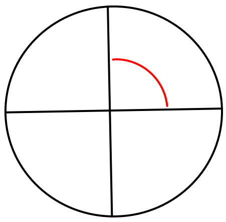
SOLUCIONES DEL TEMA 9:TRIGONOMETRÍA II: 11,12,13,14

11.

$a)\ 3sen90° - \sqrt{3}cos90° + 7tg\pi = 3 \cdot 1 - \sqrt{3} \cdot 0 + 7 \cdot 0 = 3$

$A = (0, r)$



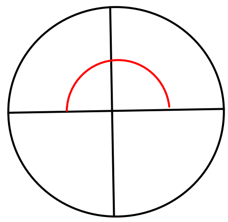
$90°$

$$sen90° = \frac{r}{r} = 1$$

$$cos90° = \frac{0}{r} = 0$$

$$tg\pi = \frac{0}{-r} = 0$$

$A = (-r, 0)$



$\pi rad = 180°$

$$b)\ 2sen^2 60° - 5cos60° + tg^2 60° = 2 \cdot \left(\frac{\sqrt{3}}{2}\right)^2 - 5 \cdot \frac{1}{2} + \left(\sqrt{3}\right)^2 = 2 \cdot \frac{3}{4} - \frac{5}{2} + 3 =$$

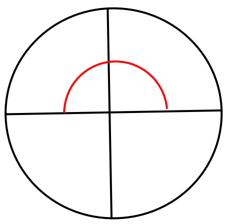
$$= \frac{3}{2} - \frac{5}{2} + 3 = \frac{3 - 5 + 6}{2} = \frac{4}{2} = 2$$

$$c)\ sen30° - \sqrt{3}cos30° + 3tg45° = \frac{1}{2} - \sqrt{3} \cdot \frac{\sqrt{3}}{2} + 3 \cdot 1 = \frac{1}{2} - \frac{3}{2} + 3 = \frac{1 - 3 + 6}{2} =$$

$$= \frac{4}{2} = 2$$

$$d)\ 5sen\pi - 7cos\frac{3\pi}{2} + 4tg3\pi = 5 \cdot 0 - 7 \cdot 0 + 4 \cdot tg\pi = 0 + 4 \cdot 0 = 0$$

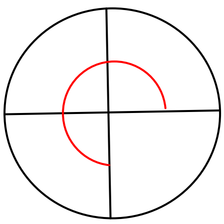
$A = (-r, 0)$



$\pi rad = 180°$

$$sen180° = \frac{0}{r} = 0$$

$$tg180° = \frac{0}{-r} = 0$$



$\frac{3\pi}{2} rad = 270°$

$$cos270° = \frac{0}{r} = 0$$

$A = (0, -r)$

$e)\ 4 \cdot sen\frac{\pi}{2} + tg\frac{\pi}{4} - 3tg\pi = 4 \cdot sen90° + tg45° - 3 \cdot tg180° = 4 \cdot 1 + 1 - 3 \cdot 0 =$

$= 4 + 1 = 5$

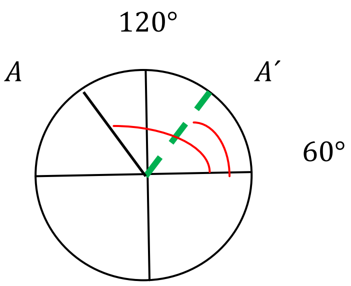
$f)\ 2tg^2 30° - cos^2 30° - tg^2 30° = 2 \cdot \left(\frac{\sqrt{3}}{3}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{\sqrt{3}}{3}\right)^2 = 2 \cdot \frac{3}{9} - \frac{3}{4} - \frac{3}{9} =$

$\frac{2}{3} - \frac{3}{4} - \frac{1}{3} = \frac{8-9-4}{12} = \frac{-5}{12}$

12.

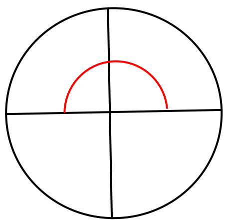
$a)\ 2sen120° - 3cos180° - tg30° = 2 \cdot sen60° - 3 \cdot (-1) - \frac{\sqrt{3}}{3} = 2 \cdot \frac{\sqrt{3}}{2} + 3 - \frac{\sqrt{3}}{3}$

$= \sqrt{3} + 3 - \frac{\sqrt{3}}{3} = \left(1 - \frac{1}{3}\right)\sqrt{3} + 3 = \frac{2}{3}\sqrt{3} + 3$



$180° - 120° = 60°$ $\quad sen120° = sen60°$

$A = (-r, 0)$

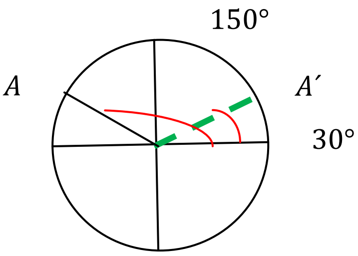


$\pi rad = 180°$

$cos180° = \frac{-r}{r} = -1$

$b)\ 3cos30° + sen150° - tg60° = 3 \cdot \frac{\sqrt{3}}{2} + sen30° - \sqrt{3} = \left(\frac{3}{2} - 1\right)\sqrt{3} + \frac{1}{2} =$

$= \frac{1}{2}\sqrt{3} + \frac{1}{2} = \frac{\sqrt{3}+1}{2}$

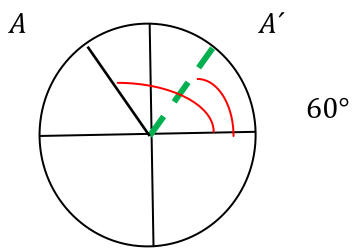


$180° - 150° = 30°$ $\quad sen150° = sen30°$

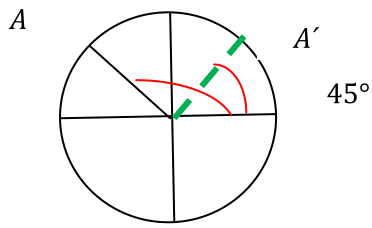
$c) tg^2 30° - cos^2 120° - tg135° = \left(\frac{\sqrt{3}}{3}\right)^2 - (-cos60°)^2 - (-tg45°) =$

$= \frac{3}{9} - \left(\frac{-1}{2}\right)^2 + 1 = \frac{1}{3} - \frac{1}{4} + 1 = \frac{4-3+12}{12} = \frac{13}{12}$

120°



135°



$180° - 120° = 60°$

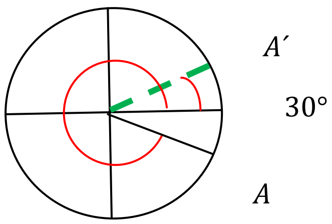
$cos120° = -cos60°$

$180° - 135° = 45°$ $\quad tg135° = -tg45°$

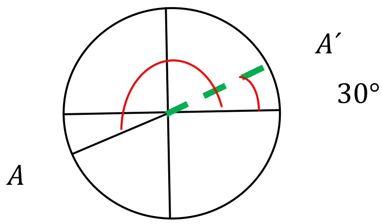
$d)\ 6sen\ 330° - cos210° - tg225° = 6 \cdot (-sen30°) - (-cos30°) - tg45° =$

$= 6 \cdot \left(\frac{-1}{2}\right) + \frac{\sqrt{3}}{2} - 1 = -3 + \frac{\sqrt{3}}{2} - 1 = \frac{\sqrt{3}}{2} - 4$

330°



210°

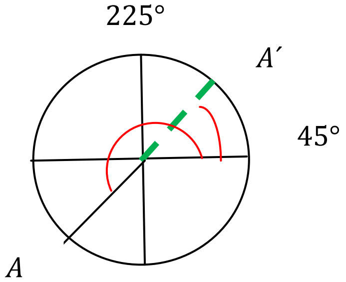


$360° - 330° = 30°$

$sen\ 330° = -sen30°$

$210° - 180° = 30°$ $\quad cos210° = -cos30°$

225°

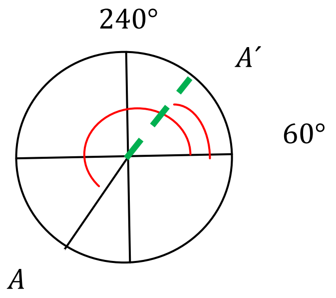


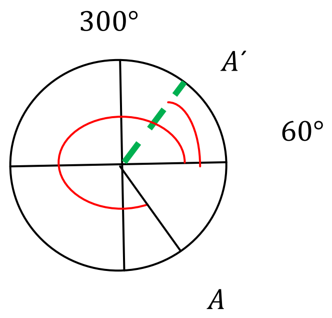
$225° - 180° = 45°$

$tg225° = tg45°$

$e)\ 4sen240° - tg300° - cos180° = 4 \cdot (-sen60°) - (-tg60°) - (-1) =$

$4 \cdot \left(-\frac{\sqrt{3}}{2}\right) + \sqrt{3} + 1 = -2\sqrt{3} + \sqrt{3} + 1 = -\sqrt{3} + 1$





$240° - 180° = 60°$

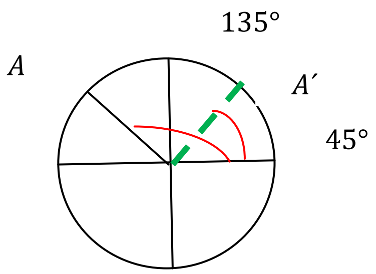
$sen\ 240° = -sen60°$

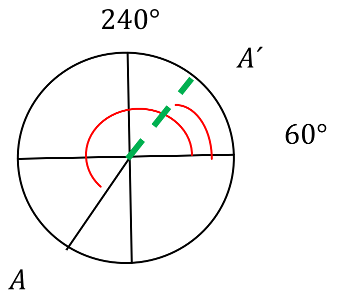
$360° - 300° = 60°$

$tg\ 300° = -tg60°$

$f)2sen135° + cos240° - tg^2 330° = 2 \cdot sen45° - cos60° - (-tg30°)^2 =$

$$2 \cdot \frac{\sqrt{2}}{2} - \frac{1}{2} - \left(\frac{-\sqrt{3}}{3}\right)^2 = \sqrt{2} - \frac{1}{2} - \frac{3}{9} = \sqrt{2} - \frac{1}{2} - \frac{1}{3} = \sqrt{2} + \left(\frac{-3-2}{6}\right) = \sqrt{2} - \frac{5}{6}$$





$180° - 135° = 45°$

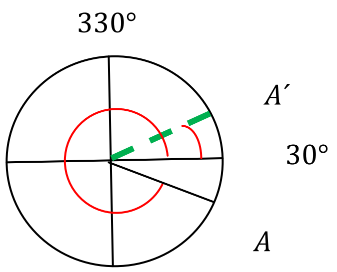
$sen135° = sen45°$

$240° - 180° = 60°$

$cos240° = -cos60°$

$360° - 330° = 30°$

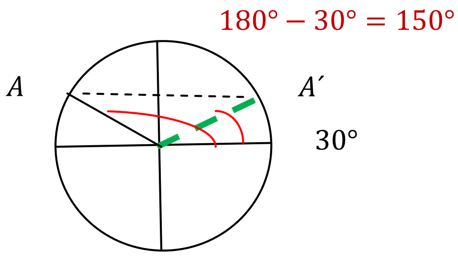
$tg330° = -tg\ 30°$

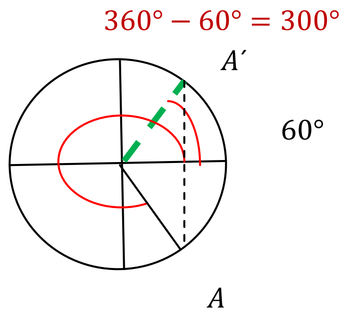


13.

$a) sen x = 0{,}5 \quad x = 30° + n \cdot 360° \quad x = 150° + n \cdot 360°$

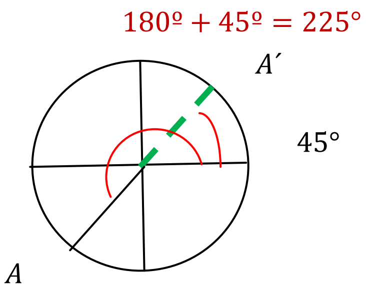
$b)\ cos x = 0{,}5 \quad x = 60° + n \cdot 360° \quad x = 300° + n \cdot 360°$

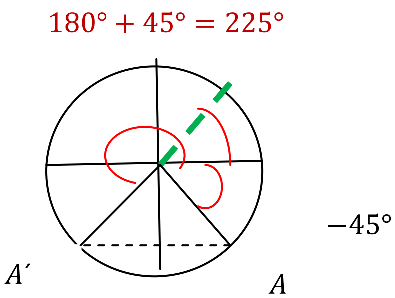




$c) tg x = 1 \quad x = 45° + n \cdot 360° \quad x = 225° + n \cdot 360°$

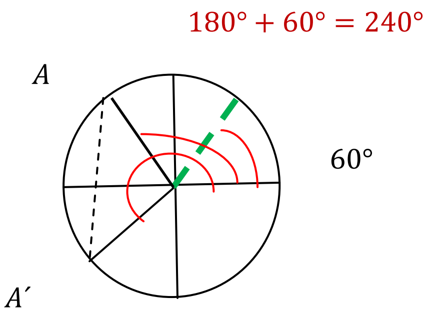
$d)\ sen x = \frac{-\sqrt{2}}{2} \quad x = -45° + n \cdot 360° \quad x = 225° + n \cdot 360°$

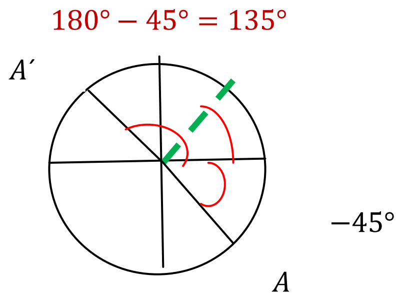




$e) cos x = -0{,}5 \quad x = 120° + n \cdot 360° \quad x = 240° + n \cdot 360°$

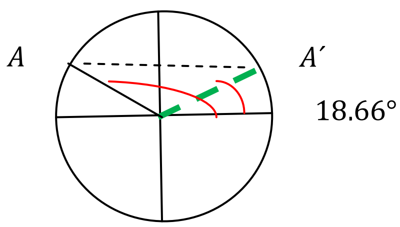
$f)\ tg x = -1 \quad x = -45° + n \cdot 360° \quad x = 135° + n \cdot 360°$





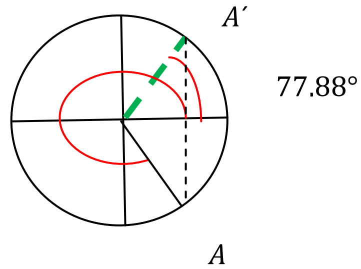
$g)\ senx = 0{,}32 \quad \begin{matrix} x = 18{,}66° + n \cdot 366° \\ x = 161{,}34° + n \cdot 360° \end{matrix}$

$180° - 18{,}66° = 161{,}34°$



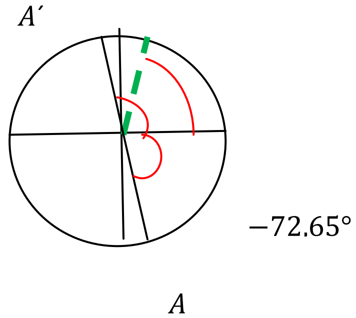
$h)\ cosx = 0{,}21 \quad \begin{matrix} x = 77{,}88° + n \cdot 360° \\ x = 282{,}12° + n \cdot 360° \end{matrix}$

$360° - 77.88° = 282.12°$



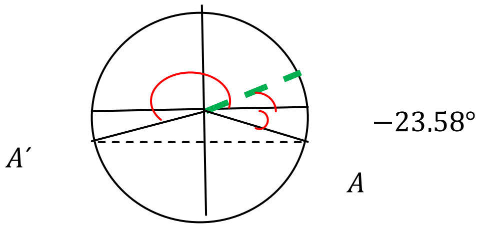
$i)\ tgx = -3{,}2 \quad \begin{matrix} x = -72{,}65° + n \cdot 366° \\ x = 107{,}35° + n \cdot 360° \end{matrix}$

$180° - 72.65° = 107.35°$



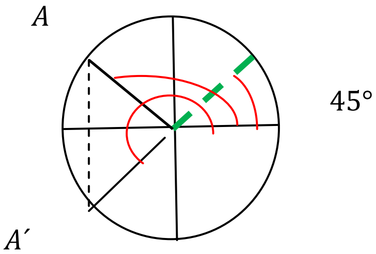
$k)\ senx = -0{,}4 \quad \begin{matrix} x = -23{,}58° + n \cdot 360° \\ x = 203{,}58° + n \cdot 360° \end{matrix}$

$180° + 23.58° = 203.58°$



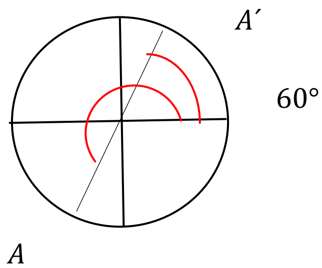
$l)\ cosx = -\frac{\sqrt{2}}{2} \quad \begin{matrix} x = 135° + n \cdot 366° \\ x = 225° + n \cdot 360° \end{matrix}$

$180° + 45° = 225°$



$m)\ tgx = \sqrt{3} \quad \begin{matrix} x = 60° + n \cdot 360° \\ x = 240° + n \cdot 360° \end{matrix}$

$180º + 60º = 240°$



14.

$cos\alpha = \frac{1}{3}$ $\quad$ $sen^2\alpha + cos^2\alpha = 1$ $\quad$ $tg\alpha = \frac{sen\alpha}{cos\alpha}$

$\sec\alpha = \frac{1}{cos\ \alpha} = 3$ $\quad$ $sen^2\alpha + \left(\frac{1}{3}\right)^2 = 1$ $\quad$ $tg\alpha = \frac{2\sqrt{2}}{3} : \frac{1}{3} =$

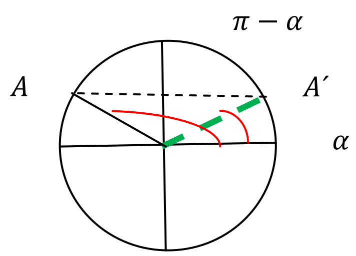
$sen^2\alpha = 1 - \frac{1}{9}$ $\quad$ $= \frac{2\sqrt{2}\cdot 3}{3} = 2\sqrt{2}$

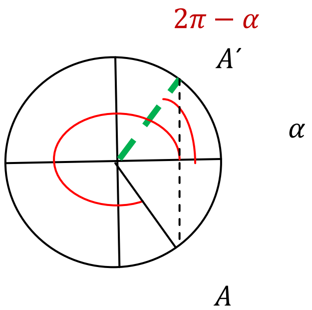
$sen\alpha = \sqrt{\frac{8}{9}} = \frac{2\sqrt{2}}{3}$ $\quad$ $cotg\alpha = \frac{1}{tg\ \alpha} = \frac{1}{2\sqrt{2}}$

$cosec\ \alpha = \frac{1}{sen\ \alpha} = \frac{3}{2\sqrt{2}} = \frac{3\sqrt{2}}{4}$ $\quad$ $= \frac{\sqrt{2}}{2\cdot 2} = \frac{\sqrt{2}}{4}$

$a)\ sen(\pi - \alpha) = sen\alpha = \frac{2\sqrt{2}}{3}$

$g)\ \cos(\pi - \alpha) = -cos\alpha = -\frac{1}{3}$

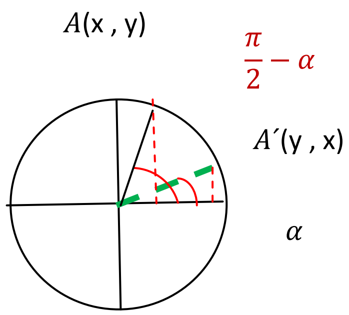




$b)\ \cos(2\pi - \alpha) = cos\alpha = \frac{1}{3}$

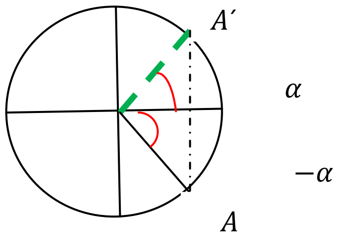
$i)\ sen(2\pi - \alpha) = -sen\alpha = -\frac{2\sqrt{2}}{3}$

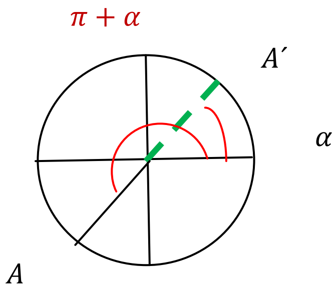
$c)\ tg\left(\frac{\pi}{2} - \alpha\right) = cotg\alpha = \frac{\sqrt{2}}{4}$



$$d)\ \sec(-\alpha) = \frac{1}{\cos(-\alpha)} = \frac{1}{\cos\alpha} = \sec\alpha = 3$$

$$e)\ cosec(-\alpha) = \frac{1}{sen(-\alpha)} = \frac{1}{-sen\alpha} = -cosec\ \alpha = \frac{-3\sqrt{2}}{4}$$





$$f)\ sen\ (\pi + \alpha) = -sen\ \alpha = -\frac{2\sqrt{2}}{3}$$

$$k)\ tg(\pi + \alpha) = tg\ \alpha = 2\sqrt{2}$$

$$h)\ tg\ \left(\frac{\pi}{2} + \alpha\right) = -cotg\alpha = -\frac{\sqrt{2}}{4}$$