



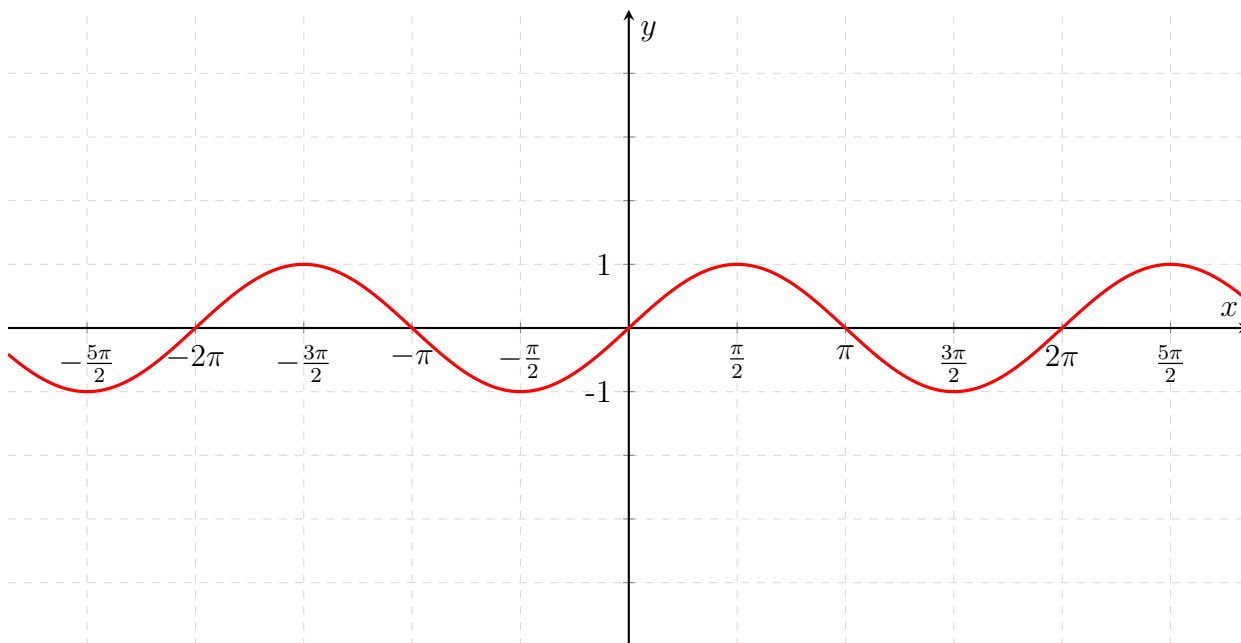
MTM3100 - Pré-cálculo

Gabarito parcial da 13ª lista de exercícios

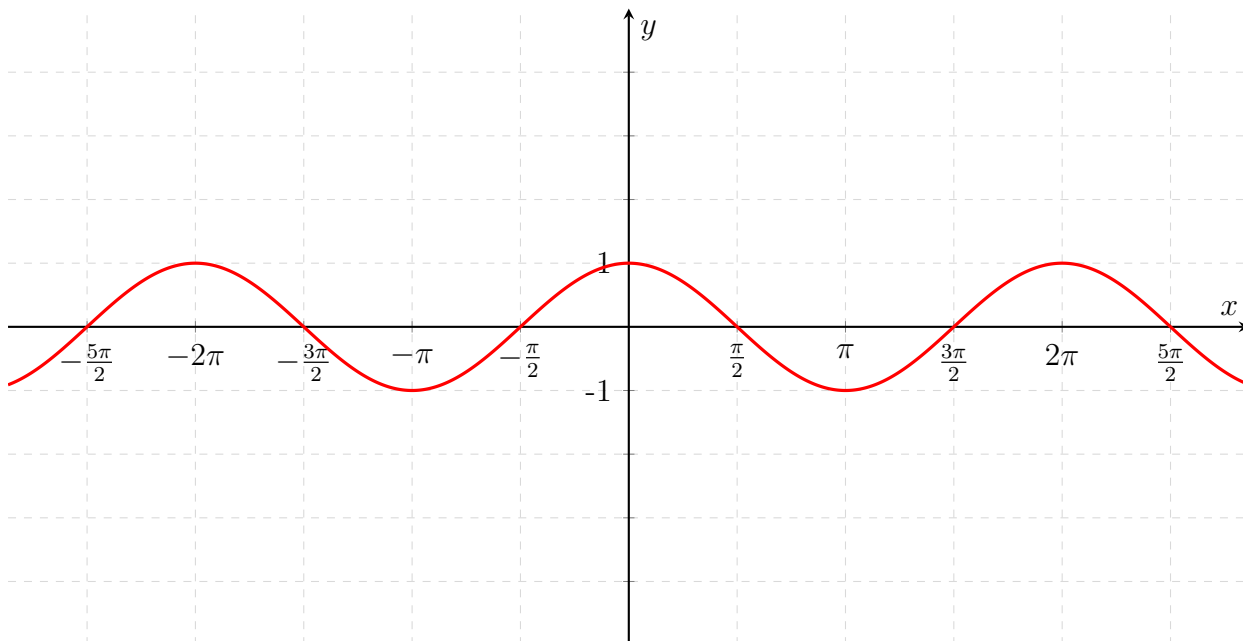
1. (a) $x = 5$. (b)
(c) $x = \frac{2}{5}$. (d)
(e) Não há solução. (f) $x = -\frac{9}{4}$.
(g) $x = 2 \log 5$. (h) $x = -\frac{\ln 7}{2}$.
(i) $x = 1 - \log_2 3$. (j) $x = \log_{5/4} 4 = \frac{\log 4}{\log 5 - \log 4}$.
(k) $x = \frac{2 \log 5}{\log 7 + 2 \log 5} = \log_{175} 25$. (l)
2. (a) $x = 0$ ou $x = \ln 2$. (b) $x = 2 \ln 2$.
(c) (d) $x = -1$ ou $x = 2$.
3. (a) $x = e^{10}$. (b) $x = e - 2$.
(c) (d) $x = 1004$.
(e) $x = -2$ ou $x = 3$. (f)
(g) (h) $x = \frac{\sqrt{9 + 4e} - 1}{2}$.
(i)
4. (a) $S = (-\infty, \log_2 3)$. (b) $S = [1/2 - \log_3 2, \infty)$.
(c) $S = \emptyset$. (d)
(e) $S = (0, 4)$. (f)
5. (a) $f^{-1}(x) = \frac{\log_2 x}{2}$. (b) $f^{-1}(x) = 2^x + 1$.
6. (a) $P(h) = P_0 e^{-h/k}$.
(b) $P(4) \cong 56,47 \text{ kPa}$.

7. (a) $y = -\frac{4}{5}$. (b) $x = \frac{24}{25}$.
 (c) $y = 0$. (d)
8. (a) $(-1, 0)$. (b) $(1, 0)$. (c) (d)
 (e) $(-\sqrt{3}/2, 1/2)$. (f) (g) (h)
9. (a) $\bar{t} = \frac{\pi}{3}$. (b) (c) $\bar{t} = \frac{\pi}{3}$.
 (d) (e) $\bar{t} = \frac{\pi}{3}$. (f)
10. (a) $(1/2, \sqrt{3}/2)$ e $(-1/2, -\sqrt{3}/2)$. (b) (c) $(1/2, \sqrt{3}/2)$ e $(1/2, \sqrt{3}/2)$.
 (d) (e) $(1/2, \sqrt{3}/2)$ e $(1/2, \sqrt{3}/2)$. (f)
11. (a) $\sin 0 = 0$, $\cos 0 = 1$, $\operatorname{tg} 0 = 0$, $\sec 0 = 1$.
 (b) $\sin \pi/2 = 1$, $\cos \pi/2 = 0$, $\operatorname{cotg} \pi/2 = 0$, $\operatorname{cosec} \pi/2 = 1$.
 (c) $\sin \pi = 0$, $\cos \pi = -1$, $\operatorname{tg} \pi = 0$, $\sec \pi = -1$.
 (d) $\sin 3\pi/2 = -1$, $\cos 3\pi/2 = 0$, $\operatorname{cotg} 3\pi/2 = 0$, $\operatorname{cosec} 3\pi/2 = -1$.
 (e) $\sin 2\pi = 0$, $\cos 2\pi = 1$, $\operatorname{tg} 2\pi = 0$, $\sec 2\pi = 1$.
 (f) $\sin(-\pi/2) = -1$, $\cos(-\pi/2) = 0$, $\operatorname{cotg}(-\pi/2) = 0$, $\operatorname{cosec}(-\pi/2) = -1$.
 (g) $\sin 2k\pi = 0$, $\cos 2k\pi = 1$, $\operatorname{tg} 2k\pi = 0$, $\sec 2k\pi = 1$.
 (h) $\sin(\pi/2 + 2k\pi) = 1$, $\cos(\pi/2 + 2k\pi) = 0$, $\operatorname{cotg}(\pi/2 + 2k\pi) = 0$, $\operatorname{cosec}(\pi/2 + 2k\pi) = 1$.
12. (a) $\sin \pi/4 = \sqrt{2}/2$, $\cos \pi/4 = \sqrt{2}/2$, $\operatorname{tg} \pi/4 = 1$, $\operatorname{cotg} \pi/4 = 1$, $\sec \pi/4 = \sqrt{2}$, $\operatorname{cosec} \pi/4 = \sqrt{2}$.
 (b) $\sin 3\pi/4 = \sqrt{2}/2$, $\cos 3\pi/4 = -\sqrt{2}/2$, $\operatorname{tg} 3\pi/4 = -1$, $\operatorname{cotg} 3\pi/4 = -1$, $\sec 3\pi/4 = -\sqrt{2}$,
 $\operatorname{cosec} 3\pi/4 = \sqrt{2}$.
 (c)
 (d)
 (e) $\sin(-3\pi/4) = -\sqrt{2}/2$, $\cos(-3\pi/4) = -\sqrt{2}/2$, $\operatorname{tg}(-3\pi/4) = 1$, $\operatorname{cotg}(-3\pi/4) = 1$, $\sec(-3\pi/4) = -\sqrt{2}$,
 $\operatorname{cosec}(-3\pi/4) = -\sqrt{2}$.
 (f) $\sin(\pi/4 + 2k\pi) = \sqrt{2}/2$, $\cos(\pi/4 + 2k\pi) = \sqrt{2}/2$, $\operatorname{tg}(\pi/4 + 2k\pi) = 1$, $\operatorname{cotg}(\pi/4 + 2k\pi) = 1$,
 $\sec(\pi/4 + 2k\pi) = \sqrt{2}$, $\operatorname{cosec}(\pi/4 + 2k\pi) = \sqrt{2}$.

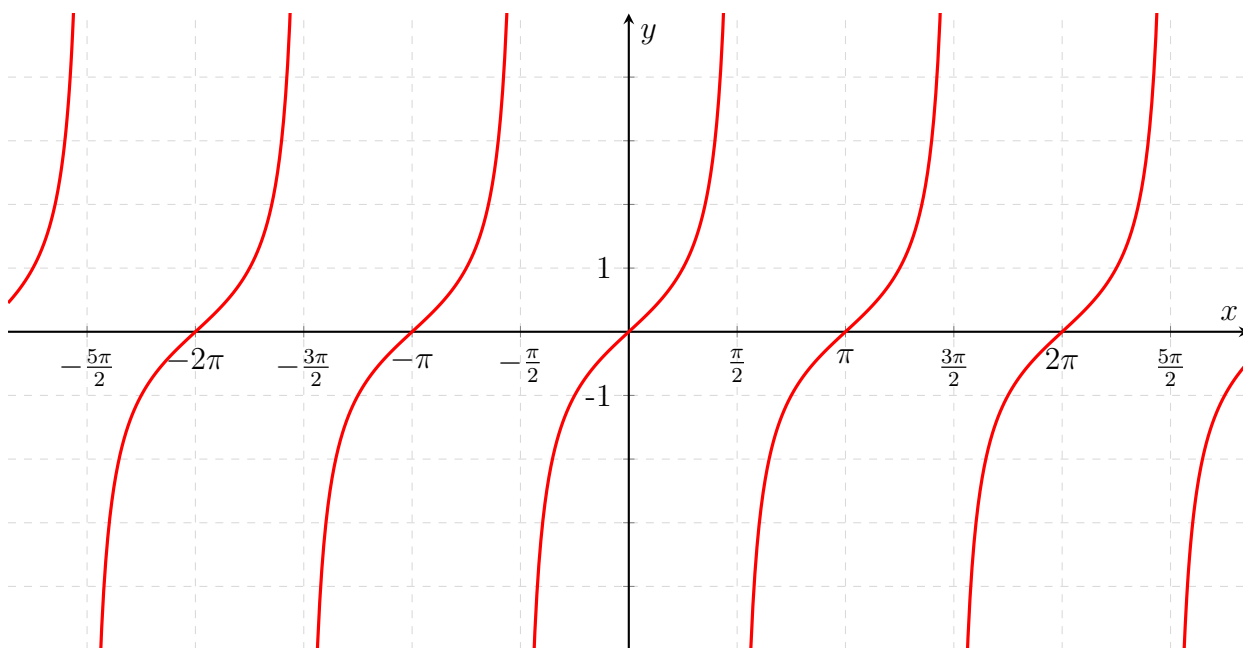
13. (a) $\sin \pi/6 = 1/2$, $\cos \pi/6 = \sqrt{3}/2$, $\operatorname{tg} \pi/6 = \sqrt{3}/3$, $\operatorname{cotg} \pi/6 = \sqrt{3}$, $\sec \pi/6 = 2\sqrt{3}/3$, $\operatorname{cosec} \pi/6 = 2$.
- (b)
- (c) $\sin 7\pi/6 = -1/2$, $\cos 7\pi/6 = -\sqrt{3}/2$, $\operatorname{tg} 7\pi/6 = \sqrt{3}/3$, $\operatorname{cotg} 7\pi/6 = \sqrt{3}$, $\sec 7\pi/6 = -2\sqrt{3}/3$, $\operatorname{cosec} 7\pi/6 = -2$.
- (d)
- (e) $\sin(-5\pi/6) = -1/2$, $\cos(-5\pi/6) = -\sqrt{3}/2$, $\operatorname{tg}(-5\pi/6) = \sqrt{3}/3$, $\operatorname{cotg}(-5\pi/6) = \sqrt{3}$, $\sec(-5\pi/6) = -2\sqrt{3}/3$, $\operatorname{cosec}(-5\pi/6) = -2$.
- (f) $\sin(11\pi/6 + 2k\pi) = -1/2$, $\cos(11\pi/6 + 2k\pi) = \sqrt{3}/2$, $\operatorname{tg}(11\pi/6 + 2k\pi) = -\sqrt{3}/3$, $\operatorname{cotg}(11\pi/6 + 2k\pi) = -\sqrt{3}$, $\sec(11\pi/6 + 2k\pi) = 2\sqrt{3}/3$, $\operatorname{cosec}(11\pi/6 + 2k\pi) = -2$.
14. (a) $\sin t = 3/5$, $\cos t = -4/5$, $\operatorname{tg} t = -3/4$, $\operatorname{cotg} t = -4/3$, $\sec t = -5/4$, $\operatorname{cosec} t = 5/3$.
- (b) $\sin t = -2\sqrt{6}/5$, $\cos t = -1/5$, $\operatorname{tg} t = 2\sqrt{6}$, $\operatorname{cotg} t = \sqrt{6}/12$, $\sec t = -5$, $\operatorname{cosec} t = -5\sqrt{6}/12$.
- (c) $\sin t = -7\sqrt{2}/10$, $\cos t = \sqrt{2}/10$, $\operatorname{tg} t = -7$, $\operatorname{cotg} t = -1/7$, $\sec t = 5\sqrt{2}$, $\operatorname{cosec} t = -5\sqrt{2}/7$.
- (d)
- (e) $\sin t = \sqrt{3}/2$, $\cos t = -1/2$, $\operatorname{tg} t = \sqrt{3}$, $\operatorname{cotg} t = -\sqrt{3}/3$, $\sec t = -2$, $\operatorname{cosec} t = 2\sqrt{3}/3$.
- (f)
15. $\cos t = -\sqrt{1 - \sin^2 t}$ e $\operatorname{tg} t = -\frac{\sin t}{\sqrt{1 - \sin^2 t}}$.
16. (a) Função $f(x) = \sin x$. $\operatorname{Dom}(f) = \mathbb{R}$, $\operatorname{Im}(f) = [-1, 1]$, período 2π , f é ímpar.



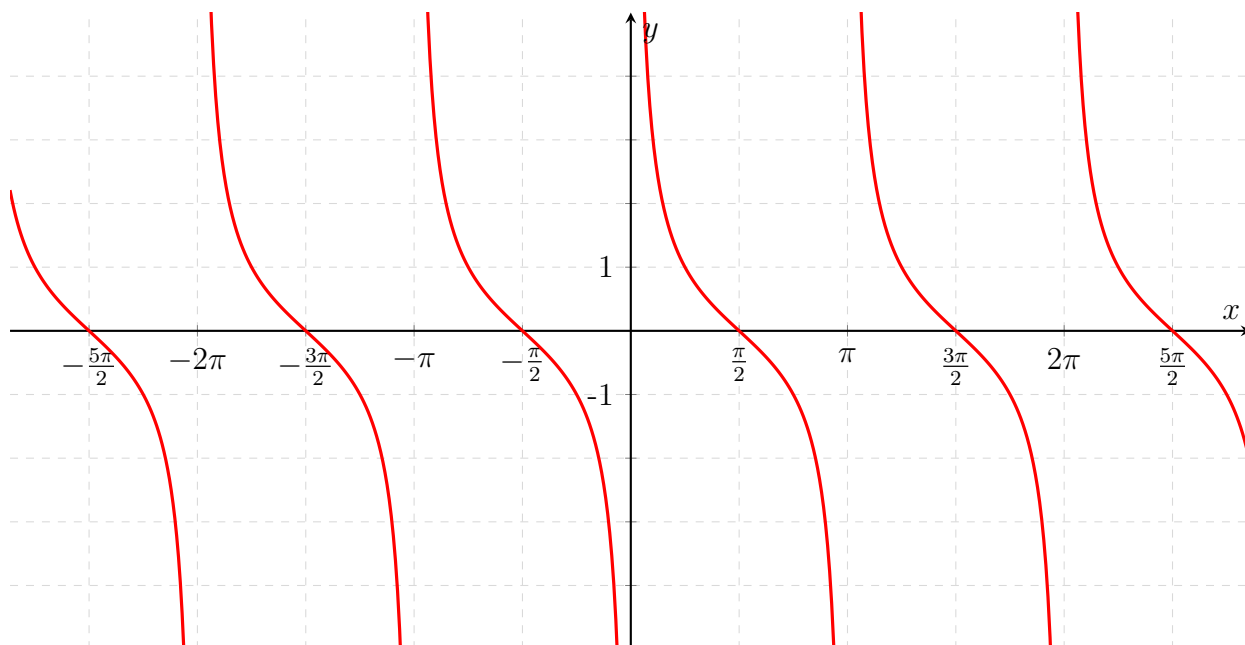
(b) Função $f(x) = \cos x$. $\text{Dom}(f) = \mathbb{R}$, $\text{Im}(f) = [-1, 1]$, período 2π , f é par.



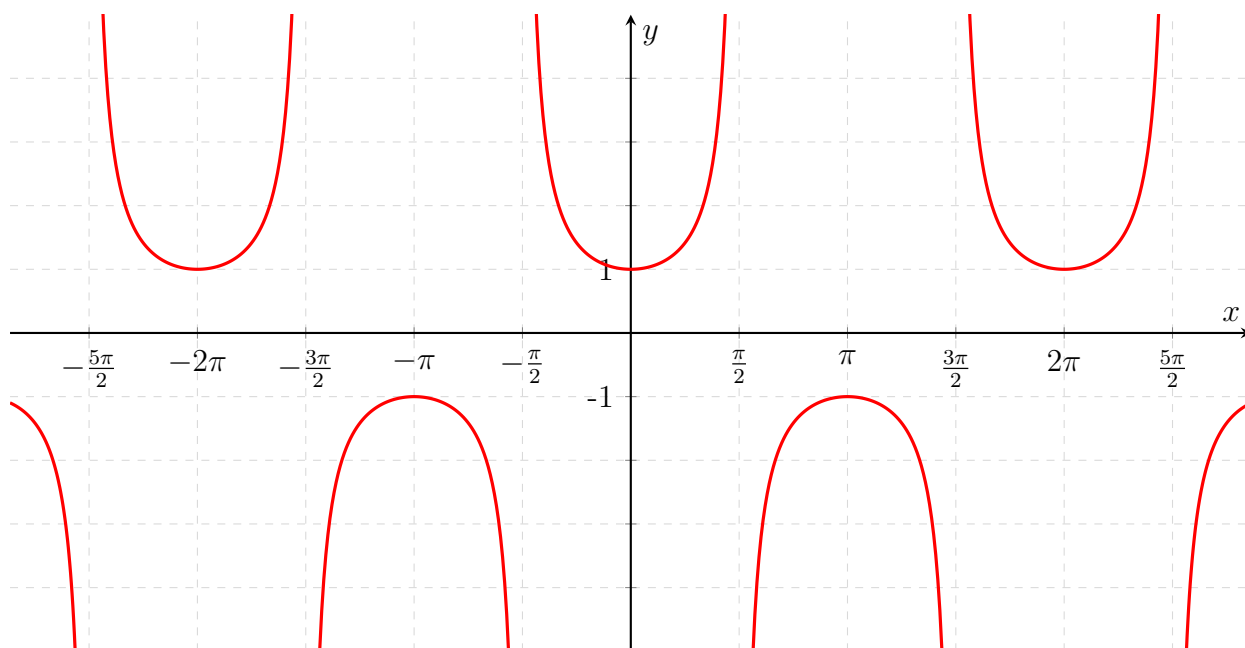
(c) Função $f(x) = \text{tg } x$. $\text{Dom}(f) = \mathbb{R} - \{\pi/2 + k\pi \mid k \in \mathbb{Z}\}$, $\text{Im}(f) = \mathbb{R}$, período π , f é ímpar.



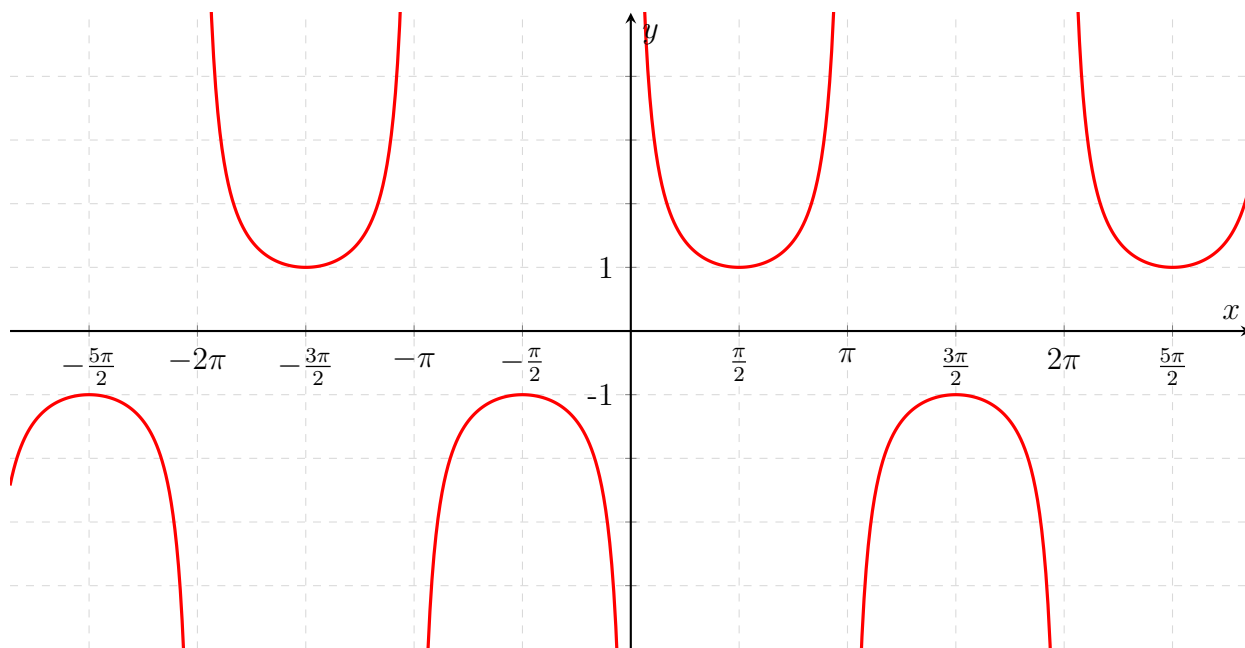
(d) Função $f(x) = \cotg x$. $\text{Dom}(f) = \mathbb{R} - \{k\pi \mid k \in \mathbb{Z}\}$, $\text{Im}(f) = \mathbb{R}$, período π , f é ímpar.



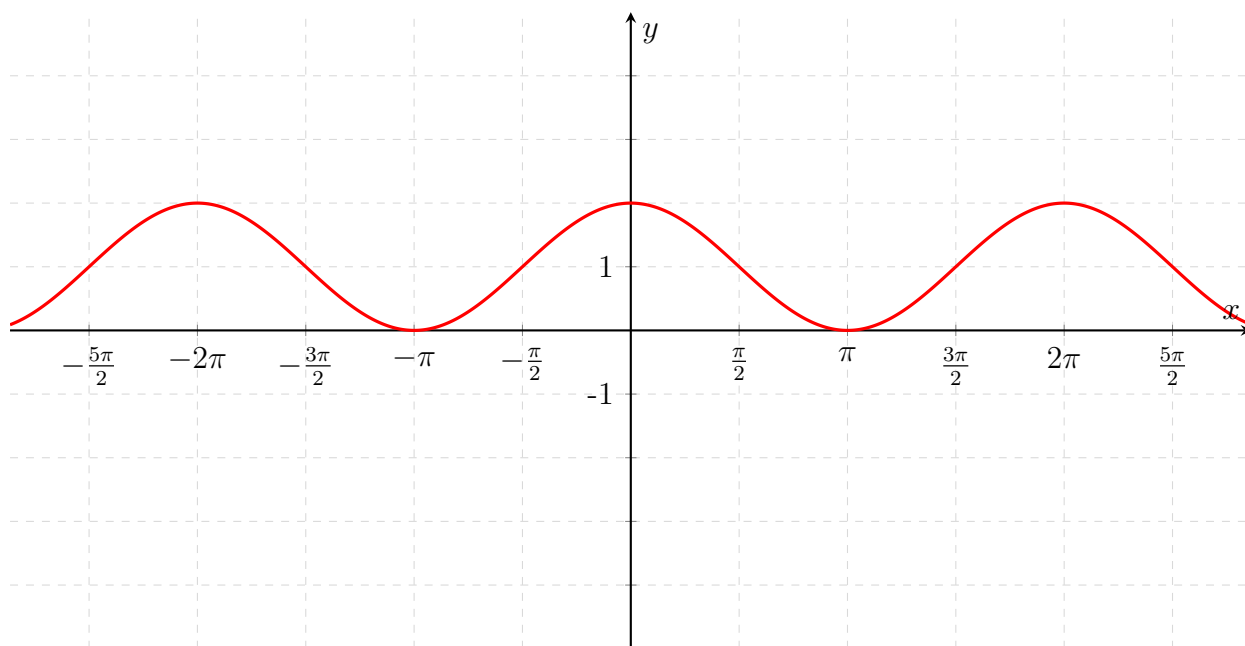
(e) Função $f(x) = \sec x$. $\text{Dom}(f) = \mathbb{R} - \{\pi/2 + k\pi \mid k \in \mathbb{Z}\}$, $\text{Im}(f) = (-\infty, -1] \cup [1, \infty)$, período 2π , f é par.



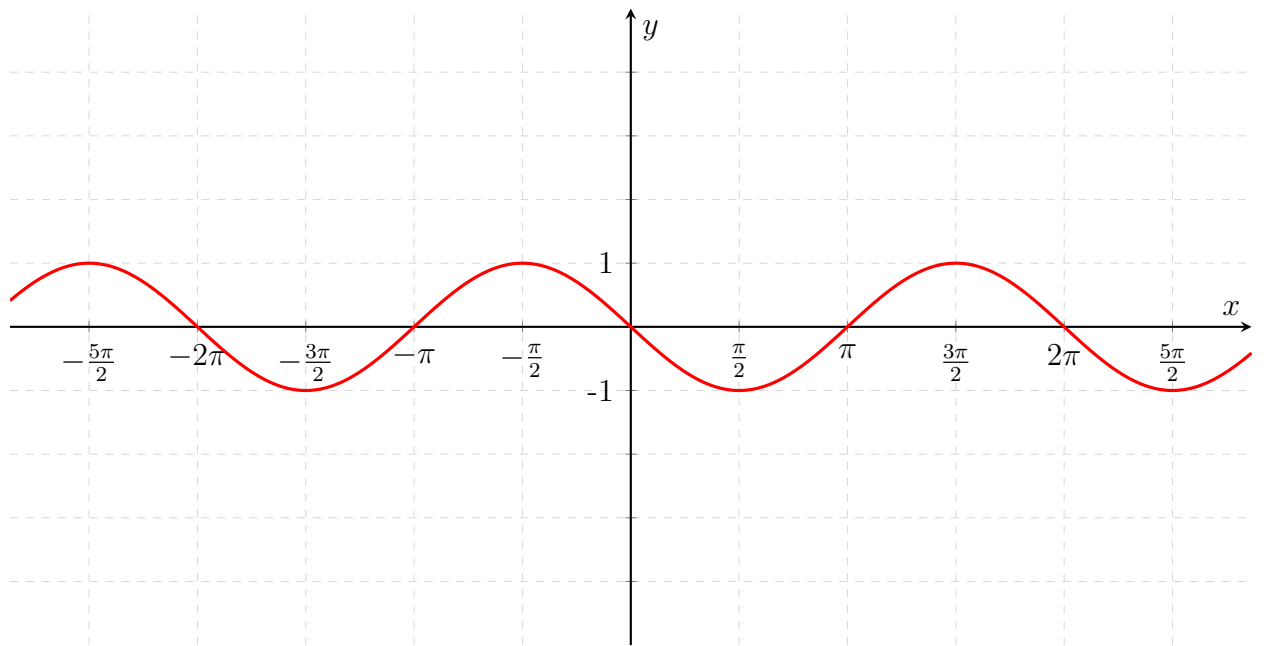
(f) Função $f(x) = \operatorname{cosec} x$. $\operatorname{Dom}(f) = \mathbb{R} - \{k\pi \mid k \in \mathbb{Z}\}$, $\operatorname{Im}(f) = (-\infty, -1] \cup [1, \infty)$, período 2π , f é ímpar.



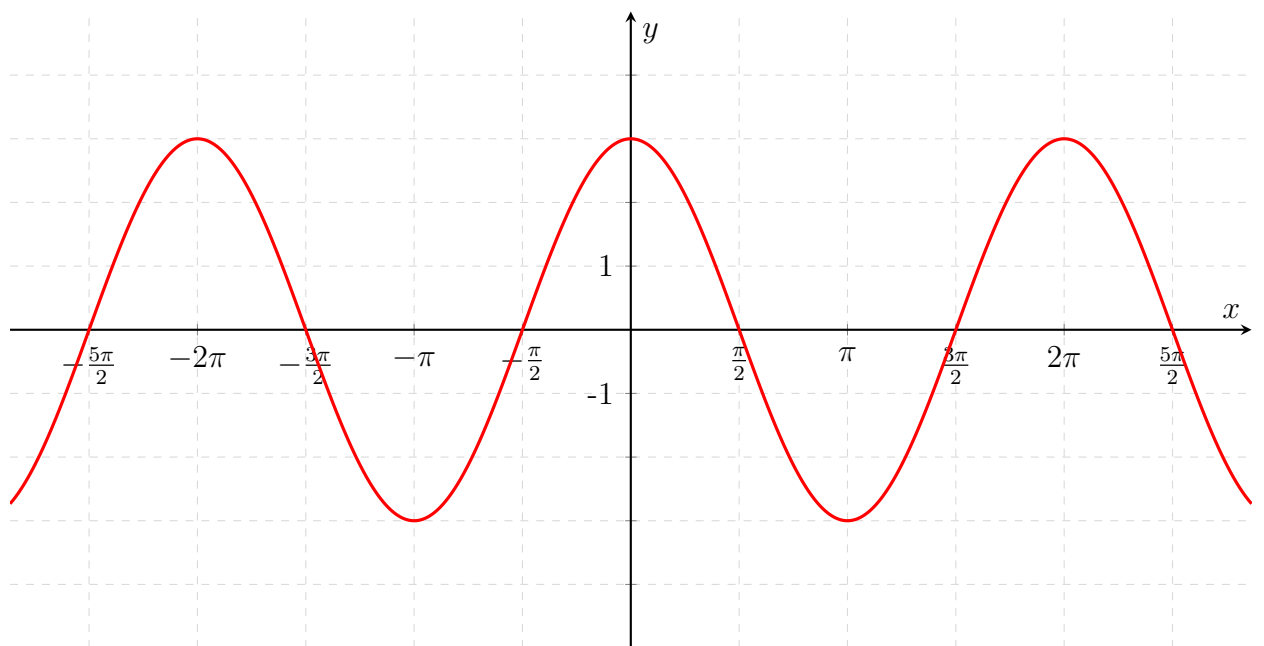
17. (a)



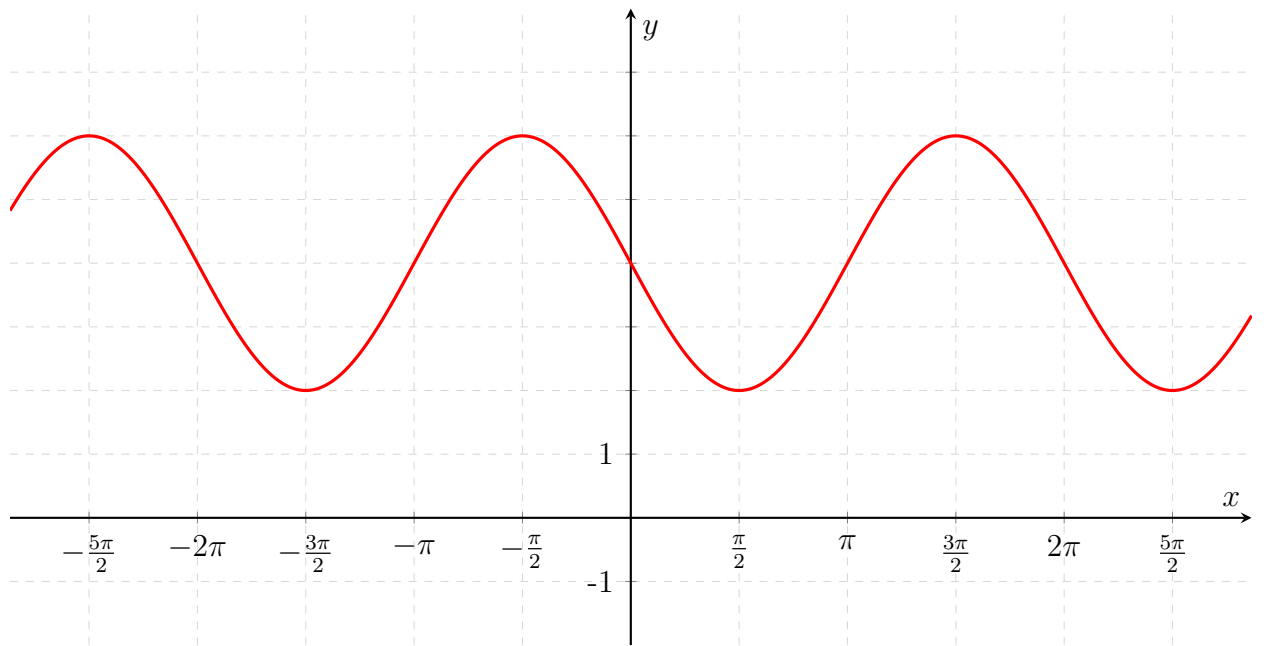
(b)



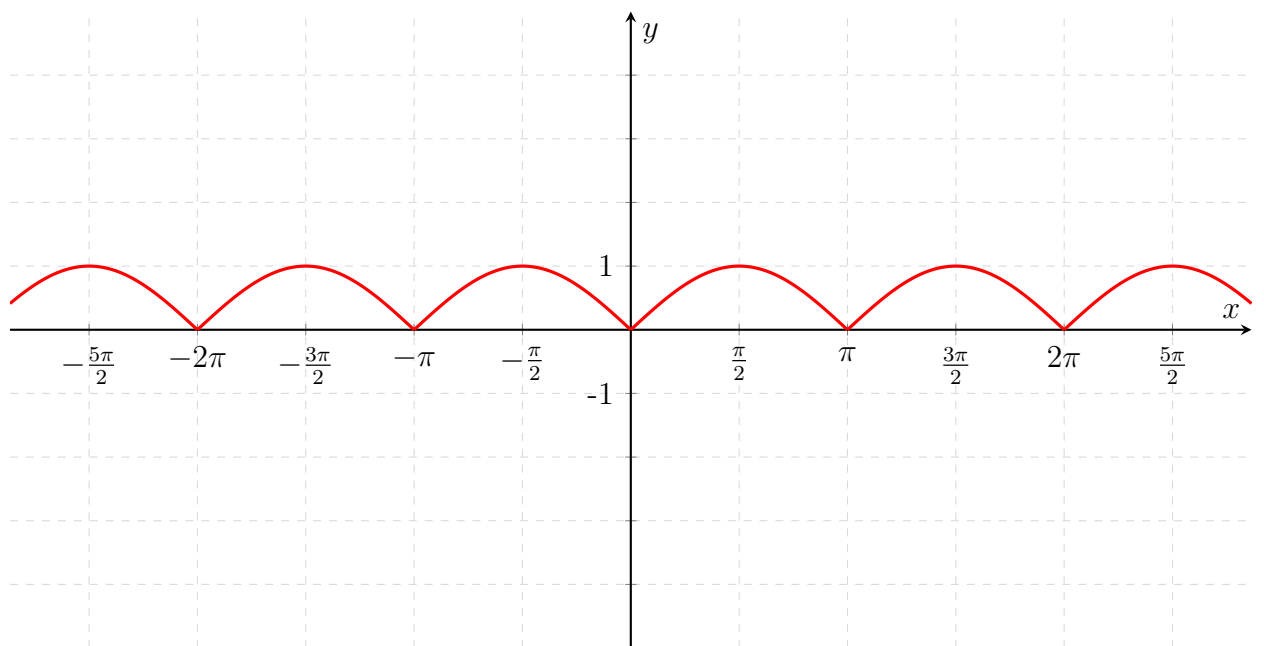
(c)



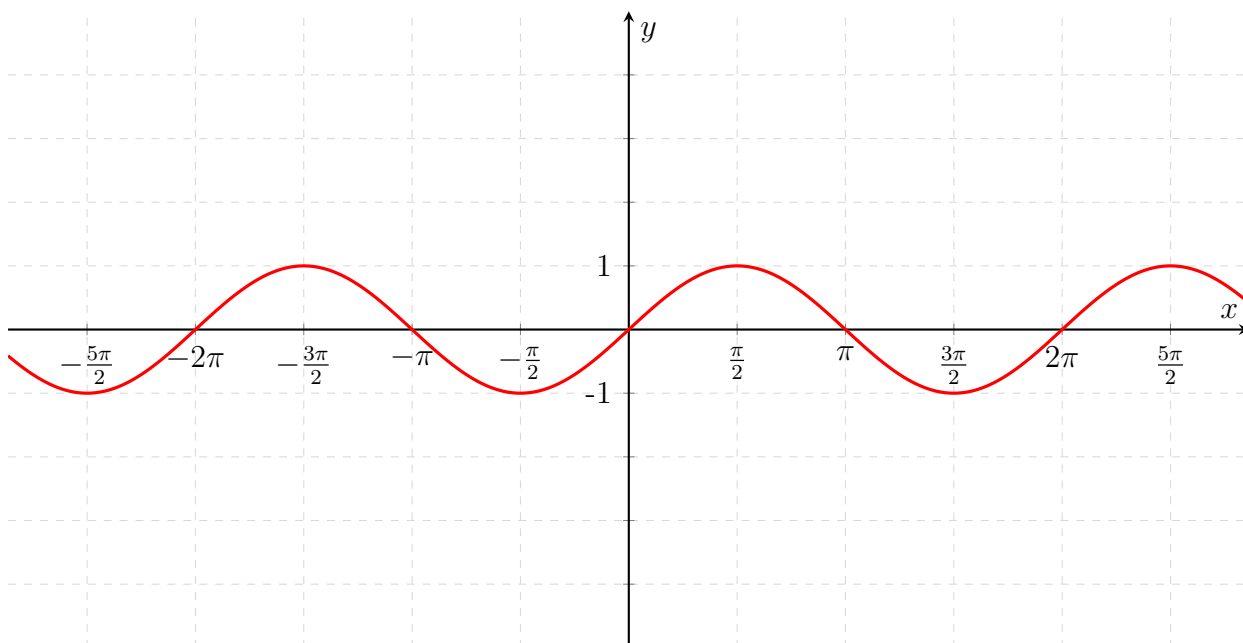
(d)



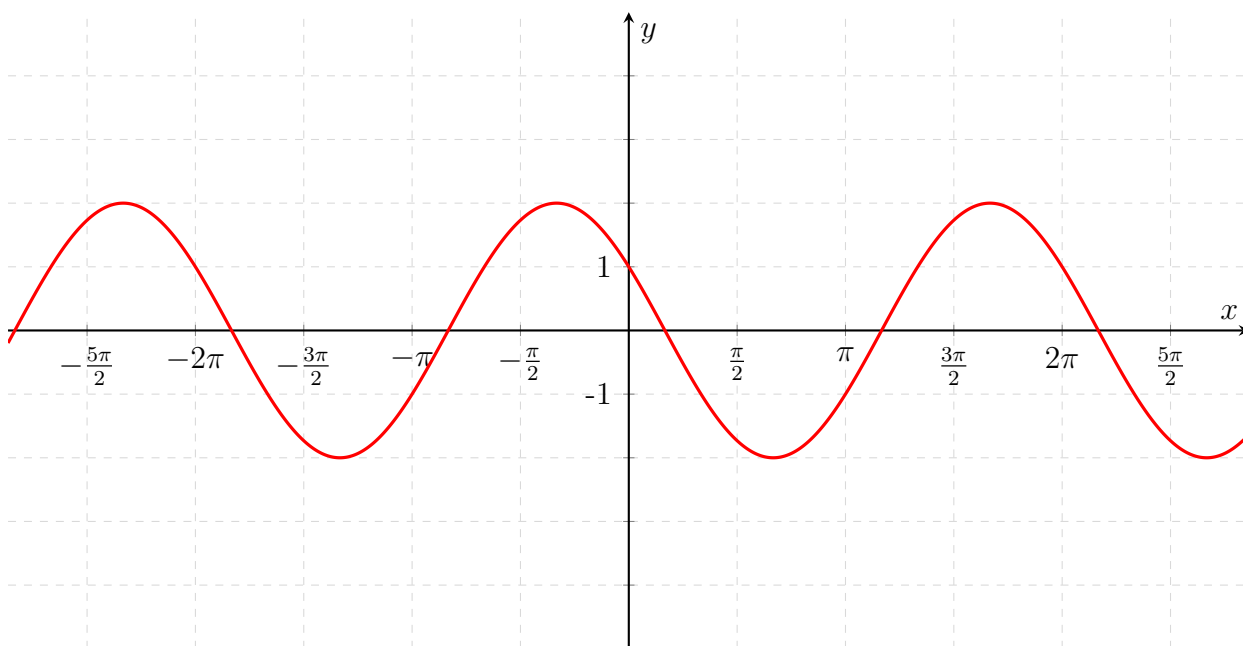
(e)



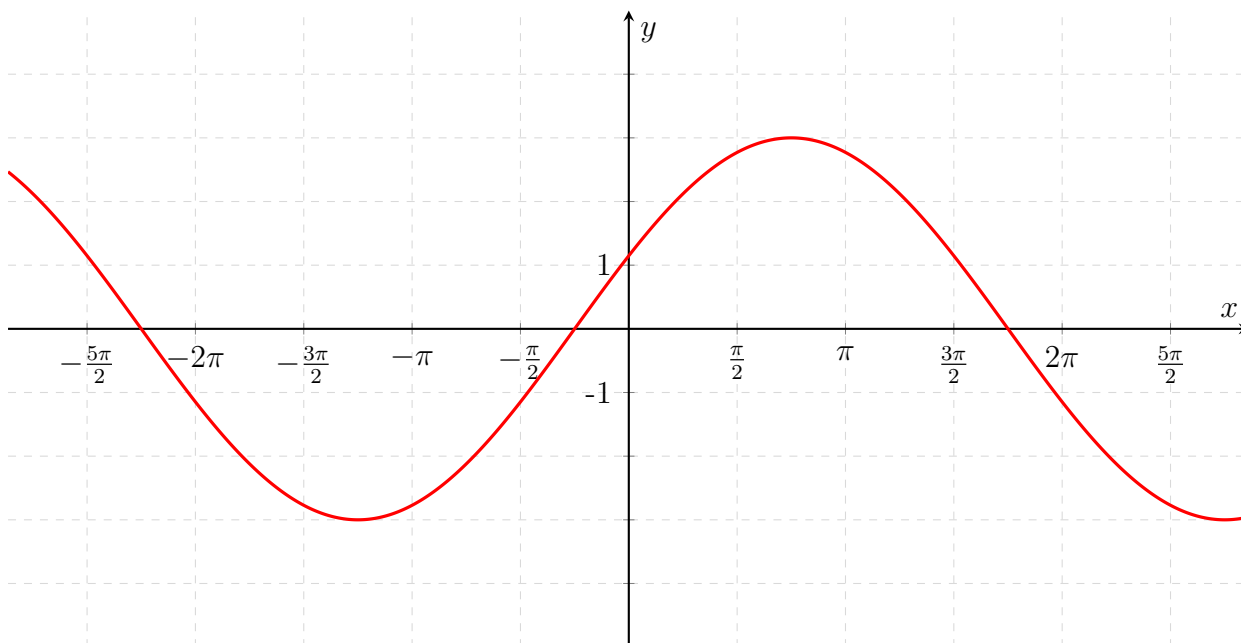
18. (a) Período 2π , amplitude 1, fase $\pi/2$ e imagem $[-1, 1]$.



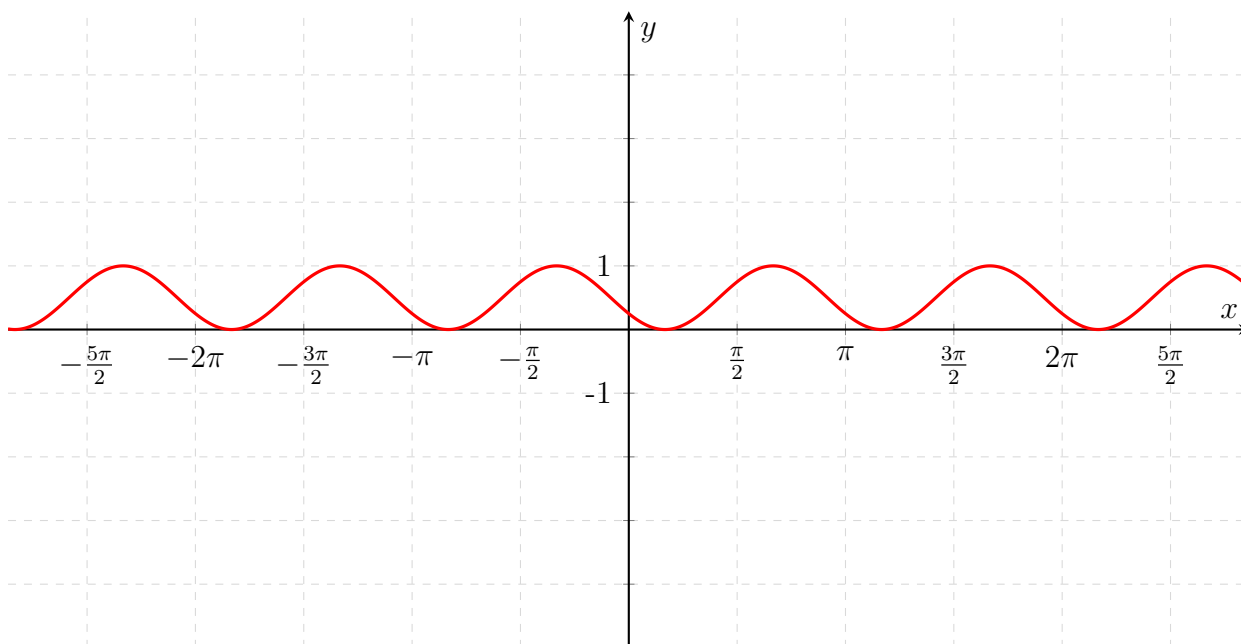
- (b) Período 2π , amplitude 2, fase $\pi/6$ e imagem $[-2, 2]$.



(c) Período 4π , amplitude 3, fase $-\pi/4$ e imagem $[-3, 3]$.



(d) Período π , amplitude $1/2$, fase $\pi/6$ e imagem $[0, 1]$.



19. (a) 312 dias.

(b)

20. (a) $72^\circ = \frac{2\pi}{5}$ rad.

(b)

(c)

21. (a) $\frac{7\pi}{6}$ rad = 210° .

(b)

(c)

22. $R = \frac{300 \cdot 180}{2,7\pi} \text{ km} \cong 6366,2 \text{ km}.$

23.

24. $\frac{100}{\operatorname{tg} 14^\circ + \operatorname{tg} 18^\circ} m \cong 174 m.$

25. $\frac{300 \operatorname{tg} 32^\circ \operatorname{tg} 35^\circ}{\operatorname{tg} 35^\circ - \operatorname{tg} 32^\circ} m \cong 1742 m.$