

3.3 Solving Trig Equations I

A Solve the following equations for the angles between 0° and 360° .

1. $\sin\theta = 0.75$
2. $\cos\theta = 0$
3. $2\sin\theta - 1 = 0$
4. $3\cos\theta + 5 = 4$
5. $3\cos\theta = 15$
6. $2\tan\theta + 6 = 11$
7. $4\sin\theta - 2 = 1$
8. $4\cos\theta - 2 = 1$
9. $8\sin\alpha - 3 = \sin\alpha + 1$
10. $9\cos\alpha = -3 - 5\cos\alpha$
11. $\sin\beta + 1 = 3\sin\beta$
12. $10\cos x + 3 = 16\cos x$
13. $5\sin y + 8\sin y + 6 = 3$
14. $\tan\theta + 14 = 3\tan\theta$
15. $8(\tan\theta - 5) - 6 = -3\tan\theta$

B Solve for θ where $180^\circ < \theta < 360^\circ$

16. $4\sin\theta + 1 = 15$
17. $3(\cos\theta + 2) + 2 = 7$
18. $4\tan\theta + 8 = \tan\theta - 1$
19. $5(\sin\theta - 2) - 2 = -14$
20. $8 + 9\sin\theta = 10$

Answers:

1. $49^\circ, 131^\circ$
2. $90^\circ, 270^\circ$
3. $30^\circ, 150^\circ$
4. $109^\circ, 251^\circ$
5. No answer
6. $68^\circ, 248^\circ$
7. $49^\circ, 131^\circ$
8. $41^\circ, 319^\circ$
9. $35^\circ, 145^\circ$
10. $102^\circ, 258^\circ$
11. $30^\circ, 150^\circ$
12. $60^\circ, 300^\circ$
13. $193^\circ, 347^\circ$
14. $82^\circ, 262^\circ$
15. $77^\circ, 257^\circ$
16. No answer
17. 251°
18. 288°
19. $104^\circ, 336^\circ$
20. No answer

$$1. \sin \theta = 0.75$$



$$2. \cos \theta = 0$$

↳ ref $\angle = 90^\circ$



$$3. 2\sin \theta - 1 = 0$$

$$2\sin \theta = 1$$

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



$$4. 3\cos \theta + 5 = 4$$

$$3\cos \theta = -1$$

$$\cos \theta = -\frac{1}{3}$$



$$5. 3\cos \theta = 15$$

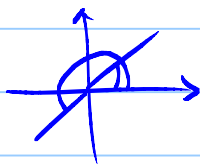
$$\cos \theta = 5$$

No Answer!

$$6. 2\tan \theta + 6 = 11$$

$$2\tan \theta = 5$$

$$\tan \theta = 2.5$$



$$7. 4\sin \theta - 2 = 1$$

$$4\sin \theta = 3$$

$$\sin \theta = \frac{3}{4}$$



$$8. 4\cos x - 2 = 1$$

$$4\cos x = 3$$

$$\cos x = \frac{3}{4}$$

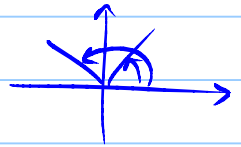


$$9. 8\sin A - 3 = \sin A + 1$$

$$7\sin A - 3 = 1$$

$$7\sin A = 4$$

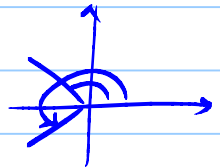
$$\sin A = \frac{4}{7}$$



$$10. 9\cos \alpha = -3 - 5\cos \alpha$$

$$14\cos \alpha = -3$$

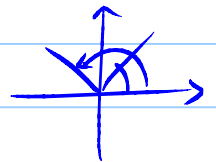
$$\cos \alpha = -\frac{3}{14}$$



$$11. \sin \beta + 1 = 3\sin \beta$$

$$1 = 2\sin \beta$$

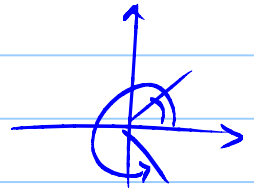
$$\sin \beta = \frac{1}{2}$$



$$12. 10\cos x + 3 = 16\cos x$$

$$3 = 6\cos x$$

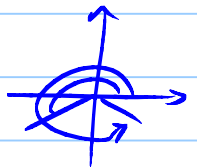
$$\frac{1}{2} = \cos x$$



$$13. 5\sin y + 8\sin y + 6 = 3$$

$$13\sin y = -3$$

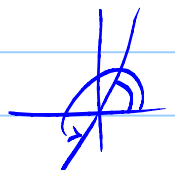
$$\sin y = -\frac{3}{13}$$



$$14. \tan \theta + 14 = 3\tan \theta$$

$$14 = 2\tan \theta$$

$$\tan \theta = 7$$

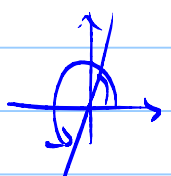


$$15. 8(\tan \theta - 5) - 6 = -3\tan \theta$$

$$8\tan \theta - 40 - 6 = -3\tan \theta$$

$$-46 = -11\tan \theta$$

$$\frac{46}{11} = \tan \theta$$



16. $4\sin\theta + 1 = 15$

$$4\sin\theta = 14$$

$$\sin\theta = \frac{14}{4}$$

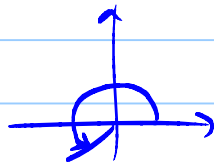
No Answer

17. $3(\cos\theta + 2) + 2 = 7$

$$3\cos\theta + 6 + 2 = 7$$

$$3\cos\theta = -1$$

$$\cos\theta = -\frac{1}{3}$$

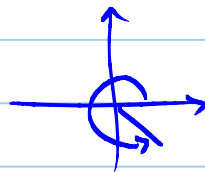


18. $4\tan\theta + 8 = \tan\theta - 1$

$$3\tan\theta + 8 = -1$$

$$3\tan\theta = -9$$

$$\tan\theta = -3$$



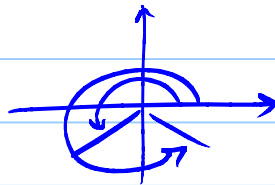
19. $5(\sin\theta - 2) - 2 = -14$

$$5\sin\theta - 10 - 2 = -14$$

$$5\sin\theta - 12 = -14$$

$$5\sin\theta = -2$$

$$\sin\theta = -\frac{2}{5}$$



20. $8 + 9\sin\theta = 10$

$$9\sin\theta = 2$$

$$\sin\theta = \frac{2}{9}$$



$\therefore$ No Answer!