MATH 142
EXAM 3 REVIEW – CHAPTER 5, SECTIONS 6.1-6.3, 7.1

1. (5.1) Prove each identity.

(a) $\sec\theta - \cos\theta = \tan\theta\sin\theta$

(b) $\cos^4 A - \sin^4 A = \cos 2A$

2. (5.2) Let $\sin A = -\frac{3}{5}$ with $270° \le A \le 360°$ and $\sin B = \frac{12}{13}$ with $90° \le B \le 180°$, find the following.

(a) $\sin(A + B)$

(b) $\cos 2B$

3. (5.2) Find the exact value of $\cos 75°$ using the sum of two common angles from the unit circle.

4. (5.2) Simplify without using a calculator.

$$\cos\left(\arcsin\frac{4}{5} - \arctan 2\right)$$

5. (5.3) Simplify.

$$\cos(2\sin^{-1} x)$$

6. (5.3, 5.4) If $\sin A = -\frac{\sqrt{5}}{5}$ and A is in QIII, find $\cos 2A$ and $\cos\frac{A}{2}$.

7. (5.4) Find the exact value of $\tan\frac{\pi}{12}$ using the half-angle identity.

8. (5.4) Find $\cos x$ if $\cos 2x = \frac{1}{2}$.

9. (6.1, 6.2) Find all solution for $0° \le \theta < 360°$.

(a) $\cos\theta - 2\sin\theta\cos\theta = 0$

(b) $\sin\frac{\theta}{2} + \cos\theta = 0$

(c) $\sin\theta + \cos\theta = 1$

10. (6.2) Find all solutions in radians.

$$\cos 2x - 3\cos x = -2$$

11. (6.3) Find all solutions in degrees.

$$\sin^2 3\theta = \frac{1}{2}$$

12. (6.3) Find all solutions $0 \le x < 2\pi$

(a) $\cos 3x = -\frac{\sqrt{3}}{2}$

(b) $\tan 2x = 1$

13. (6.3) Find all solutions for $0° \le \theta < 360°$, rounded to the nearest tenth of a degree.

$$4\cos^2\theta - 4\cos\theta = 2$$

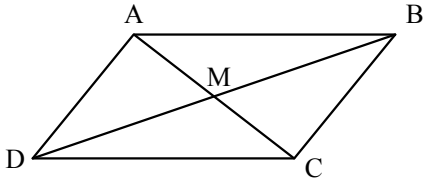
14. (6.3) Find all solutions for $0 \le x < 2\pi$, rounded to the nearest 2 decimal places.

$$\sin 2x = \frac{3}{5}$$

15. (7.1) In triangle ABC, A = 32°, B = 69°, and $a = 3.8$ inches. Find b rounded to the nearest tenth of an inch.

16. (7.1) A man standing near a building, notices that the angle of elevation to the top of the building is 64°. He then walks 240 feet farther away from the building and find the angle of elevation to the top to be 43°. How tall is the building? Round your answer to the nearest foot.

17. (7.1) The diagonals of parallelogram ABCD, meet at point M. If AC = 26 meters, m∠AMB = 122°, and m∠MBC = 30°, find the length of side BC. Round your answer to the nearest hundredth of a meter.



Math 142 Exam 3 Review – Answers

1. Answers will vary
2. (a) $\frac{63}{65}$; (b) $-\frac{119}{169}$
3. $\frac{\sqrt{6}-\sqrt{2}}{4}$
4. $\frac{11\sqrt{5}}{25}$
5. $1-2x^2$
6. $\frac{3}{5}$; $-\sqrt{\frac{5-2\sqrt{5}}{10}}$
7. $2-\sqrt{3}$
8. $\pm\frac{\sqrt{3}}{2}$
9. (a) 30°, 90°, 150°, 270°;
   (b) 180°; (c) 0°, 90°
10. $2k\pi$, $\frac{\pi}{3}+2k\pi$, $\frac{5\pi}{3}+2k\pi$
11. $15^\circ+30^\circ k$
12. (a) $\frac{5\pi}{18}$, $\frac{7\pi}{18}$, $\frac{17\pi}{18}$, $\frac{19\pi}{18}$, $\frac{29\pi}{18}$, $\frac{31\pi}{18}$;

    (b) $\frac{\pi}{8}$, $\frac{5\pi}{8}$, $\frac{9\pi}{8}$, $\frac{13\pi}{8}$
13. 111.5°, 248.5°
14. 0.32, 1.25, 3.46, 4.39
15. 6.7 inches
16. About 411 feet
17. 22.05 meters