

## The “No Calculators” Pages

**Instructions:** See front page for general instructions. Finish this page before going to the rest. You may not return to this page once you turn on your calculator.

N1.) (16 points) Find exact algebraic values for each of the following, where defined. Otherwise, write “undefined.” 16

(a)  $\sin 135^\circ$

(e)  $\sec 30^\circ$

(b)  $\cos(-60^\circ)$

(f)  $\tan 210^\circ$

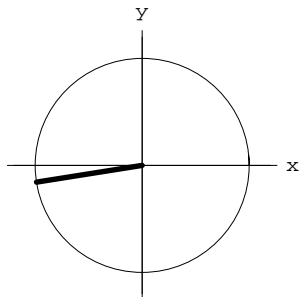
(c)  $\tan(-90^\circ)$

(g)  $\sin 240^\circ$

(d)  $\cos 150^\circ$

(h)  $\sin 390^\circ$

N2.) (10 points) An angle  $\theta$  is shown in standard position. Just by looking, give approximate values for  $\sin \theta$  and  $\cos \theta$ . Better answers get better points. If the sign of an answer is wrong, no points will be given for that part. 26



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|-----------------------|
| $\sin \theta \approx$ |
| $\cos \theta \approx$ |

N3.) (12 points) For each below, circle the inequality ( $<$  or  $>$ ) that makes the statement true. 38  
*Incorrect answers will be awarded negative points to discourage random guessing.* (So perhaps you should leave an answer blank if you have no idea.)

(a)  $\cos 16^\circ < > \cos 17^\circ$

(d)  $\sin 316^\circ < > \sin 317^\circ$

(b)  $\cos 116^\circ < > \cos 117^\circ$

(e)  $\cos 16^\circ < > \cos 116^\circ$

(c)  $\cos 216^\circ < > \cos 217^\circ$

(f)  $\sin 16^\circ < > \sin 116^\circ$

N4.) (9 points) Write the *exact algebraic values* of the functions  $\sin \theta$ ,  $\cos \theta$  and  $\tan \theta$  for the smallest positive angle  $\theta$  in standard position whose initial side is the positive  $x$ -axis and whose terminal side is on the line  $2x + 3y = 0$ . 47

$\sin \theta =$

$\cos \theta =$

$\tan \theta =$

N5.) (6 points) Write 53

(a) a reciprocal identity involving  $\sin \theta$ ,

(b) a Pythagorean identity involving  $\sin \theta$ ,

(c) a cofunction identity involving  $\sin \theta$ .

N6.) (9 points) Assuming  $\cos \theta = -3/4$ , and  $\theta \in \text{QII}$ , give exact algebraic values for the following. 62

(a)  $\sec \theta$

(b)  $\sin \theta$

(c)  $\tan \theta$

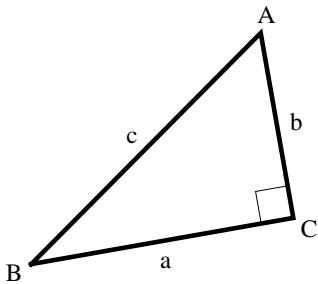
Test #1

**Instructions:** Answer all problems correctly. Calculators are allowed (except on the “No Calculators Page”) but *they must not be used to retrieve information or formulas*. Feel free to leave numerical answers in “calculator-ready form” unless otherwise instructed. Each starred problem is extra credit, and each ★ is worth 5 points.

The phrase *exact algebraic values* appears throughout the test. Quantities such as  $\sqrt{3}$ ,  $5/3$ , etc., are exact algebraic values, as opposed to *numerical approximations*, such as 1.732, 1.666, etc., which are not.

A maximum of 115 points (out of 100) will be awarded on this test. Enjoy.

1. (12 points) Solve the triangle, given that  $B = 35.20^\circ$  and  $a = 12.50$  cm. (That is, find the missing values  $A$ ,  $b$ ,  $c$ .) 74

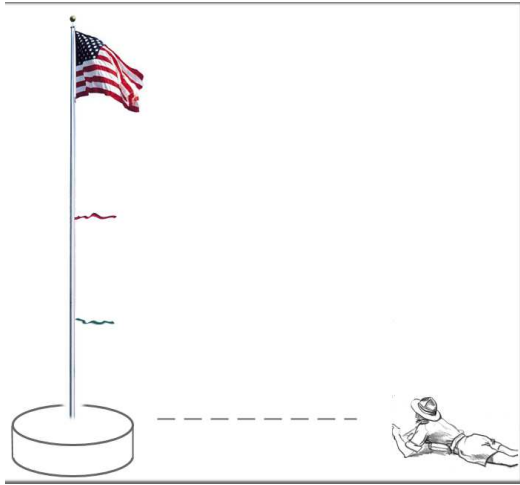


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| $A =$ |
| $b =$ |
| $c =$ |

2. (12 points) A metal pole exactly ten feet tall stands straight up on level ground. The shadow cast by the pole in the sun is 72.50 feet long. What is the angle of elevation of the sun (in decimal degrees)? 86

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3. (12 points) A tall pole has two ribbons tied to it at different heights. A person viewing the pole measures the angle of elevation to the lower ribbon to be  $22^\circ$ , while the upper ribbon is at an angle of elevation of  $43^\circ$ . (Both angles are measured at ~~ground level~~ **the level of the viewer's eye**, so you don't need to worry about the height of the viewer.) The viewer's eye is 22 feet from the base of the pole. How far apart are the ribbons (in feet)?

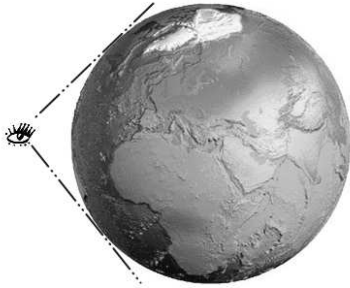



4. (10 points) A triangle has two sides of length 12.34 inches (**each**) and two angles measuring  $23^\circ 45'$  (**each**). Find the length of the third side.

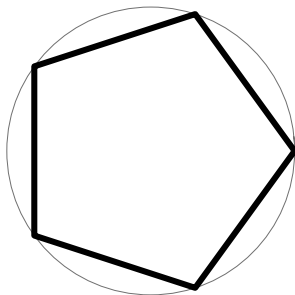
\*\*\* Extra Credit \*\*\*

(You may do these on the back of the previous page if you wish.)

- A.) (★) From a point above the surface of the earth the angular “field of view” of the earth is  $98.0^\circ$  (which is the measure of the angle formed at the eye by two tangent lines drawn to opposite points on the visible disk of the sphere). How far is the eye from the surface of the earth? (I’m sure you know that the earth’s radius is about 3960 miles.)



- B.) (★) A regular pentagon is inscribed in a circle. If the length of each side of the pentagon is  $x$ , find the radius of the circle (in terms of  $x$ ).



C.) (★) Find any (exact) solution  $x$  to the following equation.

$$\sin x = \sin(111^\circ + x)$$

D.) (★...★) Ask a question you wish I had asked and answer it. Points will vary.