

# Trigonometry - ANSWERS

## T.1 Exercises

1. Complementary, 180

5.  $20.075^\circ$

9.  $15.168^\circ$

13.  $65^\circ 0' 5''$

17.  $83^\circ 59'$

21.  $28^\circ 03' 03''$

25.  $45^\circ, 135^\circ$

29.  $180 - \theta^\circ$

3. coterminal, 360

7.  $274.304^\circ$

11.  $18^\circ 0' 45''$

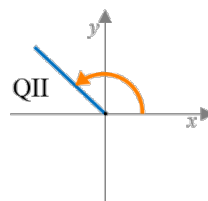
15.  $175^\circ 23' 58''$

19.  $33^\circ 50'$

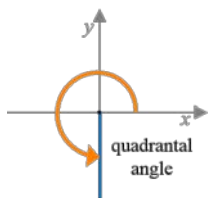
23.  $60^\circ, 150^\circ$

27.  $74^\circ 30', 164^\circ 30'$

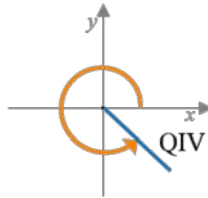
31.



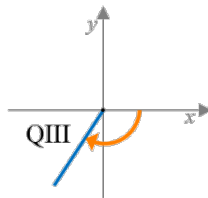
33.



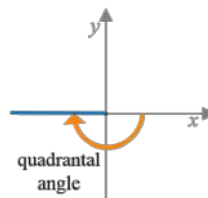
35.



37.



39.



41.  $15^\circ$

43.  $135^\circ$

45.  $30^\circ + k \cdot 360^\circ$

47.  $k \cdot 360^\circ$

49.  $\alpha^\circ + k \cdot 360^\circ$

51.  $7.5^\circ$

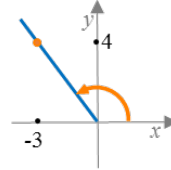
## T.2 Exercises

1.  $\sin \theta = \frac{3}{5}$ ,  $\cos \theta = \frac{4}{5}$ ,  $\tan \theta = \frac{3}{4}$

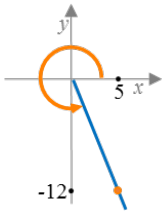
5.  $\sin \theta = \frac{n}{\sqrt{n^2+4}}$ ,  $\cos \theta = \frac{2}{\sqrt{n^2+4}}$ ,  $\tan \theta = \frac{n}{2}$

3.  $\sin \theta = \frac{\sqrt{3}}{2}$ ,  $\cos \theta = \frac{1}{2}$ ,  $\tan \theta = \sqrt{3}$

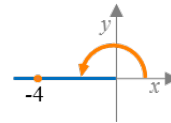
7.  $\sin \theta = \frac{4}{5}$ ,  $\cos \theta = -\frac{3}{5}$ ,  $\tan \theta = -\frac{4}{3}$



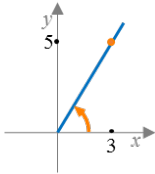
9.  $\sin \theta = -\frac{12}{13}$ ,  $\cos \theta = \frac{5}{13}$ ,  $\tan \theta = -\frac{12}{5}$



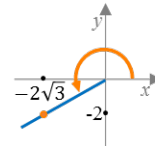
11.  $\sin \theta = 0$ ,  $\cos \theta = -1$ ,  $\tan \theta = 0$



13.  $\sin \theta = \frac{5\sqrt{34}}{34}$ ,  $\cos \theta = \frac{3\sqrt{34}}{34}$ ,  $\tan \theta = \frac{5}{3}$



15.  $\sin \theta = -\frac{1}{2}$ ,  $\cos \theta = -\frac{\sqrt{3}}{2}$ ,  $\tan \theta = \frac{\sqrt{3}}{3}$



17. sine and cosine is negative, tangent is positive

19. negative

21. negative

23. positive

25. positive

27. negative

29. 1

31. -1

33. 0

35. 0

37. *undefined*

39.  $\cos \beta = -\frac{\sqrt{5}}{3}$

$$\tan \beta = \frac{2\sqrt{5}}{5}$$

## T.3 Exercises

1. approximated

3. reference, acute,  $x$ -axis

5. 0.6000

7. -0.9106

## A42

9.  $\frac{\sqrt{2}}{2}$   
11.  $\frac{\sqrt{3}}{2}$
13.  $\frac{1}{2}$   
15. 1
17.  $\cos 67.5^\circ$   
19.  $82^\circ$
21.  $13^\circ$   
23.  $6^\circ$
25. QIII and QIV  
27. QII
29. QIV  
31. negative
33. negative  
35. positive
37. positive  
39.  $\frac{\sqrt{3}}{2}$
41.  $\frac{1}{2}$   
43.  $-\frac{\sqrt{3}}{2}$
45. 1  
47.  $60^\circ, 300^\circ$
49.  $60^\circ, 120^\circ$   
51.  $135^\circ, 225^\circ$
53.  $150^\circ, 330^\circ$   
55.  $\sin \alpha = -\frac{4}{5}$   
 $\tan \alpha = -\frac{4}{3}$

## T.4 Exercises

1. solve, three, sides  
3. inverse
5. 25, East, South  
7.  $37.8^\circ$
9.  $138.6^\circ$   
11.  $48.6^\circ$
13.  $a \approx 19.3$ ,  $\angle B = 51.5^\circ$ ,  $c \approx 24.3$   
15.  $a \approx 15.3$ ,  $\angle B = 48^\circ$ ,  $c \approx 22.9$
17.  $\angle A = 26^\circ 48'$ ,  $a \approx 9.6$ ,  $c \approx 21.4$   
19.  $a = 4$ ,  $b = 4\sqrt{3}$ ,  $d = 4\sqrt{6}$ ,  $h = 4\sqrt{3}$
21.  $a = 3\sqrt{6}$ ,  $b = 3\sqrt{6}$ ,  $c = 12$ ,  $d = 6\sqrt{3}$   
23. 48 m
25. 88.3 ft  
27.  $14^\circ$
29. 134.7 cm  
31. 324.5 km in the direction of  $193.3^\circ$
33. 2.4 m/s  
35.  $75^\circ$
37. Yes, the car is speeding at 94.8 kph.

**T.5 Exercises**

1. oblique
5. longest, angle
9. area, sides
13.  $\angle F \approx 28.0^\circ$ ,  $\angle G \approx 31^\circ$ ,  $g \approx 43.8$  m
17.  $\angle B = 10^\circ$ ,  $b \approx 69.5$ ,  $c \approx 136.8$
21.  $\angle A \approx 17.8^\circ$ ,  $b \approx 56.6$  ft,  $\angle C \approx 21.2^\circ$
25.  $\angle E \approx 118.6^\circ$ ,  $\angle F \approx 25^\circ$ ,  $\angle G \approx 36.4^\circ$
29.  $\angle A \approx 112.8^\circ$ ,  $\angle B \approx 19^\circ$ ,  $\angle C \approx 48.2^\circ$
33.  $\sim 1687$  m
37.  $\sim 1.93$  mi
41.  $\sim 100.2$  m<sup>2</sup>
45.  $\sim 218.1$  ft
49.  $\theta \approx 18.6^\circ$
3. three, enclosed, cosines
7. ambiguous, largest
11.  $y \approx 13.8$  m,  $\angle Z = 78.4^\circ$ ,  $c \approx 14.5$  m
15.  $\angle R \approx 24.7^\circ$ ,  $\angle S \approx 114.3^\circ$ ,  $r \approx 11.5$  k
19.  $\angle B \approx 18^\circ 13' 26''$ ,  $\angle C \approx 51^\circ 31' 34''$ ,  $c \approx 40.1$
23.  $\angle R \approx 32.2^\circ$ ,  $\angle S \approx 91.4^\circ$ ,  $\angle T \approx 56.4.1^\circ$
27.  $\angle A \approx 28.3^\circ$ ,  $b \approx 45$ ,  $\angle C \approx 39.7^\circ$
31.  $AB \approx 118$  m
35.  $\sim 8.9$  mi
39.  $\sim 9.9$  ft
43.  $\sim 19.2^\circ$
47.  $\sim 372.7$  m<sup>2</sup>
51.  $\sim 3.85$  m<sup>2</sup>