

Final Homeworks

These are the final few problem sets for the course. All of the problems below are due on August 4th. They are broken into 3 smaller problem by topic for your convenience.

First Problem Set

Problem 1: Find all angles x between 0 and 2π such that $\sin x = \sin 37^\circ$.

Problem 2: Find all angles y between 0 and 2π such that $\cos y = \cos 115^\circ$.

Problem 3: Find the angles x such that $\cos x = \sin 223^\circ$.

Problem 4: Convert the following angles to radians:

- (a) 30°
- (b) 60°
- (c) 45°
- (d) 18°
- (e) 225°
- (f) 330°

Problem 5: Convert the following angles to degrees:

- (a) $\frac{5\pi}{6}$
- (b) $\frac{15\pi}{4}$
- (c) $\frac{3\pi}{4}$
- (d) $\frac{5\pi}{3}$
- (e) $\frac{11\pi}{2}$
- (f) $\frac{\pi}{18}$

Problem 6: What Quadrant I angles are equivalent to the following:

- (a) 110°
- (b) 345°
- (c) 95°
- (d) 123°

(e) 187°

(f) 210°

Problem 7: Use the identity $\sin(x - y) = \sin x \cos y + \cos x \sin y$ to find $\sin 15^\circ$. [Hint: Think what angles you know for $\sin x$ and $\cos x$.]

Problem 8: Find $\tan 60^\circ$ using $\sin x$ and $\cos x$, show your work.

Problem 9: Use the identity $\cos^2 x = \frac{1 + \cos(2x)}{2}$ to find $\cos 15^\circ$.

Second Problem Set

Problem 1: Find the following:

(a) $\sin\left(\frac{2\pi}{3}\right)$

(b) $\cos\left(\frac{3\pi}{4}\right)$

(c) $\tan\left(-\frac{3\pi}{4}\right)$

(d) $\cos\left(\frac{11\pi}{6}\right)$

Problem 2: The arc length of a circle of radius r from the x -axis to some angle θ (in radians) along the circle is $s = r\theta$. Find the arc length of a segment on a circle of radius 2 formed by the angle 45° . What is the length if the angle is $\frac{2\pi}{3}$?

Problem 3: The point $(-0.8, 0.6)$ on a circle of radius 1 forms an angle θ with the origin. What is this angle, say θ , approximately? Calculate $\sin \theta$ and $\cos \theta$ exactly.

Problem 4: What are the midline, amplitude, and period for $f(x) = 6 \sin(2\pi x)$?

Problem 5: What are the midline, amplitude, and period for $g(y) = 2 \cos(\pi y) - 8$?

Problem 6: It is known that for all θ , $\cos^2 \theta = 1 - \sin^2 \theta$. If $\sin \theta = \frac{3}{4\sqrt{2}}$, what is $\cos \theta$?

Third Problem Set

Problem 1: Find the equation of a line passing through the points $(-2, 6)$ and $(3, 4)$. Is this the only possible line? Explain.

Problem 2: Find the equation of a line with slope 6 and passing through the point $(3, 1)$. Is this the only possible line? Explain.

Problem 3: Find the equation of a line perpendicular to the line $2x + 3y = 6$ that passes through the point $(-1, 6)$. Is this the only possible line? Explain.

Problem 4: Find the vertex of the parabola $3x^2 - 6x + 12$.

Problem 5: Find the hypotenuse of a right triangle with legs having length 48 and 64, respectively.

Problem 6: Find the number of digits in $134^{12,145}$.

Problem 7: Solve for x in the equation $\log_6(2x - 1) + 2 = 3$.

Problem 8: Solve for x in the equation $e^{1-3x} + 1 = 5$.

Problem 9: Solve for x in the equation $x^2 5^x - 16(5^x) = 0$.