

MATH 110 Review Problem Set 0.D

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The following problems based on Appendix D of the textbook will help you review. *You do not need to hand in solutions to these problems.*

1. (Based on D.1–6) Convert from degrees to radians.

(a) 60° (b) 330° (c) -20° (d) 780°

2. (Based on D.7–12) Convert from radians to degrees.

(a) 3π (b) $\frac{7\pi}{3}$ (c) $-\frac{5\pi}{6}$ (d) 6

3. (Based on D.17–22) Draw, in standard position, the angle the measure of which is given.

(a) 75° (b) -720° (c) $\frac{2\pi}{3}$ rad (d) $-\frac{7\pi}{4}$ rad

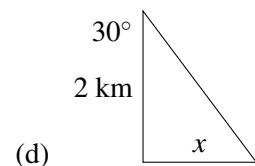
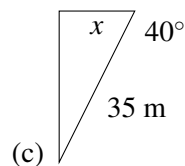
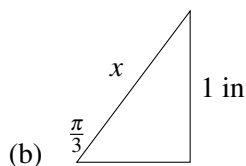
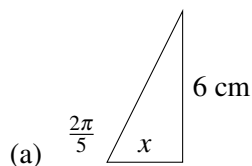
4. (Based on D.23–28) Find the exact trigonometric ratios for the angle the radian measure of which is given.

(a) $\frac{2\pi}{3}$ (b) $\frac{9\pi}{4}$ (c) $-\frac{5\pi}{6}$ (d) $-\frac{11\pi}{2}$

5. (Based on D.29–34) Find the remaining trigonometric ratios.

(a) $\sin \theta = \frac{5}{13}, 0 < \theta < \frac{\pi}{2}$ (c) $\sec \theta = -2.25, \frac{\pi}{2} < \theta < \pi$
(b) $\tan \theta = 3, 0 < \theta < \frac{\pi}{2}$ (d) $\cot \alpha = 3.5, \pi < \alpha < 2\pi$

6. (Based on D.35–38) Find, correct to five decimal places, the length of the side labeled x . (Note: diagrams are not to scale!)



7. (Based on D.65–72) Find all values of x in the interval $[0, 2\pi]$ that satisfy the given equation.
- (a) $2\sin x - 1 = 0$ (b) $3\tan^2 x = 1$ (c) $4\cos^2 x = 3$ (d) $\cos 2x + \cos x = 0$
8. (Based on D.73–76) Find all values of θ in the interval $[0, 2\pi]$ that satisfy the given inequality.
- (a) $\cos \theta \leq \frac{1}{2}$ (c) $-\frac{1}{\sqrt{3}} < \tan \theta < \sqrt{3}$
- (b) $-2\sin \theta + 1 \geq 0$ (d) $\sin \theta < \cos \theta$
9. (Based on D.14) If a circle has radius 18 m, find the length of an arc subtended by a central angle of 60° degrees.
10. (Based on D.15) A circle has radius 30 cm. What angle is subtended at the center of the circle by an arc 10 cm long?
11. (Based on D.42–58) Prove the following identities.
- (a) $\sin(2\pi - x) = -\sin x$
 (b) $(\sin x - \cos x)^2 = 1 - \sin 2x$
 (c) $(\sin x + \sin y)(\sin x - \sin y) = \sin(x + y)\sin(x - y)$
 (d) $\sin 3\theta = 3\sin \theta - 4\sin^3 \theta$
12. (Based on D.59–64) If $\cos x = 8/17$ and $\csc y = 2$, where x and y lie in the interval $[0, \pi/2]$, evaluate the following expressions.
- (a) $\sin(x + y)$ (b) $\cos(x - y)$ (c) $\cos 2x$ (d) $\tan(x + y)$
13. (Based on D.39–41) Prove the following identities from the textbook.
- (a) $\sin 2x = 2\sin x \cos x$ (b) $\cos^2 x = \frac{1 + \cos 2x}{2}$
14. (Based on D.86) Use the subtraction formula for the sine function, namely

$$\sin(x - y) = \sin x \cos y - \cos x \sin y$$

to prove the addition formula for the sine function, namely

$$\sin(x + y) = \sin x \cos y + \cos x \sin y$$

You may find the following additional exercises from Appendix D helpful.

Appendix D C-level: 1–6, 7–12, 17–22, 23–28, 29–34, 35–38, 65–72, 73–76;
 B-level: 13–16, 42–58, 59–64;
 A-level: 39–41, 83–89