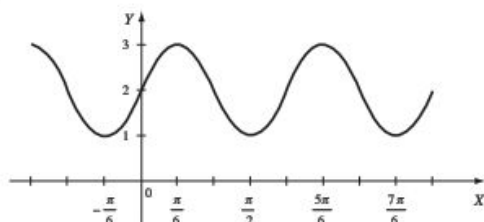
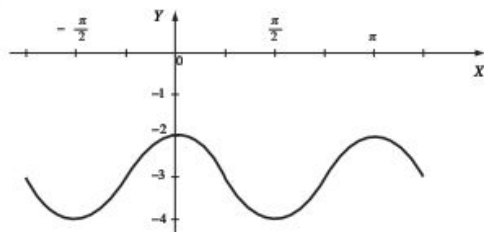


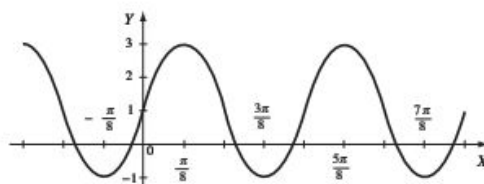
25.



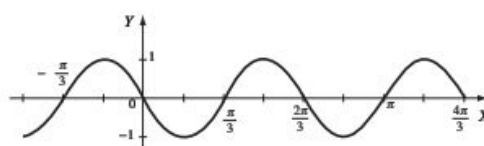
26.



27.



28.



CAPÍTULO 14

EJERCICIO 42

1 a 32. No se incluye la solución por ser demostraciones.

EJERCICIO 43

- | | |
|----------------------------------|--------------------------|
| 1. $\frac{\sqrt{3}}{2}$ | 6. $-\frac{\sqrt{2}}{2}$ |
| 2. $\frac{\sqrt{6}-\sqrt{2}}{4}$ | 7. $-\sqrt{3}$ |
| 3. $\frac{\sqrt{6}+\sqrt{2}}{4}$ | 8. $-\sqrt{2}$ |
| 4. -1 | 9. 1 |
| 5. $-\sqrt{2}$ | 10. 1 |

- | | |
|--|---|
| 11. $\frac{1}{2}(\sqrt{3}\sin\theta + \cos\theta)$ | 16. $\frac{1-\tan\beta}{1+\tan\beta}$ |
| 12. $\frac{\sqrt{2}}{2}(\sin x - \cos x)$ | 17. $\frac{1}{2}(\sqrt{3}\sin x - \cos x)$ |
| 13. $\sin\beta$ | 18. $-\sec 2\omega$ |
| 14. $\frac{1}{\tan x} = \cot x$ | 19. $-\tan\alpha$ |
| 15. $\frac{2}{\sqrt{3}\cos\alpha - \sin\alpha}$ | 20. $\frac{\sqrt{2}}{2}(\sin\theta + \cos\theta)$ |

EJERCICIO 44

- | | |
|----------------------------|-----------------------------------|
| 1. $-(2+\sqrt{3})$ | 6. $\frac{\sqrt{6}-\sqrt{2}}{4}$ |
| 2. $2-\sqrt{3}$ | 7. $\sqrt{3}-2$ |
| 3. $\sqrt{2}(1+\sqrt{3})$ | 8. $-(\sqrt{6}-\sqrt{2})$ |
| 4. $-\sqrt{2}(1+\sqrt{3})$ | 9. $\sqrt{2}-\sqrt{6}$ |
| 5. $2+\sqrt{3}$ | 10. $\frac{\sqrt{2}-\sqrt{3}}{2}$ |

$$11. \sin(\alpha+\beta) = \frac{\sqrt{13}}{65}, \cos(\alpha+\beta) = -\frac{18\sqrt{13}}{65},$$

$$\tan(\alpha+\beta) = -\frac{1}{18}$$

$$12. \sin(\alpha-\beta) = -\frac{\sqrt{2}+\sqrt{6}}{4}, \cos(\alpha-\beta) = \frac{\sqrt{6}-\sqrt{2}}{4},$$

$$\tan(\alpha-\beta) = -(2+\sqrt{3})$$

 13. Funciones del ángulo $(\alpha+\beta)$

$$\sin(\alpha+\beta) = -\frac{\sqrt{3}}{9}(2+\sqrt{10}), \cos(\alpha+\beta) = \frac{\sqrt{3}}{9}(\sqrt{5}-2\sqrt{2})$$

$$\tan(\alpha+\beta) = 3\sqrt{2}+2\sqrt{5}, \operatorname{ctg}(\alpha+\beta) = \frac{2\sqrt{5}-3\sqrt{2}}{2},$$

$$\sec(\alpha+\beta) = -(\sqrt{15}+2\sqrt{6}), \csc(\alpha+\beta) = \sqrt{3}-\frac{1}{2}\sqrt{30}$$

 Funciones del ángulo $(\alpha-\beta)$

$$\sin(\alpha-\beta) = \frac{\sqrt{3}}{9}(2-\sqrt{10}), \cos(\alpha-\beta) = -\frac{\sqrt{3}}{9}(\sqrt{5}+2\sqrt{2})$$

$$\tan(\alpha-\beta) = 2\sqrt{5}-3\sqrt{2}, \operatorname{ctg}(\alpha-\beta) = \frac{2\sqrt{5}+3\sqrt{2}}{2}$$

$$\sec(\alpha-\beta) = \sqrt{15}-2\sqrt{6}, \csc(\alpha-\beta) = -\sqrt{3}-\frac{1}{2}\sqrt{30}$$

14 a 34. No se incluye la solución por ser demostraciones.

EJERCICIO 45

1.

Funciones trigonométricas del ángulo $\frac{\pi}{8}$

$$\operatorname{sen} \frac{\pi}{8} = \frac{\sqrt{2-\sqrt{2}}}{2} \quad \operatorname{ctg} \frac{\pi}{8} = \sqrt{3+2\sqrt{2}}$$

$$\cos \frac{\pi}{8} = \frac{\sqrt{2+\sqrt{2}}}{2} \quad \sec \frac{\pi}{8} = \sqrt{4-2\sqrt{2}}$$

$$\tan \frac{\pi}{8} = \sqrt{3-2\sqrt{2}} \quad \csc \frac{\pi}{8} = \sqrt{4+2\sqrt{2}}$$

Funciones trigonométricas del ángulo $\frac{3}{8}\pi$

$$\operatorname{sen} \frac{3}{8}\pi = \frac{\sqrt{2+\sqrt{2}}}{2} \quad \operatorname{ctg} \frac{3}{8}\pi = \sqrt{3-2\sqrt{2}}$$

$$\cos \frac{3}{8}\pi = \frac{\sqrt{2-\sqrt{2}}}{2} \quad \sec \frac{3}{8}\pi = \sqrt{4+2\sqrt{2}}$$

$$\tan \frac{3}{8}\pi = \sqrt{3+2\sqrt{2}} \quad \csc \frac{3}{8}\pi = \sqrt{4-2\sqrt{2}}$$

Funciones trigonométricas del ángulo $\frac{5}{8}\pi$

$$\operatorname{sen} \frac{5}{8}\pi = \frac{\sqrt{2+\sqrt{2}}}{2} \quad \operatorname{ctg} \frac{5}{8}\pi = -\sqrt{3-2\sqrt{2}}$$

$$\cos \frac{5}{8}\pi = -\frac{\sqrt{2-\sqrt{2}}}{2} \quad \sec \frac{5}{8}\pi = -\sqrt{4+2\sqrt{2}}$$

$$\tan \frac{5}{8}\pi = -\sqrt{3+2\sqrt{2}} \quad \csc \frac{5}{8}\pi = \sqrt{4-2\sqrt{2}}$$

Funciones trigonométricas del ángulo $\frac{7}{8}\pi$

$$\operatorname{sen} \frac{7}{8}\pi = \frac{\sqrt{2-\sqrt{2}}}{2} \quad \operatorname{ctg} \frac{7}{8}\pi = -\sqrt{3+2\sqrt{2}}$$

$$\cos \frac{7}{8}\pi = -\frac{\sqrt{2+\sqrt{2}}}{2} \quad \sec \frac{7}{8}\pi = -\sqrt{4-2\sqrt{2}}$$

$$\tan \frac{7}{8}\pi = -\sqrt{3-2\sqrt{2}} \quad \csc \frac{7}{8}\pi = \sqrt{4+2\sqrt{2}}$$

2.

Funciones trigonométricas del ángulo $\frac{\alpha}{2}$

$$\operatorname{sen} \frac{\alpha}{2} = \frac{\sqrt{8+2\sqrt{15}}}{4} \quad \operatorname{ctg} \frac{\alpha}{2} = \sqrt{31-8\sqrt{15}}$$

$$\cos \frac{\alpha}{2} = \frac{\sqrt{8-2\sqrt{15}}}{4} \quad \sec \frac{\alpha}{2} = 2\sqrt{8+2\sqrt{15}}$$

$$\tan \frac{\alpha}{2} = \sqrt{31+8\sqrt{15}} \quad \csc \frac{\alpha}{2} = 2\sqrt{8-2\sqrt{15}}$$

Funciones trigonométricas del ángulo 2α

$$\operatorname{sen} 2\alpha = -\frac{\sqrt{15}}{8} \quad \operatorname{ctg} 2\alpha = -\frac{7\sqrt{15}}{15}$$

$$\cos 2\alpha = \frac{7}{8} \quad \sec 2\alpha = \frac{8}{7}$$

$$\tan 2\alpha = -\frac{\sqrt{15}}{7} \quad \csc 2\alpha = -\frac{8\sqrt{15}}{15}$$

3.

Funciones trigonométricas del ángulo $\frac{\beta}{2}$

$$\operatorname{sen} \frac{\beta}{2} = \frac{3\sqrt{13}}{13} \quad \operatorname{ctg} \frac{\beta}{2} = -\frac{2}{3}$$

$$\cos \frac{\beta}{2} = -\frac{2\sqrt{13}}{13} \quad \sec \frac{\beta}{2} = -\frac{\sqrt{13}}{2}$$

$$\tan \frac{\beta}{2} = -\frac{3}{2} \quad \csc \frac{\beta}{2} = \frac{\sqrt{13}}{3}$$

Funciones trigonométricas del ángulo 2β

$$\operatorname{sen} 2\beta = \frac{120}{169} \quad \operatorname{ctg} 2\beta = -\frac{119}{120}$$

$$\cos 2\beta = -\frac{119}{169} \quad \sec 2\beta = -\frac{169}{119}$$

$$\tan 2\beta = -\frac{120}{119} \quad \csc 2\beta = \frac{169}{120}$$

4.

Funciones trigonométricas del ángulo $\frac{\omega}{2}$

$$\operatorname{sen} \frac{\omega}{2} = \frac{\sqrt{3}}{4} \quad \operatorname{ctg} \frac{\omega}{2} = -\frac{\sqrt{39}}{3}$$

$$\cos \frac{\omega}{2} = -\frac{\sqrt{13}}{4} \quad \sec \frac{\omega}{2} = -\frac{4\sqrt{13}}{13}$$

$$\tan \frac{\omega}{2} = -\frac{\sqrt{39}}{13} \quad \csc \frac{\omega}{2} = \frac{4\sqrt{3}}{3}$$

Funciones trigonométricas del ángulo 2ω

$$\operatorname{sen} 2\omega = -\frac{5\sqrt{39}}{32} \quad \operatorname{ctg} 2\omega = \frac{7\sqrt{39}}{195}$$

$$\cos 2\omega = -\frac{7}{32} \quad \sec 2\omega = -\frac{32}{7}$$

$$\tan 2\omega = \frac{5\sqrt{39}}{7} \quad \csc 2\omega = -\frac{32\sqrt{39}}{195}$$

5.

Funciones trigonométricas del ángulo $\frac{\alpha}{2}$

$$\operatorname{sen} \frac{\alpha}{2} = \frac{\sqrt{98+28\sqrt{7}}}{14} \quad \operatorname{ctg} \frac{\alpha}{2} = \frac{\sqrt{33-12\sqrt{7}}}{3}$$

$$\cos \frac{\alpha}{2} = \frac{\sqrt{98-28\sqrt{7}}}{14} \quad \sec \frac{\alpha}{2} = \frac{\sqrt{42+12\sqrt{7}}}{3}$$

$$\tan \frac{\alpha}{2} = \frac{\sqrt{33+12\sqrt{7}}}{3} \quad \csc \frac{\alpha}{2} = \frac{\sqrt{42-12\sqrt{7}}}{3}$$

Funciones trigonométricas del ángulo 2α

$$\operatorname{sen} 2\alpha = -\frac{4\sqrt{3}}{7} \quad \operatorname{ctg} 2\alpha = -\frac{\sqrt{3}}{12}$$

$$\cos 2\alpha = \frac{1}{7} \quad \sec 2\alpha = 7$$

$$\tan 2\alpha = -4\sqrt{3} \quad \csc 2\alpha = -\frac{7\sqrt{3}}{12}$$

6.

Funciones trigonométricas del ángulo α

$$\operatorname{sen} \alpha = \frac{2}{3} \quad \cos \alpha = -\frac{\sqrt{5}}{3} \quad \tan \alpha = -\frac{2\sqrt{5}}{5}$$

7.

Funciones trigonométricas del ángulo $\frac{\beta}{2}$

$$\operatorname{sen} \frac{\beta}{2} = \frac{\sqrt{578+136\sqrt{17}}}{34} \quad \operatorname{ctg} \frac{\beta}{2} = -\sqrt{33-8\sqrt{17}}$$

$$\cos \frac{\beta}{2} = -\frac{\sqrt{578-136\sqrt{17}}}{34} \quad \sec \frac{\beta}{2} = -\sqrt{34+8\sqrt{17}}$$

$$\tan \frac{\beta}{2} = -\sqrt{33+8\sqrt{17}} \quad \csc \frac{\beta}{2} = \sqrt{34-8\sqrt{17}}$$

Funciones trigonométricas del ángulo β

$$\operatorname{sen} \beta = -\frac{\sqrt{17}}{17} \quad \operatorname{ctg} \beta = 4$$

$$\cos \beta = -\frac{4\sqrt{17}}{17} \quad \sec \beta = -\frac{\sqrt{17}}{4}$$

$$\tan \beta = \frac{1}{4} \quad \csc \beta = -\sqrt{17}$$

8.

Funciones trigonométricas del ángulo α

$$\operatorname{sen} \alpha = \frac{2\sqrt{5}}{5} \quad \tan \alpha = 2 \quad \sec \alpha = \sqrt{5}$$

$$\cos \alpha = \frac{\sqrt{5}}{5} \quad \operatorname{ctg} \alpha = \frac{1}{2} \quad \csc \alpha = \frac{\sqrt{5}}{2}$$

9.

Funciones trigonométricas del ángulo $\frac{\beta}{2}$

$$\operatorname{sen} \frac{\beta}{2} = \frac{\sqrt{3}}{3} \quad \tan \frac{\beta}{2} = \frac{\sqrt{2}}{2} \quad \sec \frac{\beta}{2} = \frac{\sqrt{6}}{2}$$

$$\cos \frac{\beta}{2} = \frac{\sqrt{6}}{3} \quad \operatorname{ctg} \frac{\beta}{2} = \sqrt{2} \quad \csc \frac{\beta}{2} = \sqrt{3}$$

Funciones trigonométricas del ángulo β

$$\operatorname{sen} \beta = \frac{2\sqrt{2}}{3} \quad \tan \beta = 2\sqrt{2} \quad \sec \beta = 3$$

$$\cos \beta = \frac{1}{3} \quad \operatorname{ctg} \beta = \frac{\sqrt{2}}{4} \quad \csc \beta = \frac{3\sqrt{2}}{4}$$

10.

Funciones trigonométricas del ángulo ω

$$\operatorname{sen} \omega = -\frac{3}{5} \quad \operatorname{ctg} \omega = -\frac{4}{3}$$

$$\cos \omega = \frac{4}{5} \quad \sec \omega = \frac{5}{4}$$

$$\tan \omega = -\frac{3}{4} \quad \csc \omega = -\frac{5}{3}$$

Funciones trigonométricas del ángulo 2ω

$$\operatorname{sen} 2\omega = -\frac{24}{25} \quad \operatorname{ctg} 2\omega = -\frac{7}{24}$$

$$\cos 2\omega = \frac{7}{25} \quad \sec 2\omega = \frac{25}{7}$$

$$\tan 2\omega = -\frac{24}{7} \quad \csc 2\omega = -\frac{25}{24}$$

Funciones trigonométricas del ángulo 4ω

$$\operatorname{sen} 4\omega = -\frac{336}{625} \quad \operatorname{ctg} 4\omega = \frac{527}{336}$$

$$\cos 4\omega = -\frac{527}{625} \quad \sec 4\omega = -\frac{625}{527}$$

$$\tan 4\omega = \frac{336}{527} \quad \csc 4\omega = -\frac{625}{336}$$

11 a 25. No se incluye la solución por ser demostraciones.

EJERCICIO 46

- $\frac{1}{2}[\operatorname{sen}(2\alpha) + \operatorname{sen}(2\beta)]$
- $\frac{1}{2}[\operatorname{sen}(105^\circ) + \operatorname{sen}(15^\circ)]$
- $-\frac{1}{2}[\cos(2y) - \cos(2\beta)]$
- $\frac{1}{2}\left[\cos\left(\frac{2}{3}\pi\right) + \cos\left(\frac{1}{6}\pi\right)\right]$
- $\frac{1}{2}[\operatorname{sen}(120^\circ) + \operatorname{sen}(45^\circ)]$
- $-\frac{1}{2}[\cos(45^\circ) - \cos(30^\circ)]$
- $\frac{1}{2}[\operatorname{sen}(2x) - \operatorname{sen}(2\alpha)]$
- $\frac{1}{2}\left[\cos(\pi) + \cos\left(\frac{1}{6}\pi\right)\right]$
- $\frac{1}{2}[\operatorname{sen}(45^\circ) - \operatorname{sen}(30^\circ)]$
- $\frac{1}{2}\left[\cos\left(\frac{11}{6}\pi\right) + \cos\left(\frac{5}{3}\pi\right)\right]$
- $-2[\cos(4\alpha) - \cos(2\alpha)]$
- $\frac{5}{2}[\operatorname{sen}(8\alpha) + \operatorname{sen}(4\alpha)]$
- $\frac{1}{2}[\operatorname{sen}(90^\circ) - \operatorname{sen}(4^\circ)]$
- $\frac{1}{2}\left[\cos\frac{1}{3}(2\alpha+5\beta) + \cos\frac{1}{3}(2\alpha-5\beta)\right]$
- $\frac{3}{2}\left[\operatorname{sen}\left(\frac{19}{2}\alpha\right) + \operatorname{sen}\left(\frac{17}{2}\alpha\right)\right]$
- $\frac{2}{\cos\frac{\pi}{2} + \cos\frac{\pi}{6}}$
- $\frac{\operatorname{sen}3\alpha + \operatorname{sen}\alpha}{\operatorname{sen}3\alpha - \operatorname{sen}\alpha}$
- $\frac{2}{\operatorname{sen}\pi - \operatorname{sen}\frac{\pi}{2}}$
- $\frac{\cos2\alpha - \cos2x}{\cos2\alpha + \cos2x}$
- $\frac{1}{2}[\operatorname{sen}(4\alpha) + \operatorname{sen}(2\beta)]$

EJERCICIO 47

1 a 14. No se incluye la solución por ser demostraciones.

EJERCICIO 48

- $2[\operatorname{sen}(120^\circ) \cdot \cos(45^\circ)]$
- $2\left[\cos\left(\frac{5}{2}\beta\right) \cos\left(\frac{9}{2}\beta\right)\right]$
- $2[\operatorname{sen}(180^\circ) \cos(60^\circ)]$
- $-2[\operatorname{sen}(4\theta) \operatorname{sen}(\theta)]$
- $2[\cos(45^\circ) \cos(7^\circ 31')]$
- $2\left[\cos\left(\frac{1}{3}\pi\right) \operatorname{sen}\left(\frac{1}{4}\pi\right)\right]$
- $2\left[\cos\left(\frac{1}{4}\pi\right) \cos\left(\frac{1}{36}\pi\right)\right]$
- $2[\cos(30^\circ) \operatorname{sen}(5^\circ)]$
- $-2\left[\operatorname{sen}\left(\frac{5}{12}\pi\right) \operatorname{sen}\left(\frac{1}{3}\pi\right)\right]$
- $2\left[\cos(\beta) \cos\left(\frac{1}{6}\pi\right)\right]$
- $2\left[\operatorname{sen}\left(\frac{7}{24}\pi\right) \cos\left(\frac{1}{24}\pi\right)\right]$
- $2\left[\operatorname{sen}\left(\frac{3}{4}(\alpha+\beta)\right) \cos\left(\frac{1}{4}(\alpha-\beta)\right)\right]$
- $-2\left[\operatorname{sen}(\alpha) \operatorname{sen}\left(\frac{\pi}{4}\right)\right]$
- $2\left[\operatorname{sen}(\beta) \cos\left(\frac{\pi}{8}\right)\right]$
- $2\left[\operatorname{sen}\left(\frac{3}{4}\pi\right) \cos\left(\alpha - \frac{\pi}{8}\right)\right]$
- $-2\left[\operatorname{sen}\left(\frac{\alpha}{2}\right) \operatorname{sen}\left(\frac{\beta}{2}\right)\right]$

EJERCICIO 49

1 a 12. No se incluye la solución por ser demostraciones.

EJERCICIO 50

1. $\frac{\pi}{4}, \frac{5}{4}\pi$
2. $\frac{\pi}{2}, 36^\circ 52' 11''$
3. $\frac{7}{12}\pi, \frac{23}{12}\pi$
4. $\frac{1}{4}\pi, \frac{5}{4}\pi$
5. $\frac{1}{6}\pi, \frac{5}{6}\pi$
6. $\frac{1}{3}\pi, \frac{5}{3}\pi$
7. $0, \pi, 2\pi$
8. $0, \pi, 2\pi, \frac{7}{6}\pi, \frac{11}{6}\pi$
9. $0, 2\pi, 152^\circ 44', 207^\circ 15'$
10. $\frac{1}{4}\pi, \frac{7}{4}\pi, \frac{3}{4}\pi, \frac{5}{4}\pi$
11. $\frac{1}{2}\pi, \frac{1}{4}\pi, \frac{5}{4}\pi$
12. $\frac{7}{6}\pi, \frac{11}{6}\pi$
13. $\frac{1}{4}\pi, \frac{5}{4}\pi$
14. $\frac{1}{3}\pi, \frac{2}{3}\pi, \frac{4}{3}\pi, \frac{5}{3}\pi$
15. $\frac{1}{6}\pi, \frac{7}{6}\pi$
16. $\frac{1}{2}\pi, \frac{1}{6}\pi, \frac{5}{6}\pi$
17. $\frac{1}{4}\pi, \frac{5}{4}\pi$
18. $0, \pi, 2\pi, \frac{2}{3}\pi, \frac{4}{3}\pi$
19. $\frac{1}{3}\pi, \frac{5}{3}\pi$
20. $0, \frac{1}{3}\pi, \frac{2}{3}\pi, \frac{4}{3}\pi, \frac{5}{3}\pi, \pi, 2\pi$

21. $0, \frac{2}{3}\pi, \frac{5}{3}\pi, \pi, 2\pi$

22. $\frac{1}{2}\pi, \frac{3}{4}\pi, \frac{5}{4}\pi$

23. $\frac{3}{2}\pi, \frac{1}{3}\pi, \frac{2}{3}\pi$

24. $\frac{1}{3}\pi, \frac{5}{3}\pi$

25. $\frac{7}{6}\pi, \frac{11}{6}\pi, \frac{1}{3}\pi, \frac{5}{3}\pi$

26. $\frac{7}{6}\pi, \frac{1}{6}\pi$

27. $\frac{7}{12}\pi, \frac{11}{12}\pi$

28. $\frac{7}{6}\pi, \frac{11}{6}\pi, \frac{1}{6}\pi, \frac{5}{6}\pi$

29. $\frac{1}{3}\pi, \frac{4}{3}\pi$

30. $\frac{1}{3}\pi, \pi, \frac{5}{3}\pi$

CAPÍTULO 15**EJERCICIO 51**

1. $c = \sqrt{145}, A = 44^\circ 54', \angle C = 45^\circ 6'$
2. $a = 2.11, c = 3.39, \angle C = 58^\circ$
3. $c = 5.23, b = 7.24, \angle A = 43^\circ 40'$
4. $b = 52.55, \angle A = 38^\circ 11' 40'', \angle C = 51^\circ 48' 20''$
5. $c = 13, b = 13\sqrt{2}, \angle C = 45^\circ$
6. $a = 13.28, c = 18.28, \angle A = 36^\circ$
7. $a = 12.51, \angle A = 33^\circ 46' 46'', \angle C = 56^\circ 13' 14''$
8. $a = 25.71, c = 22.9, \angle C = 41^\circ 48'$
9. $a = 82.68, b = 100.36, \angle A = 55^\circ 28'$
10. $c = 7.87, \angle A = 66^\circ 39' 17'', \angle C = 23^\circ 20' 43''$
11. $b = 22.36, c = 18.86, \angle C = 57^\circ 33'$
12. $c = \sqrt{13}, \angle A = 29^\circ 1' 1'', \angle C = 60^\circ 58' 59''$
13. $a = 15.27, c = 17.19, \angle A = 41^\circ 37'$
14. $b = 7.9, \angle A = 71^\circ 33' 54'', \angle C = 18^\circ 26' 5''$
15. $a = 6.28, b = 14.44, \angle C = 64^\circ 11'$
16. $\angle A = 26^\circ 33' 54'', \angle C = 63^\circ 26' 6''$

17. $a = 5, b = 13, c = 12, \angle A = 22^\circ 37' 11'', \angle C = 67^\circ 22' 48''$

18. $a = 4, b = 5, c = 3, \angle A = 53^\circ 7' 49'', \angle C = 36^\circ 52' 11''$

19. $\angle A = \angle C = 45^\circ$

20. $\angle A = 19^\circ 28' 16'', \angle C = 70^\circ 31' 44''$

EJERCICIO 52

1. 288,4 m

2. 4,2 m

3. $38^\circ 44' 4'', 1,65m$

4. $(10\sqrt{2} + 1)m$

5. $54^\circ 8'$

6. 52,07 m

7. 11,25 m

8. a) 53,6 m, b) 59,1 m, c) 22,6 m

9. $53^\circ 7', 3 m$

10. $21^\circ 47', 14 dm$

11. $L = \frac{\pi R}{90} \left[180 - \cos^{-1} \left(\frac{R-r}{l} \right) \right] + \frac{\pi r}{90} \cos^{-1} \left(\frac{R-r}{l} \right) + 2\sqrt{l^2 - (R-r)^2}$

12. sí

CAPÍTULO 16**EJERCICIO 53**

1. $a = 20,9, c = 14,7, \angle A = 79^\circ 1'$

2. $b = 52,4, a = 47,7, \angle B = 79^\circ 16'$

3. $b = 21,03, a = 46,9, \angle C = 67^\circ 44'$

4. $b = 86,21, c = 66,87, \angle B = 76^\circ 39'$

5. $a = 23,35, c = 25,23, \angle A = 67^\circ$

6. $b = 17,09, c = 22,3, \angle C = 99^\circ$

7. $c = 9,43, \angle B = 57^\circ 58' 51'', \angle C = 90^\circ 1' 8''$

8. $a = 19,8, \angle A = 118^\circ 23' 35'', \angle B = 26^\circ 21' 24''$

9. $c = 15,11, \angle A = 40^\circ 5' 50'', \angle C = 83^\circ 19' 9''$

10. $b = 11,4, \angle A = 46^\circ 14' 25'', \angle B = 66^\circ 24' 34''$

11. $\angle A = 31^\circ 48' 52'', \angle B = 34^\circ 12' 58'', \angle C = 113^\circ 58' 10''$

12. $\angle A = 27^\circ 25' 16'', \angle B = 44^\circ 1' 54'', \angle C = 108^\circ 32' 50''$

13. $\angle A = 52^\circ 17' 24'', \angle B = 44^\circ 33' 55'', \angle C = 83^\circ 8' 41''$

14. $\angle A = 48^\circ 20' 58'', \angle B = 36^\circ 42' 37'', \angle C = 94^\circ 56' 23''$

15. $c = 15,3, \angle A = 46^\circ 39' 8'', \angle B = 65^\circ 20' 52''$

16. $b = 37,07, \angle A = 47^\circ 7' 45'', \angle C = 56^\circ 52' 15''$

17. $a = 46,05, \angle B = 34^\circ 5' 24'', \angle C = 110^\circ 54' 36''$

18. $c = 15,65, \angle A = 41^\circ 52' 18'', \angle B = 82^\circ 7' 42''$

EJERCICIO 54

1. $\overline{AB} = 369,95 m$

2. 1,76 cm

3. 30,34 km

4. 19,4 km

5. 8,03 m

6. 4,7 cm

7. 322,92 km

8. 307,4 m

9. 29,07 km

10. 180,37 m

11. 29,7 cm

12 a 13. No se incluye la solución por ser demostraciones.

CAPÍTULO 17**EJERCICIO 55**

1. $z = \sqrt{17} \operatorname{cis} 345^\circ 37' 49''$

2. $z = 2 \operatorname{cis} 30^\circ$

3. $z = 2\sqrt{2} \operatorname{cis} 135^\circ$

4. $z = 5 \operatorname{cis} 0^\circ$

5. $z = 3 \operatorname{cis} 270^\circ$

6. $z = \frac{5}{6} \operatorname{cis} 53^\circ 7' 48''$

7. $z = \operatorname{cis} 315^\circ$

8. $z = \operatorname{cis} 150^\circ$

9. $z_1 \cdot z_2 = \sqrt{26} \operatorname{cis} 75^\circ$

10. $z_2 \cdot z_4 = \sqrt{26} \operatorname{cis} 165^\circ$

11. $z_1 \cdot z_3 = 2\sqrt{2} \operatorname{cis} 105^\circ$

12. $z_1 \cdot z_2 \cdot z_3 = 2\sqrt{26} \operatorname{cis} 135^\circ$

13. $z_1 \cdot z_3 \cdot z_4 = 4 \operatorname{cis} 240^\circ$

14. $\frac{z_1}{z_4} = \operatorname{cis} 270^\circ$

15. $\frac{z_2}{z_4} = \frac{\sqrt{26}}{2} \operatorname{cis} 255^\circ$

16. $\frac{z_1}{z_3} = \frac{\sqrt{2}}{2} \operatorname{cis} 345^\circ$

17. $\frac{z_1 \cdot z_2}{z_3} = \frac{\sqrt{26}}{2} \operatorname{cis} 15^\circ$

18. $\frac{z_2}{z_1 \cdot z_4} = \frac{\sqrt{13}}{2} \operatorname{cis} 210^\circ$