

Ex 4.1.1:

$$a) \frac{\pi}{6} \longrightarrow \frac{\pi}{6} \cdot \frac{180^\circ}{\pi} = \frac{180^\circ}{6} = 30^\circ$$

$$b) \frac{2\pi}{3} \longrightarrow \frac{2\pi}{3} \cdot \frac{180^\circ}{\pi} = \frac{360^\circ}{3} = 120^\circ$$


$$\frac{2}{3} \cdot 180^\circ = \frac{360^\circ}{3} = 120^\circ$$

$$g) 1 \longrightarrow 1 \cdot \frac{180^\circ}{\pi} \cong 57,3^\circ$$

$$h) -2 \longrightarrow -2 \cdot \frac{180^\circ}{\pi} \cong \underline{-114,6^\circ}$$

$$j) 3 \longrightarrow 3 \cdot \frac{180^\circ}{\pi} \cong \underline{171,9^\circ}$$

Ex 4.1.2:

$$a) 45^\circ \longrightarrow 45^\circ \cdot \frac{\pi}{180^\circ} = \frac{\pi}{4}$$

$$b) 60^\circ \longrightarrow 60^\circ \cdot \frac{\pi}{180^\circ} = \frac{\pi}{3}$$

$$c) 75^\circ \longrightarrow 75^\circ \cdot \frac{\pi}{180^\circ} = \frac{5\pi}{12}$$

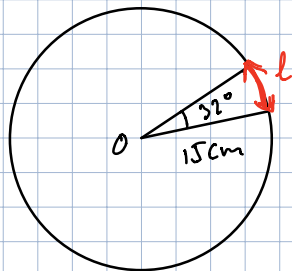
$$d) -30^\circ \longrightarrow -30^\circ \cdot \frac{\pi}{180^\circ} = -\frac{\pi}{6}$$

$$e) 120^\circ \longrightarrow 120^\circ \cdot \frac{\pi}{180^\circ} = \frac{2\pi}{3}$$

$f) 315^\circ \rightarrow 315^\circ \cdot \frac{\pi}{180^\circ} \approx \frac{7\pi}{4}$ ↓ diviser par 45
 $g) 22,7^\circ \rightarrow 22,7^\circ \cdot \frac{\pi}{180^\circ} \approx 0,4$
 $h) -107,9^\circ \rightarrow -107,9^\circ \cdot \frac{\pi}{180^\circ} \approx -1,88$
 $i) 292,3^\circ \rightarrow 292,3^\circ \cdot \frac{\pi}{180^\circ} \approx 5,1$
 $j) 152,5^\circ \rightarrow 152,5^\circ \cdot \frac{\pi}{180^\circ} \approx 2,66$

Ex 4.1.4:

a)

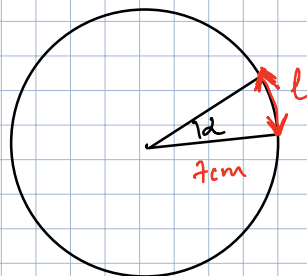


$l = 2\pi r \frac{\alpha}{360}$ α en degré'
 ou:
 $l = \alpha r$ α en radian

$\alpha = 32^\circ \Rightarrow l = 2\pi r \frac{\alpha}{360} = 2\pi \cdot 150 \cdot \frac{32}{360}$
 $r = 15\text{ cm} = 150\text{ mm}$

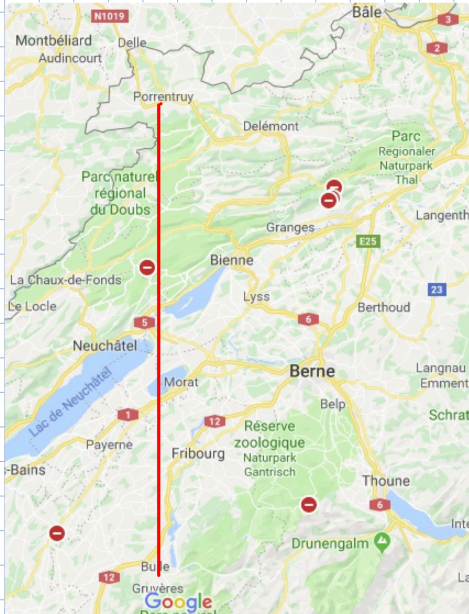
$= \frac{32}{180} \cdot \pi \cdot 150 \approx 84\text{ mm}$

b)



$r = 7\text{ cm} = 70\text{ mm}$
 $\alpha = 2$
 $\Rightarrow l = 2 \cdot 70 = 140\text{ mm}$

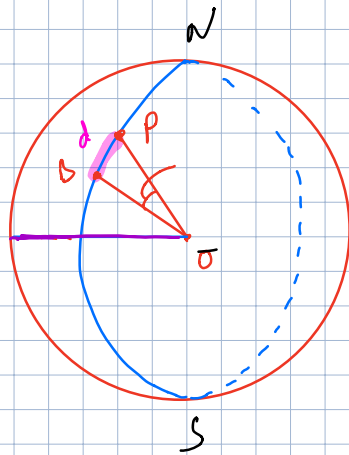
Ex 4.1.6



• Le méridien terrestre :

=> est un grand cercle imaginaire tracé sur le globe terrestre passant par les pôles

• La latitude : est une valeur angulaire, exprimée du positionnement Nord-Sud d'un point sur Terre, au Nord ou au Sud de l'équateur.



$$R_{\text{Terre}} = 6370 \text{ km}$$

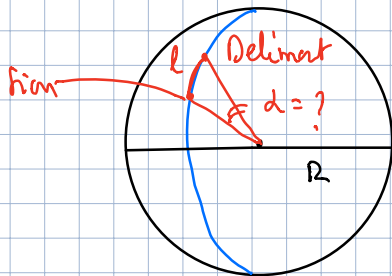
$$d = \alpha \cdot R$$

Latitude Porrentruy : $47^{\circ}25'N$
 " Bâle : $46^{\circ}37'N$

$$\begin{aligned} \alpha &= \underbrace{47^{\circ}25'} - \underbrace{46^{\circ}37'} = \\ &= 47^{\circ} + \frac{25}{60} - \left(46^{\circ} + \frac{37}{60} \right) = 0,8^{\circ} \end{aligned}$$

$$\text{donc } d = \alpha \cdot R = 0,8^{\circ} \cdot \frac{\pi}{180^{\circ}} \cdot 6370 \approx \underline{89 \text{ km}}$$

Ex 6.1.7 :



$$l = 123 \text{ km}$$

$$\text{latitude Giron} : 46^{\circ}14' \text{ N}$$

$$\Rightarrow \text{latitude Delémont} = ?$$

$$l = 2\pi R \frac{\alpha}{360}$$

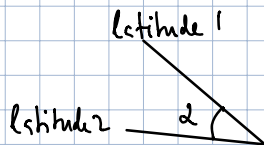
$$\Rightarrow \alpha = \frac{l \cdot 360}{2\pi R} = \frac{123 \cdot 360}{2\pi \cdot 6370}$$

$$\alpha \approx 1,1^{\circ} = 1^{\circ}06'$$

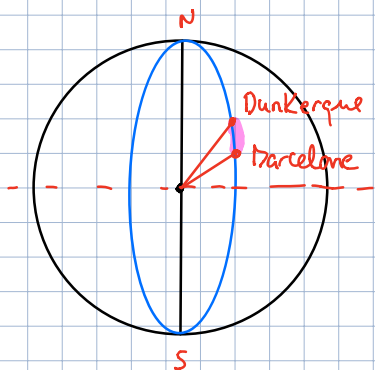
$$\left(= 1^{\circ} + \underline{0,1^{\circ}} = 1^{\circ} + 0,1 \cdot 60 \approx 1^{\circ}06' \right)$$

$$\Rightarrow \text{Latitude de Delémont} = \text{Latitude de Giron} + \alpha$$

$$\begin{aligned} \Rightarrow &= 46^{\circ}14' + 1^{\circ}06' \\ &= \underline{47^{\circ}20' \text{ N}} \end{aligned}$$



Ex 6.1.8 :



$$49^{\circ}45' \text{ N}$$

$$40^{\circ}15' \text{ N}$$

$$l = ?$$

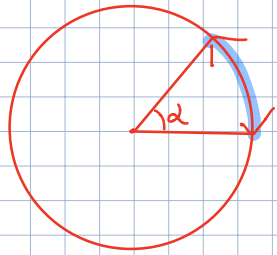
$$l = \alpha \cdot R$$

$$\begin{aligned} \alpha &= 49^{\circ}45' - 40^{\circ}15' \\ &= 9^{\circ}30' = 9,5^{\circ} \end{aligned}$$

$$\Rightarrow l = 9,5^{\circ} \cdot \frac{\pi}{180} \cdot 6370$$

$$l \approx \underline{1056 \text{ km}}$$

Ex 4.1.3



$$\begin{aligned} a) \quad \alpha &= 1^\circ \\ l &= 3 \text{ mm} \end{aligned}$$

$$l = \alpha \cdot r$$

$\downarrow$
en radian

$$\Rightarrow 1^\circ = 1 \cdot \frac{\pi}{180} \approx 0,017$$

$$l = \alpha \cdot r \quad \Rightarrow \quad r = \frac{l}{\alpha} = \frac{3}{0,017} \approx 176,5 \text{ mm}$$

$$\left(r = \frac{3}{\frac{\pi}{180}} \approx \frac{3 \cdot 180}{\pi} \approx \underline{172 \text{ mm}} \right)$$

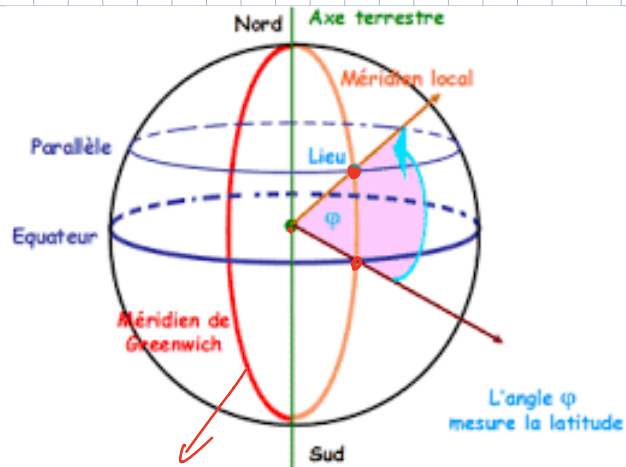
$$b) \quad \alpha = 0,03^\circ \quad \Rightarrow \quad l = 0,05 \text{ mm}$$

$$0,03^\circ = 0,03 \cdot \frac{\pi}{180} = \frac{0,03\pi}{180}$$

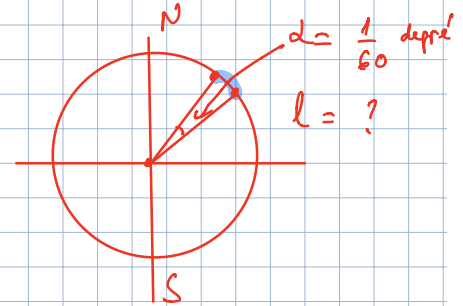
$$\Rightarrow r = \frac{l}{\alpha} = \frac{0,05}{\frac{0,03\pi}{180}} = \frac{0,05 \cdot 180}{0,03\pi}$$

$$\underline{r \approx 95 \text{ mm}}$$

Ex 4.1.5 :



$$R = 6370 \text{ km}$$



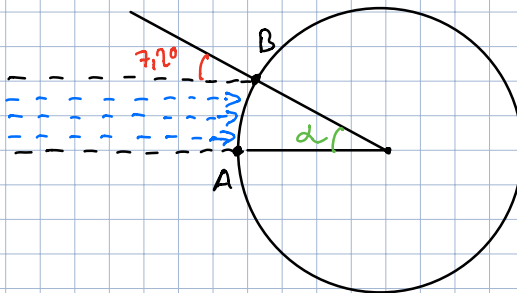
Méridien

$$a) \quad l = ? \quad \Rightarrow \quad l = \underbrace{\alpha \cdot R}_{\text{en radian}}$$

$$l = \frac{1}{60} \cdot \frac{\pi}{180} \cdot 6370 \cdot 1000 \approx \underline{1853 \text{ m}}$$

Ex 4.1.9 :

Circonférence et le rayon terrestre



$$\Rightarrow \alpha = 712^\circ$$

* Circonférence :

$$800 \text{ km} \rightarrow 712^\circ$$

$$x ? \rightarrow 360^\circ$$

$$x = \frac{360^\circ \cdot 800 \text{ km}}{712^\circ} \approx \underline{40000 \text{ km}}$$

$$* \text{ Rayon : } P = 2\pi R \Rightarrow R = \frac{P}{2\pi} = \frac{40000}{2\pi} \approx \underline{6366 \text{ km}}$$