

Math 114 Spring 2005 Lamb Third Exam

1. (5 points). Find the exact value of $\csc (\arccos (-2/3))$.
2. (5 points). What is the exact value of the tangent of the angle in problem 1 ?
3. (10 points). A triangle has angles $\pi/3$ and α , where $\sin (2\alpha) = \sqrt{3}/2$. If this triangle is not a right triangle, what are its three angles?

4. (15 points). Solve for x , where $0 \leq x < 2\pi$,

$$\frac{1}{2} + \cos(x) \sin(x) = \cos^2(x).$$

5. (5 points). Find a vector $\mathbf{v} = \langle x, y \rangle$ that has length 7 , such that \mathbf{v} has the same direction as $\mathbf{w} = \langle -2, 5 \rangle$. (You may also describe \mathbf{v} in terms of \mathbf{w} .)

6. (5 points). What is $y = \arctan(x)$? (Be sure to include its domain and range.)

7. (10 points). Establish the identity: $\cos(\pi/2 - x) = \sin(x)$.

8. (15 points). Solve for x , where $0 \leq x < 2\pi$

$$\cos(2x) + 3 \cos(x) = -2$$

9. (5 points). Write $(1 + i)^{10}$ as a complex number of the form $a + bi$ where a and b are real numbers.

10. (10 points) What is the exact value of the angle between the vectors $\mathbf{v} = \langle -3, 7 \rangle$ and $\mathbf{w} = \langle 2, 8 \rangle$.

11. (5 points) Find the exact value of the smallest angle of a triangle with sides 7, 9, and 11.

12. (10 points) Seymour is on the street directly below Eunice, who is at the window on the 4-th floor of the leaning tower of Pizza. Seymour is 6 feet tall. As luck would have it, Eunice's slice of guacamole-liver-feta (heavy on the sauce) thin crust slipped from her hands , and plummeted 34 feet to a newly crowned Seymour.

Seymour couldn't believe his luck. This event saved him cash, as well as the extra 22 feet he'd have to go to get to the front door of the historic eatery. And it was his favorite pizza!

Seymour only had to walk back the 45 feet to to outdoor elevator of his posh apartment. Then a quick ride up to his fashionably low roof , 26 feet straight up.

What is the exact value of the angle from the top of Sy's flat to the benighted Eunice, who hasn't moved an inch since her unhappy separation from her tasty morsel?