

## 8 - Solving Trigonometric Equations with Technology

1. Use your calculator to determine each value. Round answers to the nearest tenth of a degree. Sketch the resulting angle in standard position on the Cartesian plane.

a)  $\sin^{-1}(0.42)$

b)  $\cos^{-1}(-0.73)$

c)  $\tan^{-1}(1.8)$

2. Use your calculator to determine each value. Round answers to the nearest thousandth of a radian. Sketch the resulting angle in standard position on the Cartesian plane.

a)  $\sin^{-1}(0.62)$

b)  $\cos^{-1}(-0.18)$

c)  $\tan^{-1}(-3.4)$

### Part II — Reference Angles & Quadrant Reasoning

3. Determine the reference angle using inverse trig. Then determine all solutions on the interval  $0^\circ \leq \theta < 360^\circ$ . Sketch all unique solution angles in standard position on the Cartesian plane and include the related reference triangles.

a)  $\sin \theta = 0.63$

b)  $\cos \theta = -0.41$

c)  $\tan \theta = -2.7$

4. Solve for all angles on the interval  $0 \leq \theta < 2\pi$ . Round answers to the nearest thousandth of a radian. Sketch all unique solution angles in standard position on the Cartesian plane.

a)  $\sin \theta = 0.28$

b)  $\cos \theta = -0.91$

c)  $\tan \theta = 4.2$

### Part III — Solving Linear Trig Equations

5. Solve for all  $\theta$  on the interval  $0^\circ \leq \theta < 360^\circ$ . Round answers to the nearest tenth of a degree. Sketch all unique solution angles in standard position on the Cartesian plane.

a)  $3\sin \theta = 2$

c)  $2\tan \theta + 5 = 0$

e)  $3\cos \theta + 2 = 0$

b)  $4\cos \theta - 3 = 0$

d)  $5\sin \theta + 1 = 0$

### Part IV — Solving Reciprocal Trig Equations with Technology

6. Rewrite each equation using sine, cosine, or tangent. Then solve for all  $\theta$  on the interval  $0^\circ \leq \theta < 360^\circ$ . Round answers to the nearest tenth of a degree. Sketch all unique solution angles in standard position on the Cartesian plane.

a)  $\csc \theta = 1.4$

b)  $\sec \theta = -3.2$

c)  $\cot \theta = 4.8$

d)  $2\sec \theta - 5 = 0$

### Part V — Quadratic Trig Equations

7. Solve for all  $\theta$  on the interval  $0^\circ \leq \theta < 360^\circ$ . Round answers to the nearest tenth of a degree. Sketch all unique solution angles in standard position on the Cartesian plane.
- a)  $2\sin^2 \theta - 1.2 = 0$                       c)  $4\tan^2 \theta - 7 = 0$                       e)  $2\cos^2 \theta - 5\cos \theta + 2 = 0$
- b)  $3\cos^2 \theta - 2 = 0$                       d)  $5\sin^2 \theta + \sin \theta - 2 = 0$

### Part VI — Mixed Technology Problems

8. Solve for all  $\theta$  on the interval  $0^\circ \leq \theta < 360^\circ$ . Round answers to the nearest tenth of a degree. Sketch all unique solution angles in standard position on the Cartesian plane.
- a)  $\sin \theta(3\cos \theta - 2) = 0$                       c)  $\sin \theta + \cos \theta = 0$                       e)  $\cos \theta + 0.35 = 0$
- b)  $2\tan^2 \theta - 5\tan \theta + 2 = 0$                       d)  $2\sin \theta - 1.1 = 0$

### Part VII — Impossible Equations & Restrictions

9. Determine whether each equation has a solution on the interval  $0^\circ \leq \theta < 360^\circ$ . If a solution exists, solve for all values of  $\theta$  and sketch all unique solution angles in standard position on the Cartesian plane. If no solution exists, explain why using trig ranges.
- a)  $\sin \theta = 1.3$                                       c)  $\cos \theta = -1.2$                                       e)  $\tan \theta = 0$
- b)  $\sec \theta = 0.5$                                       d)  $\csc \theta = -4$

### Part IX — Restricted Intervals & Modeling Contexts

10. Solve for all  $\theta$  on the interval  $-\pi \leq \theta \leq \pi$ . Round answers to the nearest thousandth of a radian. Sketch all unique solution angles in standard position on the Cartesian plane.
- a)  $\sin \theta = 0.72$                                       b)  $\cos \theta = -0.34$                                       c)  $\tan \theta = -1.9$
11. A Ferris wheel rotates counterclockwise. The vertical position of a rider is modeled by  $\sin \theta = 0.65$ . Determine:
- all possible angles  $\theta$  on the interval  $0^\circ \leq \theta < 360^\circ$ . Round answers to the nearest tenth of a degree. Sketch all unique solution angles and rider positions on the Cartesian plane.
  - whether the rider is moving upward or downward at each angle