

Chapter 5 Homework Solutions

Lesson 5.1: p. 281 #18-50 even, 51, 52-58 even, 59, 62, 63, 65

- #18) $-16^{\circ}45'$
- #20) $-183^{\circ}28'12''$
- #22) $27^{\circ}27'54''$
- #24) 23.242°
- #26) 233.421°
- #28) -405.272°
- #30) -1080°
- #32) 540°
- #34) 810°
- #36) 1440°
- #38) sample answer: $-45^{\circ} + 360k^{\circ}; 315^{\circ}; -405^{\circ}$
- #40) sample answer: $217^{\circ} + 360k^{\circ}; 577^{\circ}; -143^{\circ}$
- #42) sample answer: $-305^{\circ} + 360k^{\circ}; 55^{\circ}; -665^{\circ}$
- #44) $780^{\circ}; -1020^{\circ}$
- #46) $80^{\circ}; \text{I}$
- #48) $339^{\circ}; \text{IV}$
- #50) $91^{\circ}; \text{II}$
- #51) III
- #52) 33°
- #54) 23°
- #56) 17°
- #58) $20^{\circ}, 160^{\circ}, 200^{\circ}, 340^{\circ}$
- #59) $32,400^{\circ}; 1,944,000^{\circ}$
- #62) 1.08×10^7 to 3.6×10^7 degrees
- #63) $22,320^{\circ}; 1,339,200^{\circ}; 80,352,000^{\circ}; 1,928,448,000^{\circ}$
- #65) a. $44^{\circ}26'64''; 68^{\circ}15'41.76''$
b. $24.559^{\circ}; 81.760^{\circ}$

Lesson 5.2: p. 288 #10-28, 30

#10) $\frac{3}{5}; \frac{4}{5}; \frac{3}{4}$

#11) $\frac{5\sqrt{89}}{89}; \frac{8\sqrt{89}}{89}; \frac{5}{8}$

#12) $\frac{3}{10}; \frac{\sqrt{91}}{10}; \frac{3\sqrt{91}}{91}$

#13) tangent

#14) 3

#15) $\frac{7}{3}$

#16) $\frac{9}{5}$

#17) $\frac{1}{2.5} = 0.4$

#18) $\frac{1}{0.75} \approx 1.3333$

#19) $\frac{1}{0.125} = 8$

#20) $\sin R = \frac{\sqrt{527}}{24}; \cos R = \frac{7}{24}; \tan R = \frac{\sqrt{527}}{7}; \csc R = \frac{24\sqrt{527}}{527}; \sec R = \frac{24}{7}; \cot R = \frac{7\sqrt{527}}{527}$

#21) $\sin R = \frac{19}{20}; \cos R = \frac{\sqrt{39}}{20}; \tan R = \frac{19\sqrt{39}}{39}; \csc R = \frac{20}{19}; \sec R = \frac{20\sqrt{39}}{39}; \cot R = \frac{\sqrt{39}}{19}$

#22) $\sin R = \frac{\sqrt{154}}{44}; \cos R = \frac{9\sqrt{22}}{44}; \tan R = \frac{\sqrt{7}}{9}; \csc R = \frac{2\sqrt{154}}{7}; \sec R = \frac{2\sqrt{22}}{9}; \cot R = \frac{9\sqrt{7}}{7}$

#23) 1.3

#24) a. 0.7963540136

b. 0.186524036

c. 35.34015106

d. 1.37638192

#25)

θ	72°	74°	76°	78°	80°	82°	84°	86°	88°
sin	0.951	0.961	0.970	0.978	0.985	0.990	0.995	0.998	0.999
cos	0.309	0.276	0.242	0.208	0.174	0.139	0.105	0.070	0.035

a. 1

b. 0

#26)

θ	18°	16°	14°	12°	10°	8°	6°	4°	2°
sin	0.309	0.276	0.242	0.208	0.174	0.139	0.105	0.070	0.035
cos	0.951	0.961	0.970	0.978	0.985	0.990	0.995	0.998	0.999
tan	0.325	0.237	0.249	0.213	0.176	0.141	0.105	0.070	0.035

a. 0

b. 1

c. 0

#27) about 1.5103

#28) $\cos R = \frac{2\sqrt{10}}{7}$; $\tan R = \frac{3\sqrt{10}}{20}$; $\csc R = \frac{7}{3}$; $\sec R = \frac{7\sqrt{10}}{20}$; $\cot R = \frac{2\sqrt{10}}{73}$

#30) $\tan \theta = \frac{\sin \theta}{\cos \theta}$

Lesson 5.3: p. 296 #14-20 even, 21, 22-34 even, 35, 36-42 even, 45, 47-49

#14) 1

#16) undefined

#18) 0

#20) sample answers: 0° ; 180°

#21) undefined

#22) $\sin 45^\circ = \frac{\sqrt{2}}{2}$; $\cos 45^\circ = \frac{\sqrt{2}}{2}$; $\tan 45^\circ = 1$; $\csc 45^\circ = \sqrt{2}$; $\sec 45^\circ = \sqrt{2}$; $\cot 45^\circ = 1$

#24) $\sin 315^\circ = -\frac{\sqrt{2}}{2}$; $\cos 315^\circ = \frac{\sqrt{2}}{2}$; $\tan 315^\circ = -1$; $\csc 315^\circ = -\sqrt{2}$; $\sec 315^\circ = \sqrt{2}$; $\cot 315^\circ = -1$

#26) $\sin 330^\circ = -\frac{1}{2}$; $\cos 330^\circ = \frac{\sqrt{3}}{2}$; $\tan 330^\circ = -\frac{\sqrt{3}}{3}$; $\csc 330^\circ = -2$; $\sec 330^\circ = \frac{2\sqrt{3}}{3}$; $\cot 330^\circ = -\sqrt{3}$

#28) -1

#30) $\sin \theta = -\frac{3}{5}$; $\cos \theta = -\frac{4}{5}$; $\tan \theta = \frac{3}{4}$; $\csc \theta = -\frac{5}{3}$; $\sec \theta = -\frac{5}{4}$; $\cot \theta = \frac{4}{3}$

#32) $\sin \theta = 0$; $\cos \theta = 1$; $\tan \theta = 0$; $\csc \theta = \text{undefined}$; $\sec \theta = 1$; $\cot \theta = \text{undefined}$

#34) $\sin \theta = -\frac{3\sqrt{34}}{34}$; $\cos \theta = \frac{5\sqrt{34}}{34}$; $\tan \theta = -\frac{3}{5}$; $\csc \theta = -\frac{\sqrt{34}}{3}$; $\sec \theta = -\frac{\sqrt{34}}{5}$; $\cot \theta = -\frac{5}{3}$

#35) $\sin \theta = \frac{15}{17}$; $\cos \theta = -\frac{8}{17}$; $\tan \theta = -\frac{15}{8}$; $\csc \theta = \frac{17}{15}$; $\sec \theta = -\frac{17}{8}$; $\cot \theta = -\frac{8}{15}$

#36) The sine of one angle is the negative of the sine of the other angle.

#38) $\sin \theta = -\frac{5}{13}$; $\tan \theta = \frac{5}{12}$; $\csc \theta = -\frac{13}{5}$; $\sec \theta = -\frac{13}{12}$; $\cot \theta = \frac{12}{5}$

#40) $\cos \theta = \frac{2\sqrt{6}}{5}$; $\tan \theta = -\frac{\sqrt{6}}{12}$; $\csc \theta = -5$; $\sec \theta = \frac{5\sqrt{6}}{12}$; $\cot \theta = -2\sqrt{6}$

#42) $\sin \theta = -\frac{\sqrt{6}}{3}$; $\cos \theta = \frac{\sqrt{3}}{3}$; $\tan \theta = -\sqrt{2}$; $\csc \theta = -\frac{\sqrt{6}}{2}$; $\cot \theta = -\frac{\sqrt{2}}{2}$

#45) 0° or 90°

#47) $\theta = 0^\circ$

#48) $\sin \theta = \frac{3\sqrt{10}}{10}$; $\cos \theta = -\frac{\sqrt{10}}{10}$; $\tan \theta = -3$; $\csc \theta = \frac{\sqrt{10}}{3}$; $\sec \theta = -\sqrt{10}$; $\cot \theta = -\frac{1}{3}$

#49) a. 76 ft.

b. 22 ft.

c. 19 ft.

d. $\frac{1}{2}r + 4$

Lesson 5.4: p. 302 #10 – 27, 29, 30

#10) 4.5

#11) 6.3

#12) 21.2

#13) 9.5

#14) 76.9

#15) 18.4

#16) 8.6

#17) 4.0

#18) 32.9

#19) 19.6; 10.4; 6; 8.5

#20) a. about 13.3 cm

b. about 15.7 cm

c. about 78.5 cm

#21) a. about 9.9 m

b. about 6.7 m

c. about 48.8 m^2

#22) a. about 2.8 cm

b. 3.2 cm

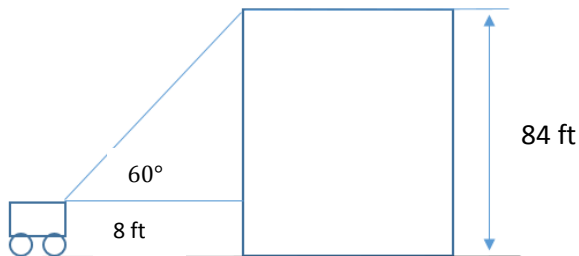
c. 19.2 cm

d. about 26.6 cm^2

#23) about 1088.8 ft.

#24) $V = \frac{1}{6}s^3 \tan \alpha$

#25) a.



- b. about 43.9 ft.
 - c. about 87.8 ft.
- #26) a. about 37,106.0 ft.
- b. about 37,310.4 ft.
- #27) about 366.8 ft.; no
- #29) Markisha's; about 7.2 ft.
- #30) about 131.7 ft.

Lesson 5.5: p. 309 #16, 18, 20, 21, 22 – 32 even, 34, 35, 36 – 42 even, 44 – 52 (all)

- #16) $120^\circ, 300^\circ$
- #18) $90^\circ, 270^\circ$
- #20) $135^\circ, 315^\circ$
- #21) Sample answers: $30^\circ, 150^\circ, 390^\circ, 510^\circ$
- #22) $\frac{4}{5}$
- #24) $\frac{5}{2}$
- #26) $\frac{12}{5}$
- #28) 59.0°
- #30) 42.8°
- #32) 65.1°
- #34) about 36.9° and 53.1°
- #35) about $48.8^\circ, 48.8^\circ$, and 82.4°
- #36) $b = 21.4, A = 44.4^\circ, B = 45.5^\circ$
- #38) $A = 43^\circ, a = 11.7, c = 17.1$
- #40) $a = 8.7, A = 67.1^\circ, B = 22.9^\circ$
- #42) $A = 57^\circ, a = 12.7, b = 8.3$
- #44) a. about 39.4°
b. about 788.5 ft.
- #45) a. Since the sine function is the side opposite divided by the hypotenuse, the sine cannot be greater than 1.
b. Since the secant function is the hypotenuse divided by the side opposite, the secant cannot be between 1 and -1.
c. Since the cosine function is the side adjacent divided by the hypotenuse, the cosine cannot be less than -1
- #46) about 14.9°
- #47) a. about 4.6°
b. about 2.9°
- #48) about 1.2°

#49) about 13.3°

#50) about 21.0°

#51) $y \approx 36.5$, $Z \approx 19.5^\circ$, $Y \approx 130.5^\circ$

#52) about 3,587.2 ft.

Lesson 5.6: p. 316 #11 – 27 odd, 30 – 35

#11) $B = 70^\circ, b = 29.2, c = 29.2$

#13) $C = 120^\circ, a = 8.8, b = 18.1$

#15) $A = 93.9^\circ, b = 3.4, c = 7.2$

#17) about 97.8

#19) 29.6 units^2

#21) 5.4 units^2

#23) 25.0 units^2

#25) about 234.8 cm^2

#27) about 70.7 ft^2

#30) about $213,987.7 \text{ ft}^2$

#31) a. about 3.6 mi

b. about 1.4 mi

#32) about 807.7 ft

#33) a. about 227.7 mi

b. about 224.5 mi

#34) about 6.7 ft

#35) a. $\frac{a}{\sin A} = \frac{b}{\sin B}$

$$\frac{a}{b} = \frac{\sin A}{\sin B}$$

b. $\frac{a}{\sin A} = \frac{c}{\sin C}$

$$\frac{a}{c} = \frac{\sin A}{\sin C}$$

$$\frac{a}{c} - 1 = \frac{\sin A}{\sin C} - 1$$

$$\frac{a}{c} - \frac{c}{c} = \frac{\sin A}{\sin C} - \frac{\sin C}{\sin C}$$

$$\frac{a-c}{c} = \frac{\sin A - \sin C}{\sin C}$$

$$\text{c.} \quad \frac{a-c}{c} = \frac{\sin A - \sin C}{\sin C}$$

$$\text{or} \quad \frac{\sin A - \sin C}{a-c} = \frac{\sin C}{c}$$

$$\frac{a}{\sin A} = \frac{c}{\sin C}$$

$$\frac{a}{c} = \frac{\sin A}{\sin C}$$

$$\frac{a}{c} + 1 = \frac{\sin A}{\sin C} + 1$$

$$\frac{a}{c} + \frac{c}{c} = \frac{\sin A}{\sin C} + \frac{\sin C}{\sin C}$$

$$\frac{a+c}{c} = \frac{\sin A + \sin C}{\sin C}$$

$$\frac{\sin C}{c} = \frac{\sin A + \sin C}{a+c}$$

$$\text{d.} \quad \frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{a}{b} = \frac{\sin A}{\sin B}$$

$$\frac{a}{b} + 1 = \frac{\sin A}{\sin B} + 1$$

$$\frac{a}{b} + \frac{b}{b} = \frac{\sin A}{\sin B} + \frac{\sin B}{\sin B}$$

$$\frac{a+b}{b} = \frac{\sin A + \sin B}{\sin B}$$

$$\frac{b}{a+b} = \frac{\sin B}{\sin A + \sin B}$$

Lesson 5.7: p. 324 #11 – 17, 18 – 28 even, 35, 36, 38

#11) 0

#12) 1

#13) 0

#14) 1

#15) 0

#16) 2

#17) 2

#18) none

#20) $B = 90^\circ$, $C = 60^\circ$, $b = 6.9$

#22) $A = 80^\circ$, $a = 13.1$, $b = 17.6$

#24) $A = 75.9^\circ$, $C = 68.1^\circ$, $a = 31.3$; $A = 32.1^\circ$, $C = 111.9^\circ$, $a = 17.2$

#26) none

#28) $A = 73.3^\circ$, $C = 66.7^\circ$, $a = 62.6$; $A = 26.7^\circ$, $C = 113.3^\circ$, $a = 29.3$

#35) about 9.6°

#36) a. about 17.2° east of north

b. about 6 hours

c. no

#38) about 10.8 cm

Lesson 3.8: p. 331 #11 – 31 odd, 32

#11) $B = 44.2^\circ$, $C = 84.8^\circ$, $a = 7.8$

#13) $A = 34.1^\circ$, $B = 44.4^\circ$, $C = 101.5^\circ$

#15) $A = 51.8^\circ$, $B = 70.9^\circ$, $C = 57.3^\circ$

#17) about 13.8°

#19) 11.6 units^2

#21) 290.5 units^2

#23) $11,486.3 \text{ units}^2$

#25) a. about 68.1 inches

b. about 1247.1 in^2

#27) about 342.3 feet

#29) a. about 122.8 miles

b. about 2.8 miles

#31) they player 30 feet and 20 feet from the posts

#32) a. about 191,335.4 feet

b. about 286,609.8 feet

c. about 96,060.0 feet