Trigonometry Chapter 2

Section 3

I. Basics

Complete each statement:

1. If $\sin(\theta)$ equals a number GREATER THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
2. If $\tan(\theta)$ equals a number GREATER THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
3. If $\sec(\theta)$ equals a number LESS THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
4. If $\cos(\theta)$ equals a number GREATER THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
5. If $\csc(\theta)$ equals a number LESS THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
6. If $\cot(\theta)$ equals a number LESS THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
7. If $\cos(\theta)$ equals a number LESS THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
8. If $\tan(\theta)$ equals a number LESS THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
9. If $\sin(\theta)$ equals a number LESS THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
10. If $\csc(\theta)$ equals a number GREATER THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
11. If $\sec(\theta)$ equals a number GREATER THAN ZERO, then θ is an angle in Quadrant ______ or ______ .
12. To solve $\sec(\theta) = constant$ first find the ____________________ of both sides of the equation, then solve using the procedure for __________ $= constant$.
13. To solve $\csc(\theta) = constant$ first find the ____________________ of both sides of the equation, then solve using the procedure for __________ $= constant$.
14. To solve $\cot(\theta) = constant$ first find the ____________________ of both sides of the equation, then solve using the procedure for __________ $= constant$.

II. Find the value(s) of the angle(s) in the interval $(0°, 90°)$ that satisfies each equation. Express your answer in degrees rounded to ONE decimal places.

Example:

a) $\cos(\theta) = .7384555$

b) $\tan(\alpha) = -3.1146351$

c) $\csc(\phi) = 1.7929332$

Solution:

a) * Quadrant Check:

$\cos(\theta) > 0 \Rightarrow$ QI, QIIII

So we choose QI

* Reference Angle:

$\theta_R = \cos^{-1}(.7384555)$

$= 42.39998646...$

≈ 42.4

* Solve:

In QI the Reference Angle IS the angle, so

$\theta = \boxed{42.4°}$

b) * Quadrant Check:

$\tan(\theta) < 0 \Rightarrow$ QII, QIIII

So we choose QII

* Reference Angle:

After Quadrant Check, IGNORE the negative SIGN

$\alpha_R = \tan^{-1}(3.1146351)$

$= 72.19999884...$

≈ 72.2

* Solve:

In QII we have

$\alpha = (180 - 72.2)°$

$= \boxed{107.8°}$

c) * Reciprocal:

$\sin(\phi) = \dfrac{1}{1.7929332}$

$= .5577452...$

* Quadrant Check:

$\sin(\phi) > 0 \Rightarrow$ QI, QII

* Reference Angle:

$\phi_R \approx \sin^{-1}(.5577452)$

$= 33.9000062...$

$\approx 33.9°$

* Solve:

QI: $\phi = \boxed{33.9°}$

$QII: \ \phi = (180 - 33.9)^\circ$

$= \boxed{146.1^\circ}$

15. $\cos(\theta) = .9626914$

16. $\sin(\theta) = .9297768$

17. $\sec(\beta) = -10.2476969$

18. $\tan(\alpha) = -.30382319$

19. $\csc(\theta) = 1.0163797$

20. $\sin(\theta) = .3778413$

III. Find the value(s) of the angle(s) in the interval $(0^\circ, 360^\circ)$ that satisfies each equation. Express your answer in degrees rounded to ONE decimal places.

Example:

a) $\tan(\theta) = -.7318891$

b) $\sec(\alpha) = \pm 1.5003024$

Solution:

a) * Quadrant Check:

$\tan(\theta) < 0 \Rightarrow$ QII, QIIII

* Reference Angle:
After Quadrant Check, IGNORE the negative SIGN

$\theta_R = \tan^{-1}(.7318891)$

$= 36.1999902...$

$\approx 36.2^\circ$

* Solve:

In QII:

$\theta = (180 - 36.2)^\circ = \boxed{143.8^\circ}$

In QIIII:

$\theta = (360 - 36.2)^\circ = \boxed{323.8^\circ}$

b) * Reciprocal:

$$\cos(\alpha) = \frac{1}{1.5003024}$$

$$= .665322...$$

* Quadrant Check:
QI, QII, QIII, QIIII

* Reference Angle:

$\alpha_R \approx \cos^{-1}(.6665322)$

$= 48.2000207...$

$\approx 48.2^\circ$

* Solve:

QI:

$\alpha == \boxed{48.2^\circ}$

QII:

$\alpha = (180 - 48.2)^\circ = \boxed{131.78^\circ}$

QIII:

$\alpha = (180 + 48.2)^\circ = \boxed{198.2^\circ}$

QIIII:

$\theta = (360 - 48.2)^\circ = \boxed{311.8^\circ}$

21. $\sin(\theta) = -.1993673$

22. $\cot(\beta) = -2.1445066$

23. $\cos(\gamma) = \pm .9857031$