

Lista 10 de CM300

1. Converta de graus para radianos:

- (a) 30° (b) 10° (c) 45° (d) 135° (e) 170°
(f) 270° (g) 15° (h) 700° (i) 1080° (j) 36°

2. Converta de radianos para graus:

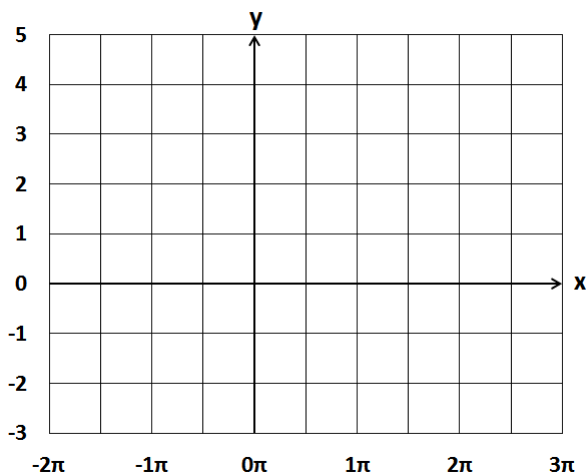
- (a) $\frac{5\pi}{3}$ (b) $\frac{\pi}{2}$ (c) 3π (d) $\frac{\pi}{36}$ (e) 10π (f) $\frac{3\pi}{2}$

3. Em cada item, alguns elementos de um triângulo retângulo têm suas medidas especificadas. Encontre a medida do elemento solicitado.

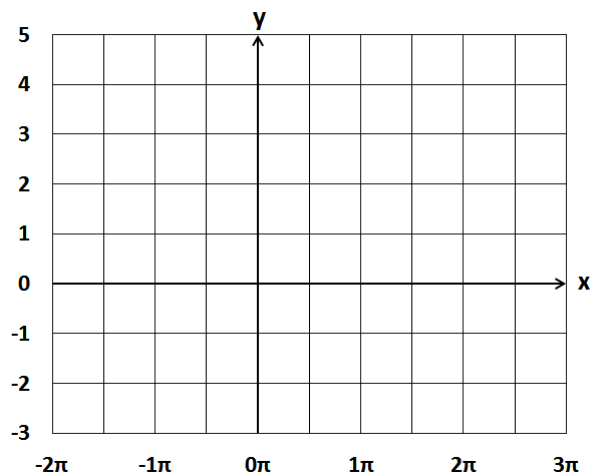
- (a) Um dos ângulos mede $\theta = \frac{\pi}{6}$ e o menor cateto mede $c = 4$. Quanto mede a hipotenusa H ?
- (b) Um dos ângulos mede $\theta = \frac{\pi}{3}$ e a hipotenusa mede $H = 2$. Quanto mede o menor cateto c ?
- (c) Um dos ângulos mede $\theta = \frac{\pi}{4}$ e a hipotenusa mede $H = 4$. Quanto mede o maior cateto C ?
- (d) Um dos catetos mede $\sqrt{6}$ e a hipotenusa mede $H = 2\sqrt{2}$. Quanto mede o ângulo θ oposto a esse cateto?
- (e) Um dos catetos mede $6\sqrt{6}$ e a hipotenusa mede $H = 12\sqrt{3}$. Quanto mede o ângulo θ adjacente a esse cateto?
- (f) Um dos ângulos mede $\theta = \frac{\pi}{6}$ e o menor cateto mede $c = 4$. Quanto mede o maior cateto C ?

4. Esboce os gráficos das funções abaixo.

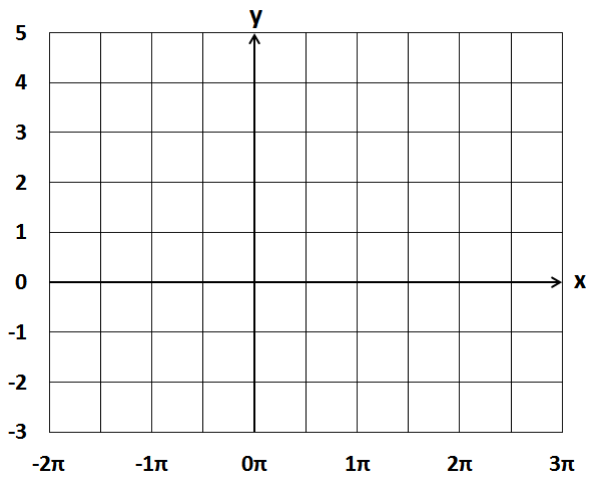
(a) $f(x) = \sin x$



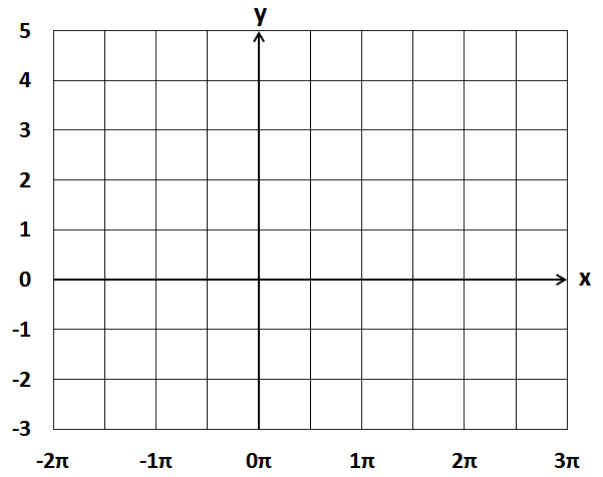
(b) $f(x) = \cos x$



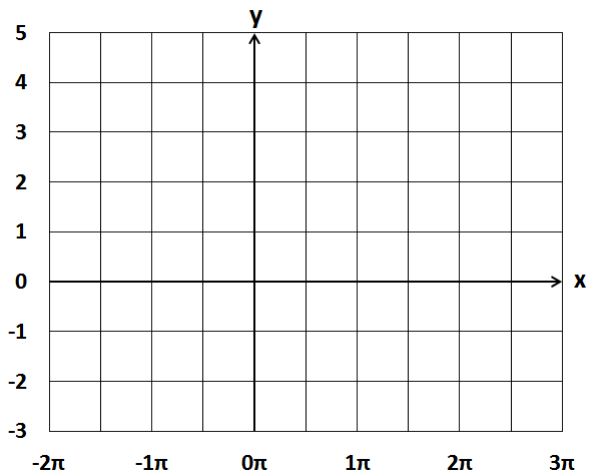
(c) $f(x) = \text{sen}\left(x + \frac{\pi}{2}\right)$



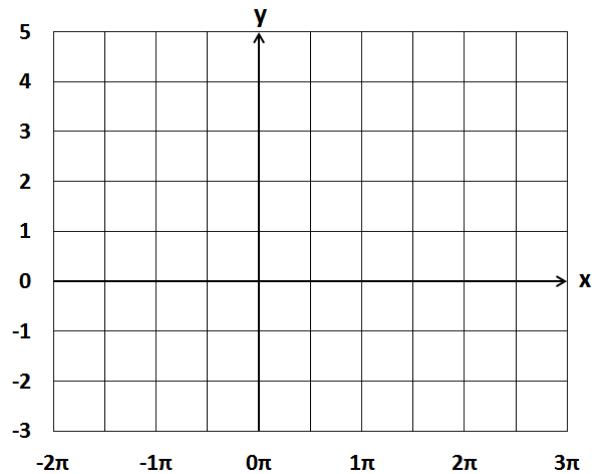
(f) $f(x) = 2 \cos(x + \pi)$



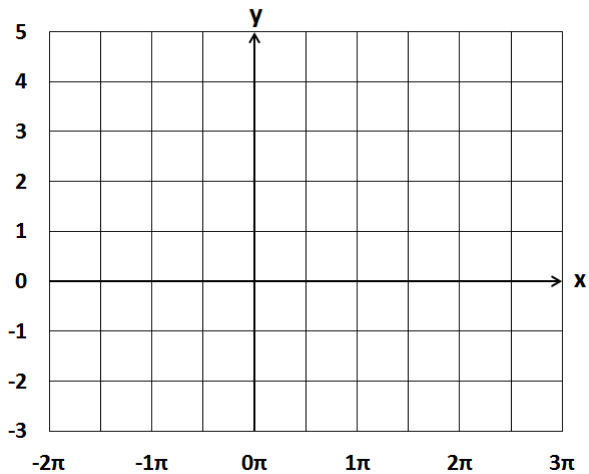
(d) $f(x) = \cos 2x$



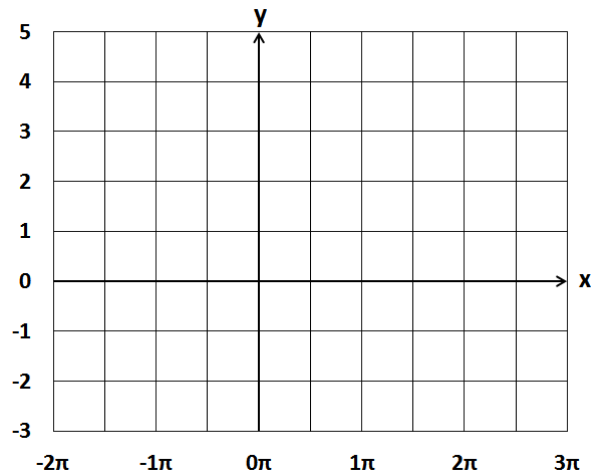
(g) $f(x) = \text{sen}\frac{x}{2} - 1$



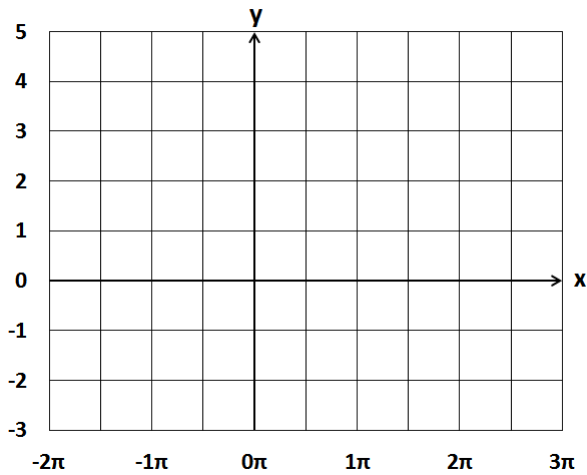
(e) $f(x) = -\text{sen} x + 1$



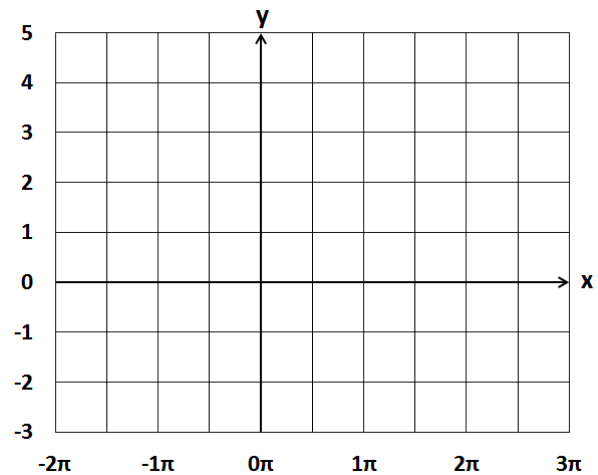
(h) $f(x) = -3 \cos x + 2$



(i) $f(x) = \frac{\text{sen } x}{2}$



(j) $f(x) = \cos\left(x - \frac{\pi}{2}\right) + 2$



5. Em cada item, calcule $\text{sen } \theta$, $\text{cos } \theta$ e $\text{tg } \theta$.

(a) $\theta = -\frac{3\pi}{4}$

(b) $\theta = \frac{11\pi}{2}$

(c) $\theta = -\frac{2\pi}{3}$

(d) $\theta = \frac{7\pi}{6}$

(e) $\theta = \frac{13\pi}{2}$

(f) $\theta = 3\pi$

(g) $\theta = \frac{7\pi}{4}$

(h) $\theta = \frac{17\pi}{4}$

(i) $\theta = \frac{5\pi}{6}$

(j) $\theta = \frac{7\pi}{3}$

(k) $\theta = \frac{-3\pi}{2}$

(l) $\theta = \frac{19\pi}{4}$

(m) $\theta = \frac{13\pi}{6}$

(n) $\theta = \frac{8\pi}{3}$

(o) $\theta = \frac{-11\pi}{6}$

(p) $\theta = -8\pi$

6. Derive as funções abaixo.

(a) $f(x) = \text{sen } x - 2 \text{cos } x$

(b) $g(x) = 3 \text{sen } x + \text{cos } \frac{x}{2}$

(c) $h(x) = -2 \text{sen } 2x - 3 \text{cos } 3x + \text{sen } x$

(d) $\omega(x) = \frac{1}{3} \text{sen} \left(x + \frac{\pi}{2}\right) + \frac{1}{4} \text{cos} \left(x + \frac{\pi}{2}\right)$

(e) $v(x) = 3 \text{sen}(2x + 5) - 4 \text{cos}(-x + 2) + 2 \text{cos}(-3x)$

(f) $\alpha(x) = -\frac{2}{5} \text{sen } 3x + \frac{4}{3} \text{cos } 5x - \text{cos } x + 1$

(g) $\beta(z) = 4 \text{cos} \left(\pi z + \frac{\pi}{3}\right)$

(h) $\lambda(x) = 3 \text{sen} \left(-\frac{\pi x}{2}\right) + 2 \text{cos} \left(-\frac{\pi x}{3}\right) + x$

(i) $\mu(t) = \text{cos } t + 2 \text{cos } 2t + 3 \text{cos } 3t$

(j) $q(t) = \text{sen}(t + 1) - 2 \text{sen}(t + 4) + 3 \text{sen}(t + 8)$

7. Encontre a equação da reta tangente ao gráfico da função f no ponto de abscissa x_0 . Dê sua resposta de forma exata e também aproximada com 2 casas decimais (utilize uma calculadora).

(a) $f(x) = \text{sen } x; \quad x_0 = \pi$

(b) $f(x) = \text{cos } x; \quad x_0 = \frac{\pi}{3}$

(c) $f(x) = \text{sen} \frac{x}{2}; \quad x_0 = -\pi$

(d) $f(x) = -\text{cos} \left(x + \frac{\pi}{2}\right); \quad x_0 = \frac{\pi}{4}$

(e) $f(x) = 2 \text{sen } x; \quad x_0 = \frac{\pi}{3}$

(f) $f(x) = \text{cos} \frac{\pi x}{3} + 3; \quad x_0 = 6$

(g) $f(x) = \text{sen } 2x + \text{cos } 2x; \quad x_0 = \frac{\pi}{2}$

(h) $f(x) = \text{cos } x - \text{cos } 2x; \quad x_0 = \frac{\pi}{2}$

(i) $f(x) = \text{sen } \pi x - \text{sen } 2\pi x; \quad x_0 = \frac{3}{2}$

(j) $f(x) = 4 \text{cos } x; \quad x_0 = -\frac{3\pi}{4}$

Respostas:

1.

(a) $\frac{\pi}{6}$

(c) $\frac{\pi}{4}$

(e) $\frac{17\pi}{18}$

(g) $\frac{\pi}{12}$

(i) 6π

(b) $\frac{\pi}{18}$

(d) $\frac{3\pi}{4}$

(f) $\frac{3\pi}{2}$

(h) $\frac{70\pi}{18}$

(j) $\frac{\pi}{5}$

2. (a) 3900°

(b) 90°

(c) 540°

(d) 5°

(e) 1800°

(f) 270°

3. (a) $H = 8.$

(c) $C = 2\sqrt{2}.$

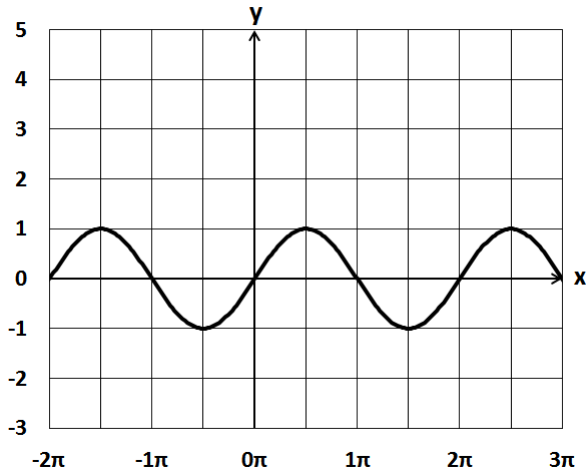
(e) $\theta = \frac{\pi}{4}$

(b) $c = 1.$

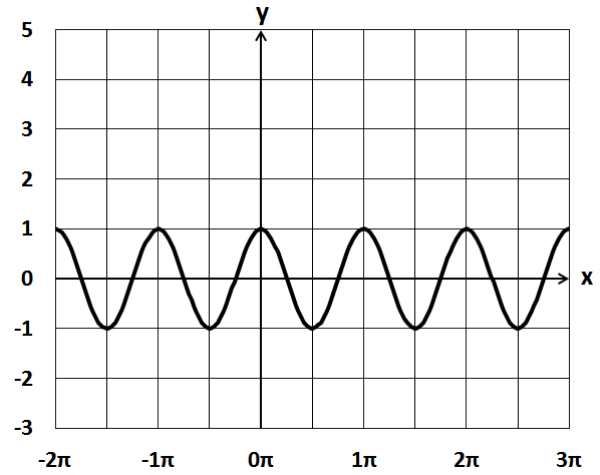
(d) $\theta = \frac{\pi}{3}.$

(f) $C = 4\sqrt{3}.$

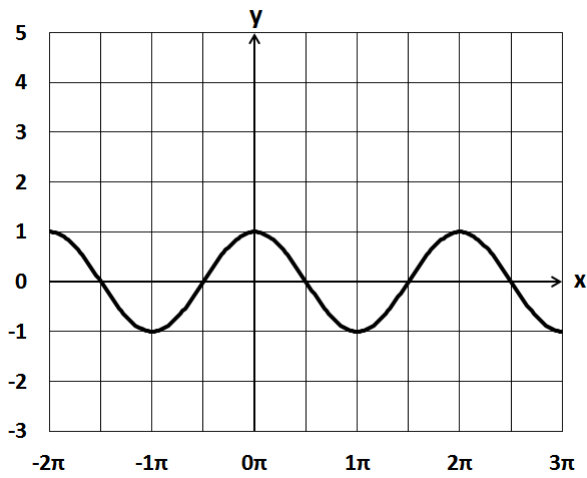
4. (a)



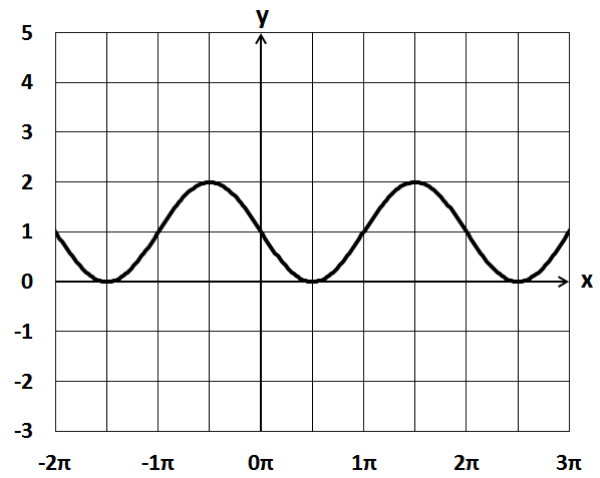
(d)



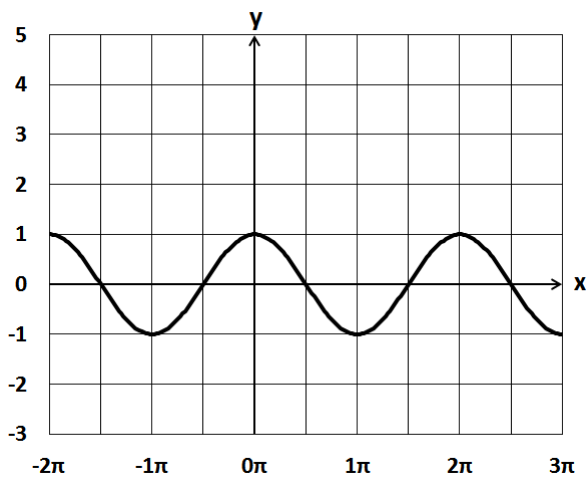
(b)



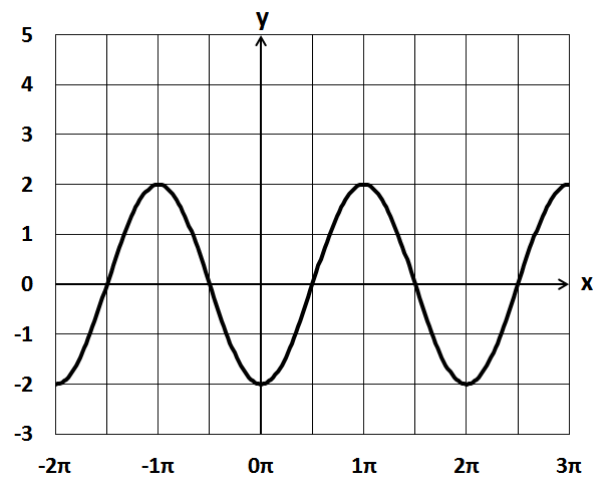
(e)



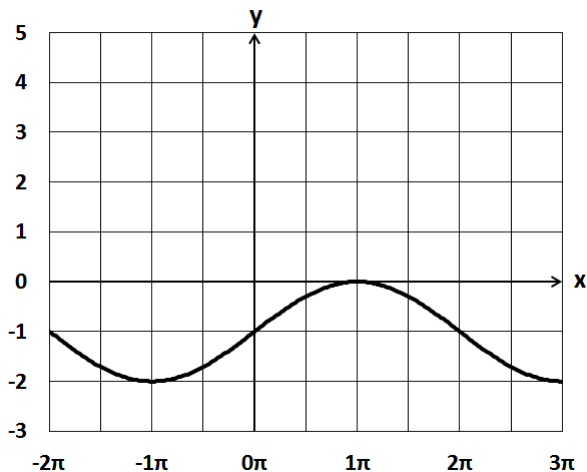
(c)



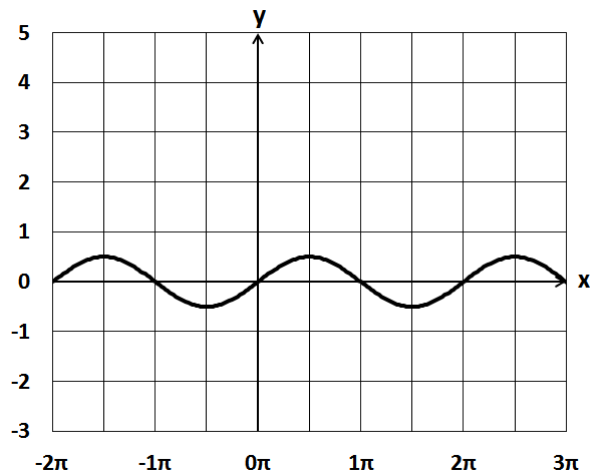
(f)



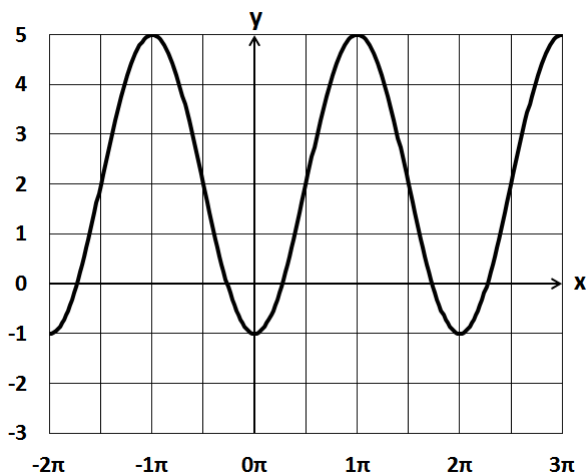
(g)



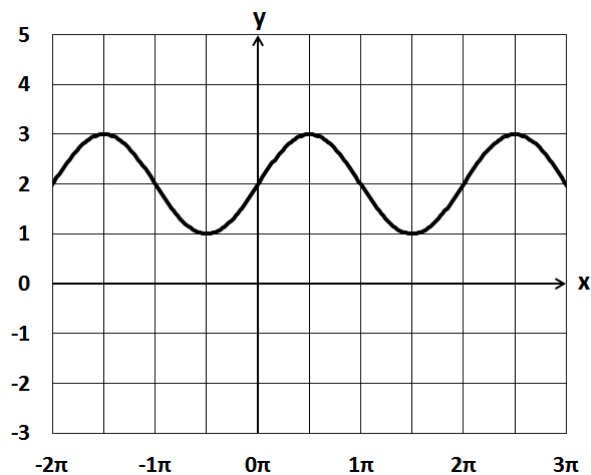
(i)



(h)



(j)



5. (a) $\sin \theta = -\frac{\sqrt{2}}{2}, \cos \theta = -\frac{\sqrt{2}}{2}, \operatorname{tg} \theta = 1$

(b) $\sin \theta = -1, \cos \theta = 0, \operatorname{tg} \theta \notin \mathbb{R}$

(c) $\sin \theta = -\frac{\sqrt{3}}{2}, \cos \theta = -\frac{1}{2}, \operatorname{tg} \theta = \sqrt{3}$

(d) $\sin \theta = -\frac{1}{2}, \cos \theta = -\frac{\sqrt{3}}{2}, \operatorname{tg} \theta = \frac{\sqrt{3}}{3}$

(e) $\sin \theta = 1, \cos \theta = 0, \operatorname{tg} \theta \notin \mathbb{R}$

(f) $\sin \theta = 0, \cos \theta = -1, \operatorname{tg} \theta = 0$

(g) $\sin \theta = -\frac{\sqrt{2}}{2}, \cos \theta = \frac{\sqrt{2}}{2}, \operatorname{tg} \theta = -1$

(h) $\sin \theta = \frac{\sqrt{2}}{2}, \cos \theta = \frac{\sqrt{2}}{2}, \operatorname{tg} \theta = 1$

6. (a) $f'(x) = \cos x + 2 \sin x$

(b) $g'(x) = 3 \cos x - \frac{1}{2} \sin \frac{x}{2}$

(c) $h'(x) = -4 \cos 2x + 9 \sin 3x + \cos x$

(d) $\omega'(x) = \frac{1}{3} \cos \left(x + \frac{\pi}{2}\right) - \frac{1}{4} \sin \left(x + \frac{\pi}{2}\right)$

(e) $v'(x) = 6 \cos(2x + 5) - 4 \sin(-x + 2) + 6 \sin(-3x)$

(i) $\sin \theta = \frac{1}{2}, \cos \theta = -\frac{\sqrt{3}}{2}, \operatorname{tg} \theta = -\frac{\sqrt{3}}{3}$

(j) $\sin \theta = \frac{\sqrt{3}}{2}, \cos \theta = \frac{1}{2}, \operatorname{tg} \theta = \sqrt{3}$

(k) $\sin \theta = 1, \cos \theta = 0, \operatorname{tg} \theta \notin \mathbb{R}$

(l) $\sin \theta = \frac{\sqrt{2}}{2}, \cos \theta = -\frac{\sqrt{2}}{2}, \operatorname{tg} \theta = -1$

(m) $\sin \theta = \frac{1}{2}, \cos \theta = \frac{\sqrt{3}}{2}, \operatorname{tg} \theta = \frac{\sqrt{3}}{3}$

(n) $\sin \theta = \frac{\sqrt{3}}{2}, \cos \theta = -\frac{1}{2}, \operatorname{tg} \theta = -\sqrt{3}$

(o) $\sin \theta = \frac{1}{2}, \cos \theta = \frac{\sqrt{3}}{2}, \operatorname{tg} \theta = \frac{\sqrt{3}}{3}$

(p) $\sin \theta = 0, \cos \theta = 1, \operatorname{tg} \theta = 0$

(f) $\alpha'(x) = -\frac{6}{5} \cos 3x - \frac{20}{3} \sin 5x + \sin x$

(g) $\beta'(z) = -4\pi \sin \left(\pi z + \frac{\pi}{3}\right)$

(h) $\lambda'(x) = -\frac{3\pi}{2} \cos \left(-\frac{\pi x}{2}\right) + \frac{2\pi}{3} \sin \left(-\frac{\pi x}{3}\right) + 1$

(i) $\mu'(t) = -\sin t - 4 \sin 2t - 9 \sin 3t$

(j) $q'(t) = \cos(t + 1) - 2 \cos(t + 4) + 3 \cos(t + 8)$

7. (a) $y = -x + \pi \approx -x + 3,14$

(b) $y = -\frac{\sqrt{3}x}{2} + \frac{\sqrt{3}\pi}{6} + \frac{1}{2} \approx -0,67x + 1,41$

(c) $y = -1$

(d) $y = \frac{\sqrt{2}x}{2} - \frac{\sqrt{2}\pi}{8} + \frac{\sqrt{2}}{2} \approx 0,71x + 0,15$

(e) $y = x - \frac{\pi}{3} + \sqrt{3} \approx x + 0,68$

(f) $y = 4$

(g) $y = -2x + \pi - 1 \approx -2x + 2,14$

(h) $y = -x + \frac{\pi}{2} + 1 \approx -x + 2,57$

(i) $y = 2\pi x - 3\pi - 1 \approx 6,28x - 10,42$

(j) $y = 2\sqrt{2} + \frac{3\sqrt{2}}{2} - 2\sqrt{2} \approx 2,83x + 3,84$