Math 130 - Test 3A

Name _____

November 18, 2020

Score _____

Show all work to receive full credit. Supply explanations where necessary. You may use your unit circle and trig identity card on any problem. For each triangle described below, a is opposite α, b is opposite β, and c is opposite γ.

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1. (7 points [3,6]) Given that β is a 3rd quadrant angle with $\cos\beta = -2/7$, find the exact values of $\sin 2\beta$ and $\cos 2\beta$. Do not use a calculator for this problem.

2. (8 points [9]) Find the exact solutions: $\cos^2 x - \cos x = 0$
(Find all solutions.)

3. (10 points [8]) Given the triangle with $\alpha = 42°$, $b = 3.4$ meters, and $c = 4.5$ meters, find the remaining angles and side length. Round your final answers to the nearest tenth.

Math 130 - Test 3B

November 18, 2020

Name _____

Score _____

Show all work to receive full credit. Supply explanations where necessary. When finding exact answers, simplify as much as possible. For each triangle described below, a is opposite α, b is opposite β, and c is opposite γ (unless otherwise indicated). This test is due November 30 by email. **You must work individually on this test.**

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1. (8 points [3,6]) Given that x is a 3rd quadrant angle with $\sin x = -1/3$, find the exact values of $\sin(x/2)$ and $\cos(x/2)$. Do not use a calculator for this problem.

2. (3 points [3,6]) Use a product-to-sum formula to rewrite $\cos 3t \sin t$.

3. (3 points [3,6]) Use a sum-to-product formula to rewrite $\sin 7\theta - \sin 3\theta$.

4. (8 points [9]) Find the exact solutions: $4\cos^2 x - 3 = 0$
(Find all solutions.)

5. (8 points [9]) Find the exact solutions: $2\sin^2 x - 5\sin x + 2 = 0$
(Find all solutions. Helpful hint: Factor the left-hand side.)

6. (10 points [7]) Solve the triangle. Round to the nearest tenth. If two solutions exist, find both.

$$\alpha = 26.0^\circ, \quad a = 10.0 \text{ centimeters}, \quad b = 18.0 \text{ centimeters}$$

7. (8 points [8]) Solve the triangle. Round to the nearest tenth. If two solutions exist, find both.

$$a = 1.2 \text{ feet}, \quad b = 2.0 \text{ feet}, \quad c = 1.5 \text{ feet}$$

8. (7 points [7]) The Bermuda triangle is a region in the Atlantic Ocean that connects Bermuda, Florida, and Puerto Rico. The distance from Bermuda to Florida is 1030 miles, and the distance from Bermuda to Puerto Rico is 980 miles. The angle between those distances is $62°$. Find the area of the Bermuda triangle. (Give units on your answer.)

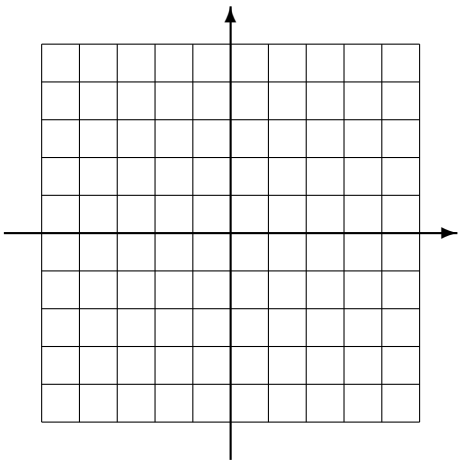
9. (5 points [9]) Find the exact solutions: $\tan 3x = 1$
(Find all solutions.)

10. (5 points [11]) Write as a complex number in standard form. Show all work.

(a) $2i(3+7i)^2$

(b) $\dfrac{2-3i}{5-2i}$

11. (3 points [11,12]) Let $z = -3+4i$. Plot z in the complex plane. Then compute $|z|$.



12. (7 points [11]) Write each complex number in polar form. If necessary, round to the nearest tenth.

(a) $2 - 2i$

(b) $5 + 12i$