Show scales on axes.

(5) 10 Points. Sketch a graph of the equation  $y = f(x) = \log_2(\sqrt{x - 3})$ . Show intercepts, asymptotes and scales on axes.

**Turn in your work and answers for the first five questions and any remaining tan paper before continuing.**

---

(6) 8 Points. Find the radian measure of a central angle  $\theta$  in a circle having radius  $r = 35.381$  meters if the arc opposite the angle has length  $s = 10.984$  meters.

(7) 10 Points. Solve the right triangle  $\triangle ABC$  if side  $a$  has length 43.81 feet and angle  $\beta$  has measure  $15^\circ 37'$ . (As usual, the angle  $\gamma$  is the right angle and side  $c$  is the hypotenuse.)

(8) 12 Points. Use your calculator to find approximate values for the following. Round appropriately.

(a)  $\cos(4.32325)$       (b)  $\tan(168^\circ 28' 57'')$       (c)  $\csc(-5.85)$

(9) 8 Points. Solve the equation  $7^{w-4} = 3$ . Find both an exact answer and a decimal approximation.

(10) 12 Points. The population of a certain small country was 2.413 million in 1986 and was 3.007 million in 1997. Assuming an exponential model for population growth, what will the country's population be in 2012?