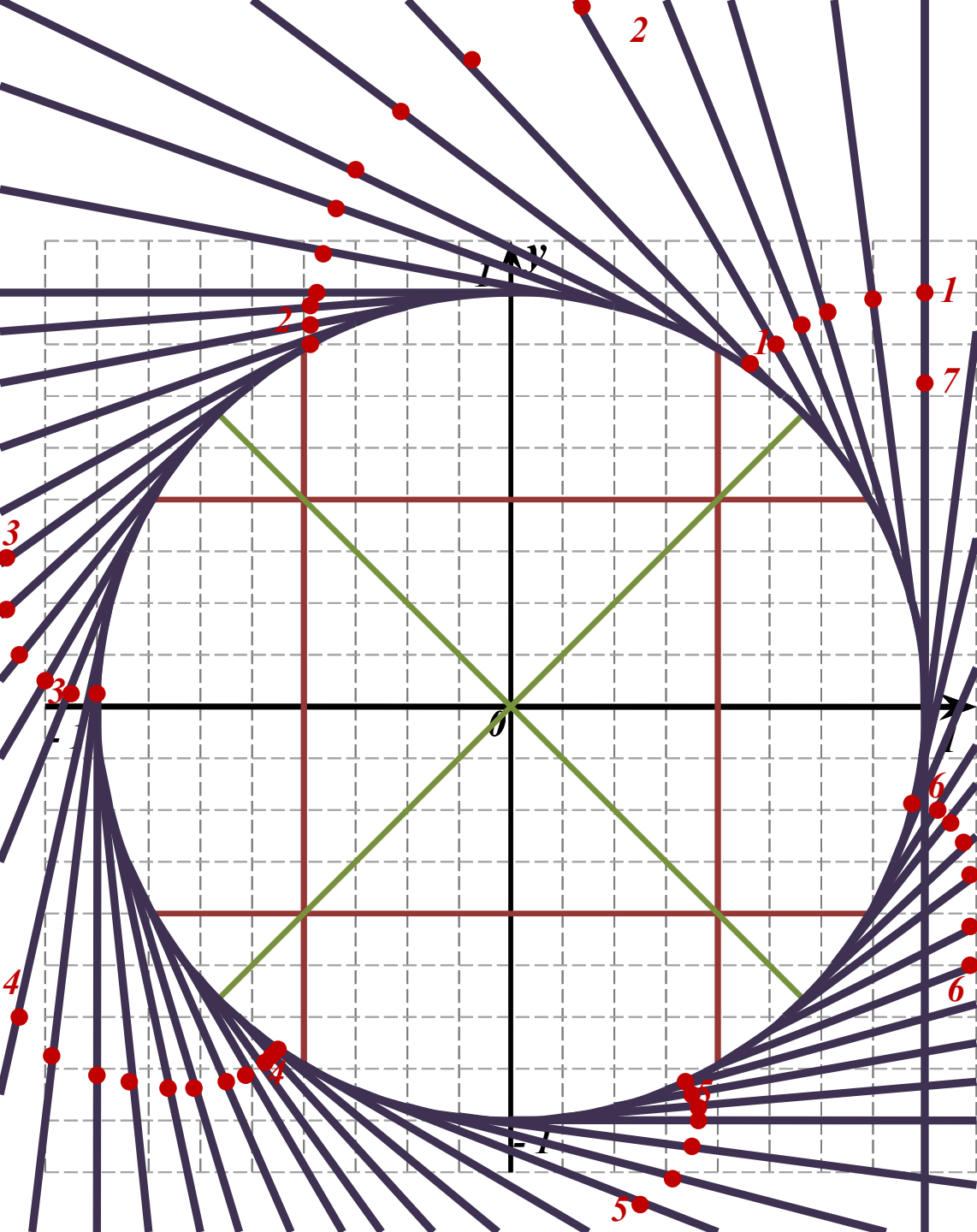


## Радианная мера угла

Возьмем числовую ось, начало которой совпадает с концом начального радиуса.

«Накрутим» положительную полуось на окружность против часовой стрелки, а отрицательную полуось «накрутим» на окружность по часовой стрелке.



# Радианная мера угла

Угол в 1 радиан – это центральный угол окружности, который соответствует дуге, равной радиусу.

$$C = 2\pi R, \quad R = 1$$

$$C = 2\pi$$

$$360^\circ = 2\pi$$

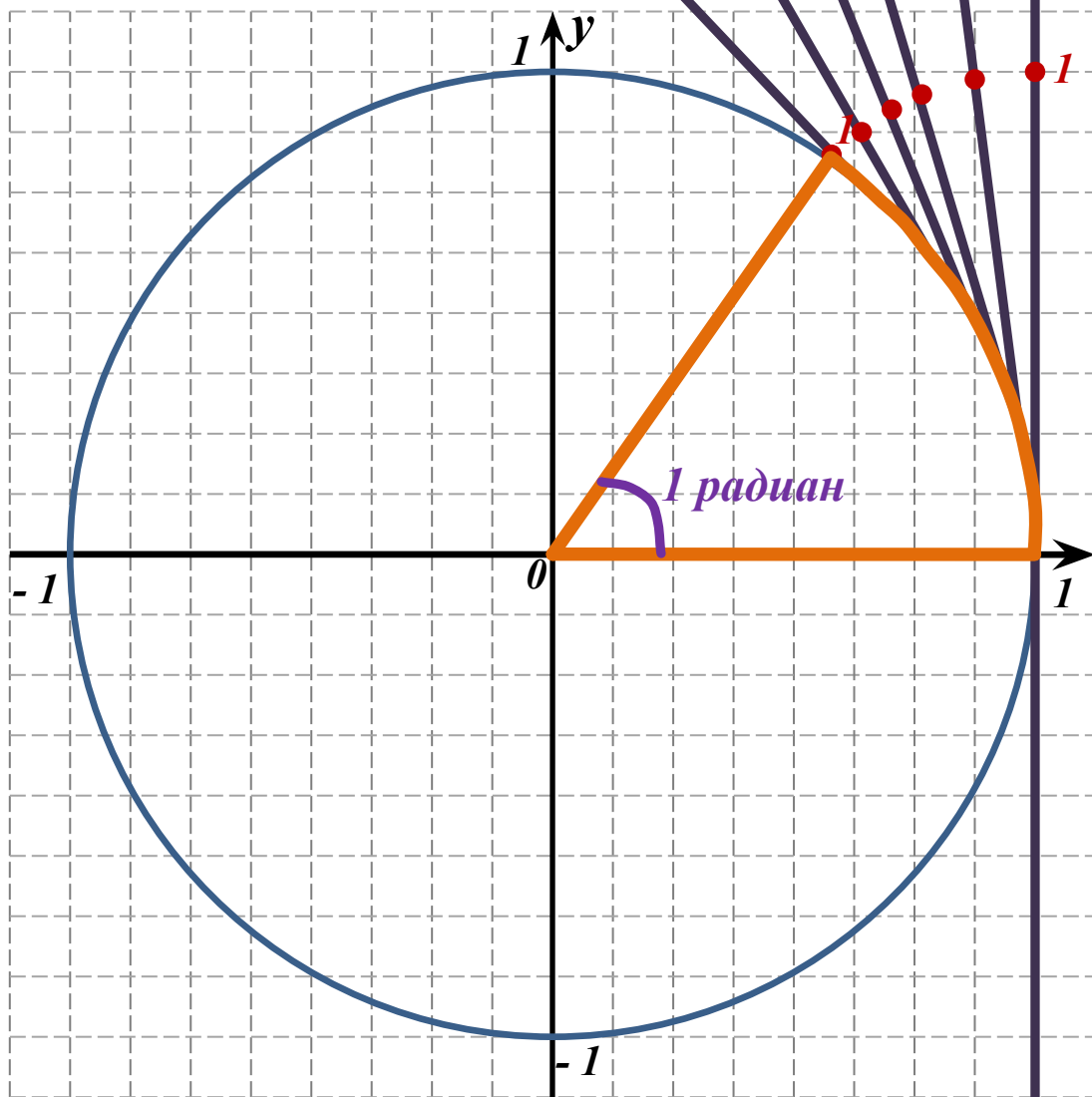
$$1^\circ = \frac{2\pi}{360^\circ}$$

$$1 \text{ рад} = \frac{360^\circ}{2\pi}$$

$$1 \text{ рад} \approx 57^\circ$$

$$\alpha^\circ = \frac{2\pi}{360^\circ} \cdot \alpha^\circ$$

$$\beta \text{ рад} = \frac{360^\circ}{2\pi} \cdot \beta$$



## *№ 1.2.1*

$$\alpha^{\circ} = \frac{2\pi}{360^{\circ}} \cdot \alpha^{\circ}$$

$$30^{\circ} = \frac{2\pi}{360^{\circ}} \cdot 30^{\circ} = \frac{\pi}{6}$$

$$45^{\circ} = \frac{\pi}{4}$$

$$-60^{\circ} = -\frac{\pi}{3}$$

$$90^{\circ} = \frac{\pi}{2}$$

$$-135^{\circ} = -\frac{3\pi}{4}$$

$$390^{\circ} = \frac{13\pi}{6}$$

## *№ 1.2.2*

$$\alpha^{\circ} = \frac{2\pi}{360^{\circ}} \cdot \alpha^{\circ}$$

$$120^{\circ} = \frac{2\pi}{3}$$

$$210^{\circ} = \frac{7\pi}{6}$$

$$180^{\circ} = \pi$$

$$330^{\circ} = \frac{5\pi}{3}$$

$$-225^{\circ} = -\frac{5\pi}{4}$$

$$300^{\circ} = \frac{11\pi}{6}$$

### № 1.2.3

$$\beta \text{ рад} = \frac{360^{\circ}}{2\pi} \cdot \beta$$

$$\frac{\pi}{5} = \frac{360^{\circ}}{2\pi} \cdot \frac{\pi}{5} = 36^{\circ}$$

$$\frac{\pi}{10} = 18^{\circ}$$

$$\frac{4\pi}{3} = 240^{\circ}$$

$$-\frac{\pi}{12} = -15^{\circ}$$

$$\frac{\pi}{36} = 5^{\circ}$$

$$-\frac{\pi}{18} = -10^{\circ}$$

## № 1.2.4

$$\beta \text{ рад} = \frac{360^{\circ}}{2\pi} \cdot \beta$$

$$\frac{\pi}{6} = 30^{\circ}$$

$$\frac{\pi}{24} = 7,5^{\circ}$$

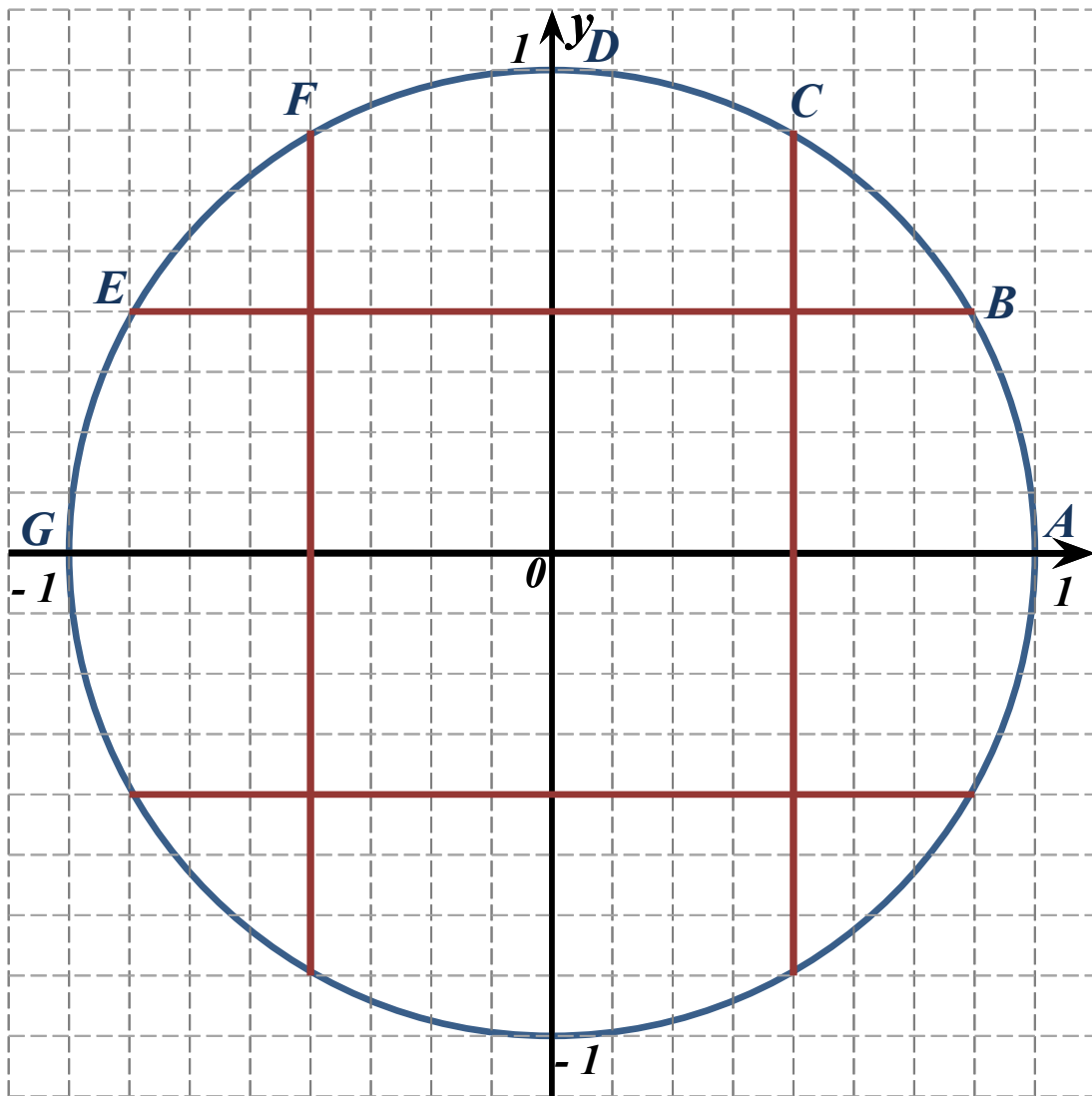
$$\frac{5\pi}{6} = 150^{\circ}$$

$$2\pi = 360^{\circ}$$

$$\frac{17\pi}{6} = 510^{\circ}$$

$$-\frac{\pi}{2} = -90^{\circ}$$





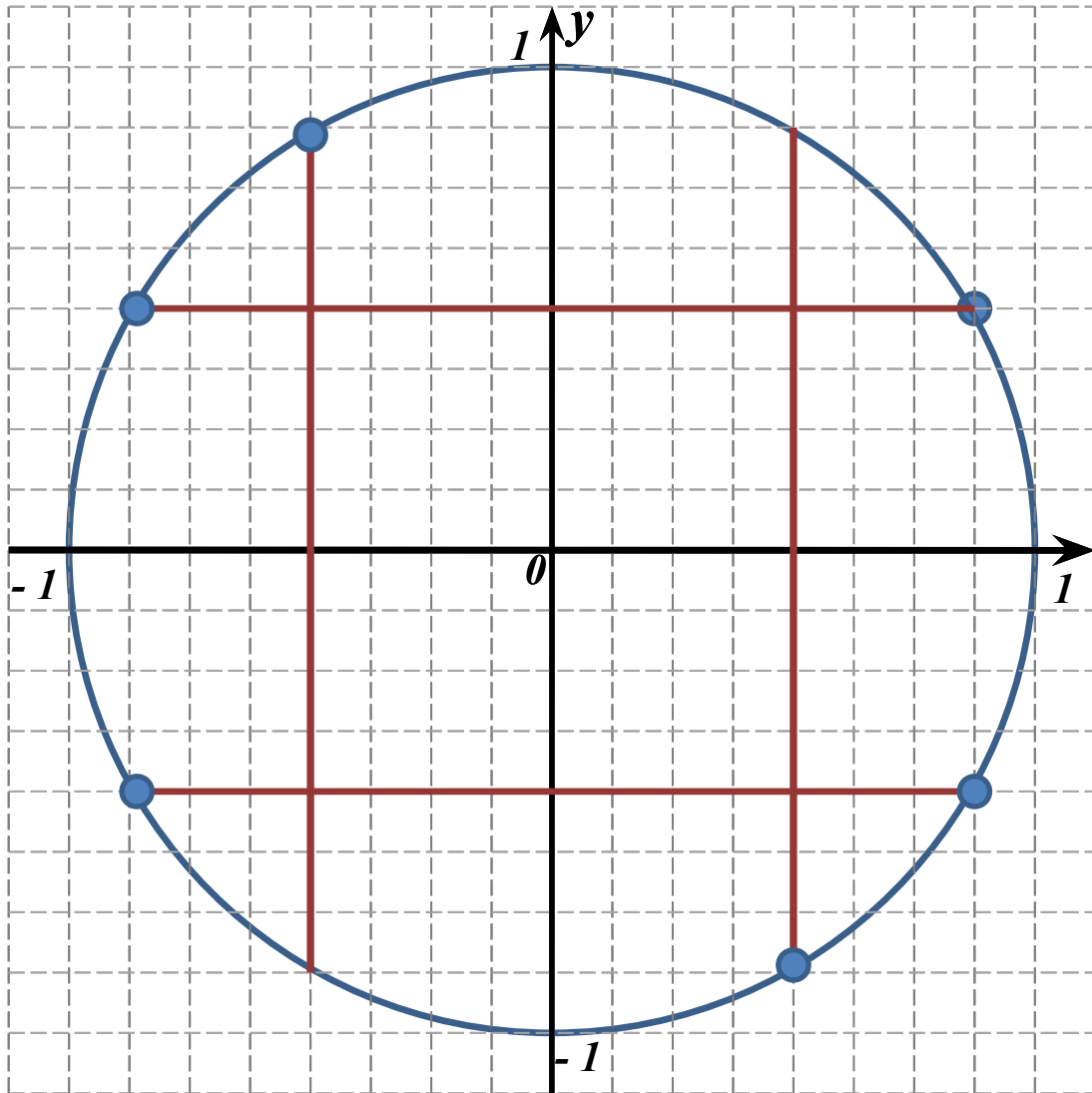
*Точки B, C, D, F, E делят дугу AG на равные дуги.*

*Дуга AG составляет  $180^{\circ}$  или  $\pi$  радиан.*

*Тогда каждая из дуг AB, BC, CD, DF,*

*FE и EG равна  $\frac{\pi}{6}$*

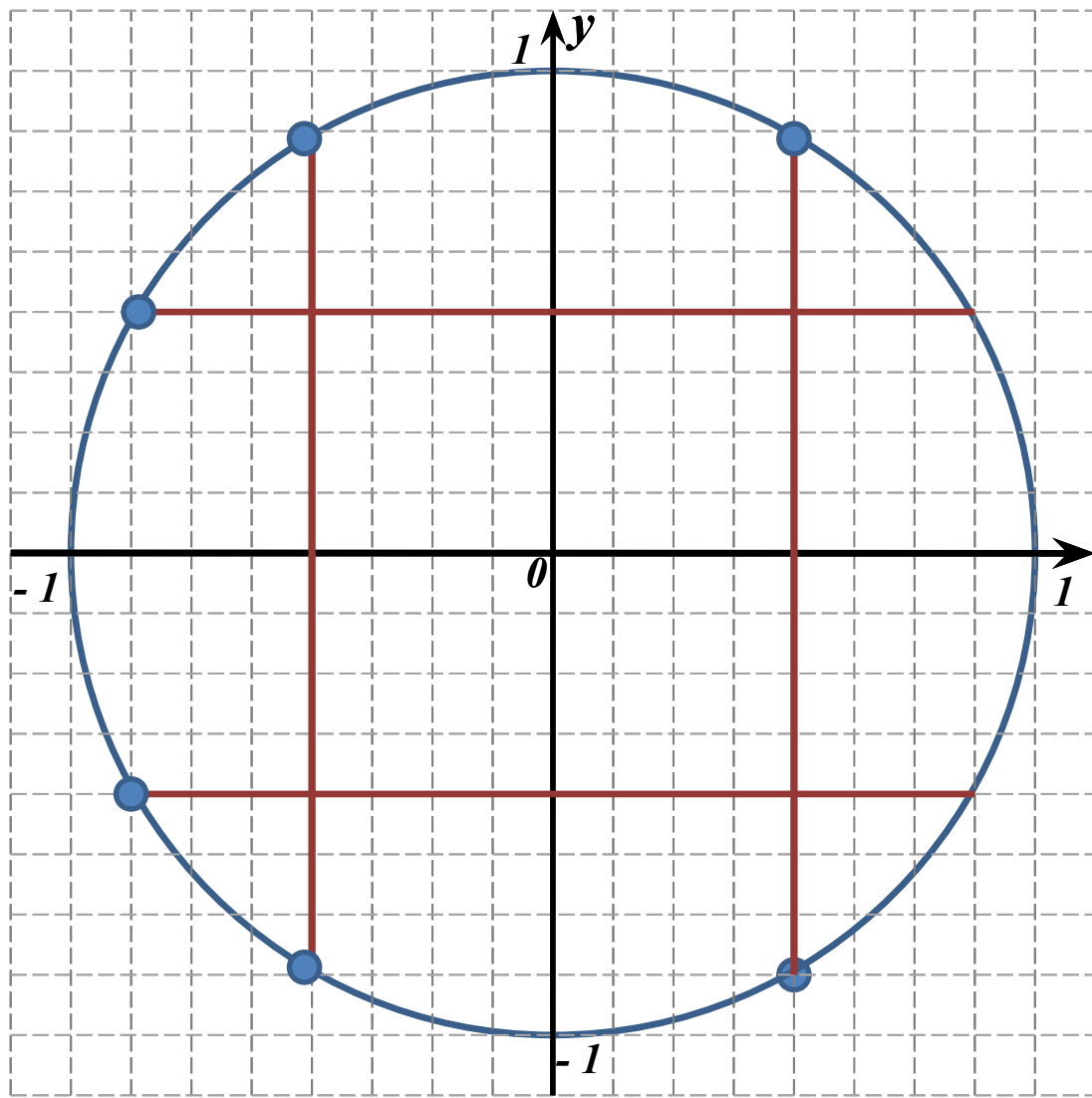
*№ 1.2.5*



- $\frac{\pi}{6}$
- $\frac{5\pi}{6}$
- $-\frac{\pi}{3}$
- $\frac{2\pi}{3}$
- $\frac{7\pi}{6}$
- $\frac{11\pi}{6}$



*№ 1.2.6*



$$-\frac{2\pi}{3}$$

$$-\frac{7\pi}{6}$$

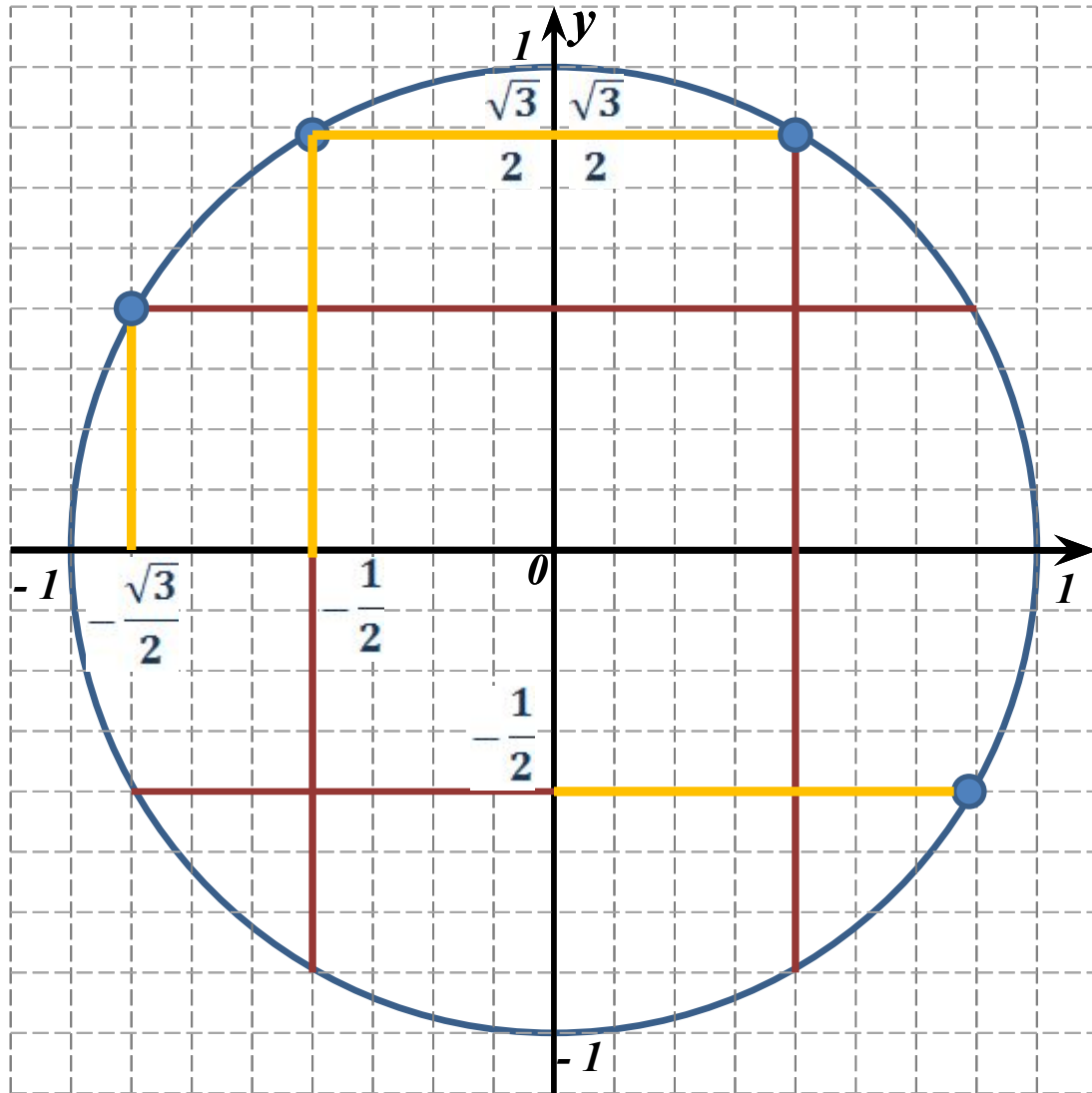
$$\frac{\pi}{3}$$

$$-\frac{5\pi}{6}$$

$$\frac{5\pi}{3}$$

$$\frac{2\pi}{3}$$

# № 1.2.7



$$\cos \frac{5\pi}{6} =$$

$$\sin \frac{\pi}{3} =$$

$$\cos \left( -\frac{7\pi}{6} \right) =$$

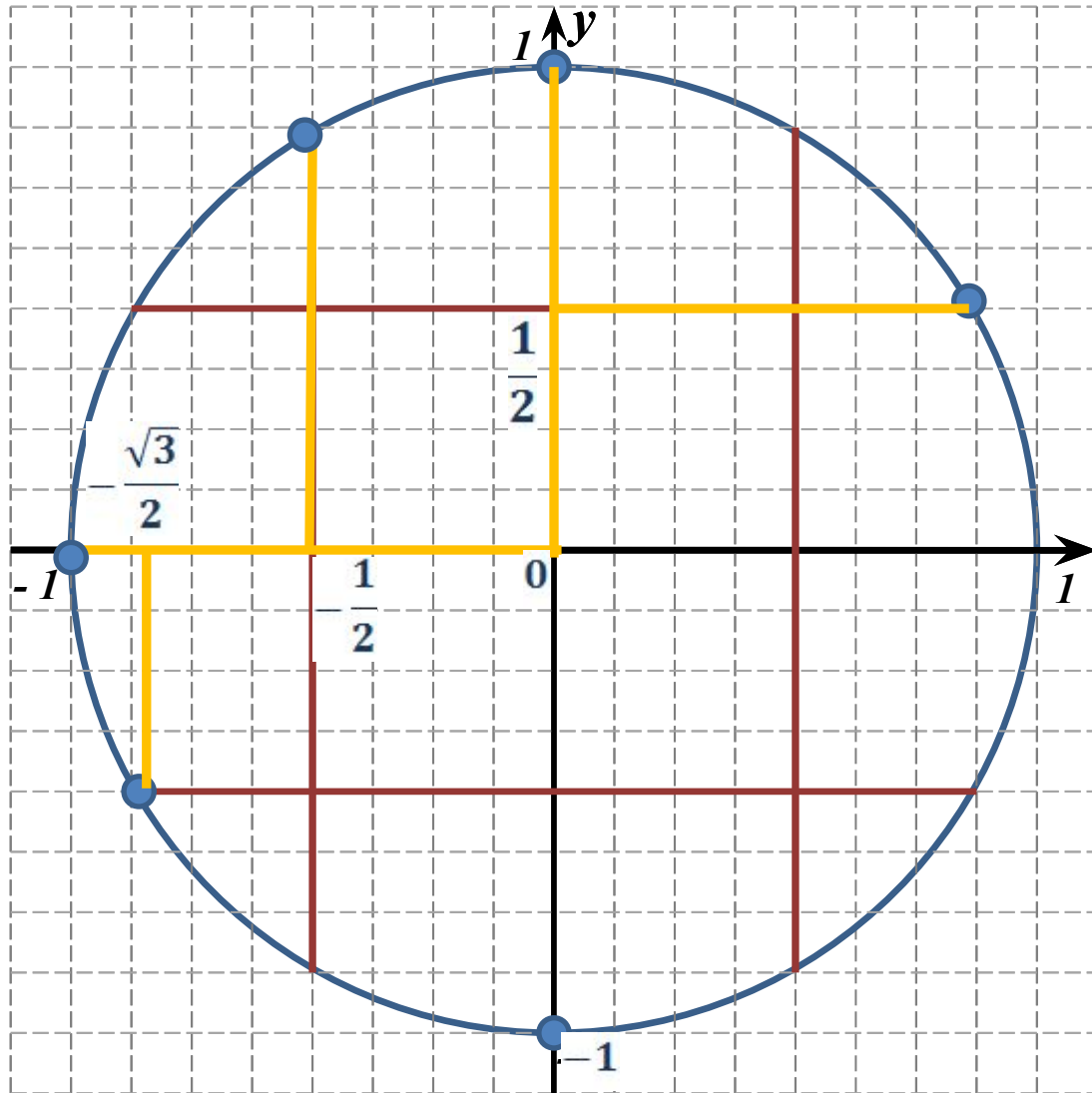
$$\sin \frac{2\pi}{3} =$$

$$\cos \left( -\frac{4\pi}{3} \right) =$$

$$\sin \left( -\frac{\pi}{6} \right) =$$



# № 1.2.8



$$\sin \frac{13\pi}{6} =$$

$$\cos \frac{\pi}{2} =$$

$$\sin \frac{3\pi}{2} =$$

$$\cos \left( -\frac{5\pi}{3} \right) =$$

$$\sin \pi =$$

$$\cos \frac{7\pi}{6} =$$



## *Nº 1.2.9*

$$\cos 2\pi = 1$$

$$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\cos \frac{4\pi}{3} = -\frac{1}{2}$$

$$\sin \frac{5\pi}{2} = 1$$

$$\cos(-\pi) = -1$$

$$\sin\left(-\frac{5\pi}{6}\right) = -\frac{1}{2}$$



## *Nº 1.2.10*

$$\sin\left(-\frac{11\pi}{6}\right) = \frac{1}{2}$$

$$\cos\frac{13\pi}{6} = \frac{\sqrt{3}}{2}$$

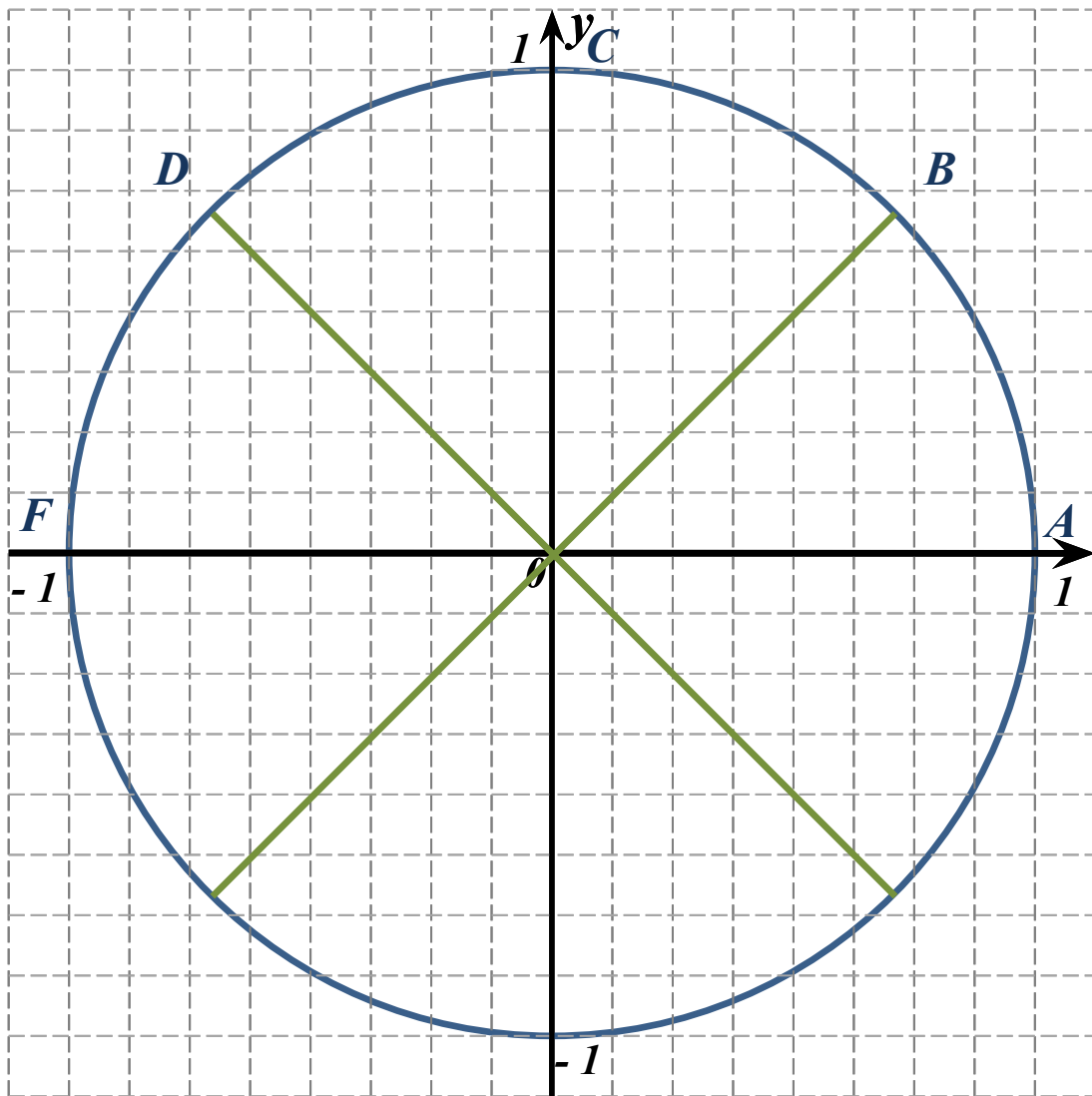
$$\sin\frac{8\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\cos\left(-\frac{\pi}{2}\right) = 0$$

$$\sin\left(-\frac{7\pi}{3}\right) = \frac{\sqrt{3}}{2}$$

$$\cos(-3\pi) = -1$$



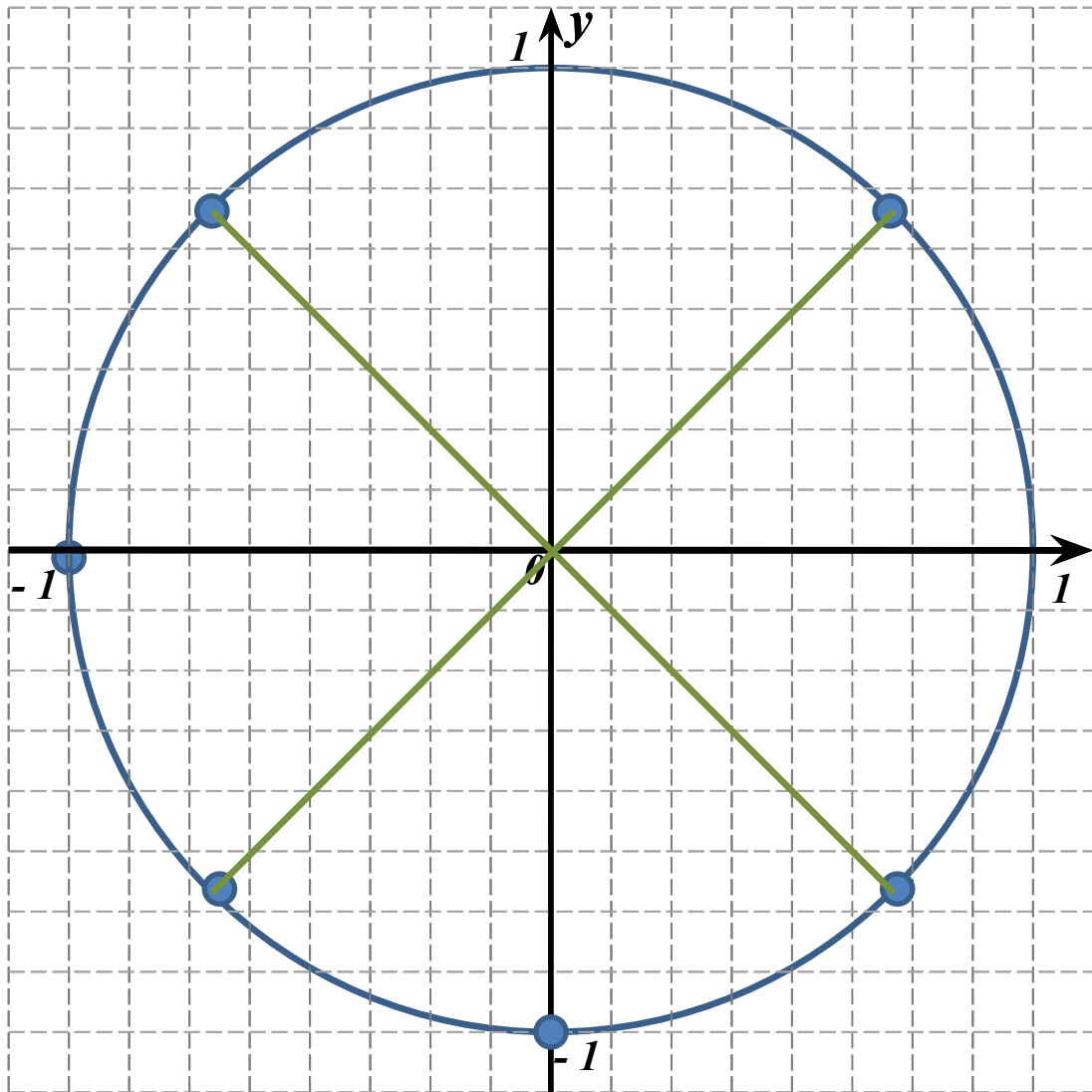


*Точки  $B, C, D$  делят дугу  $AF$  на равные дуги.*

*Дуга  $AF$  составляет  $180^\circ$  или  $\pi$  радиан.*

*Тогда каждая из дуг  $AB, BC, CD, DF$  равна  $\frac{\pi}{4}$ .*

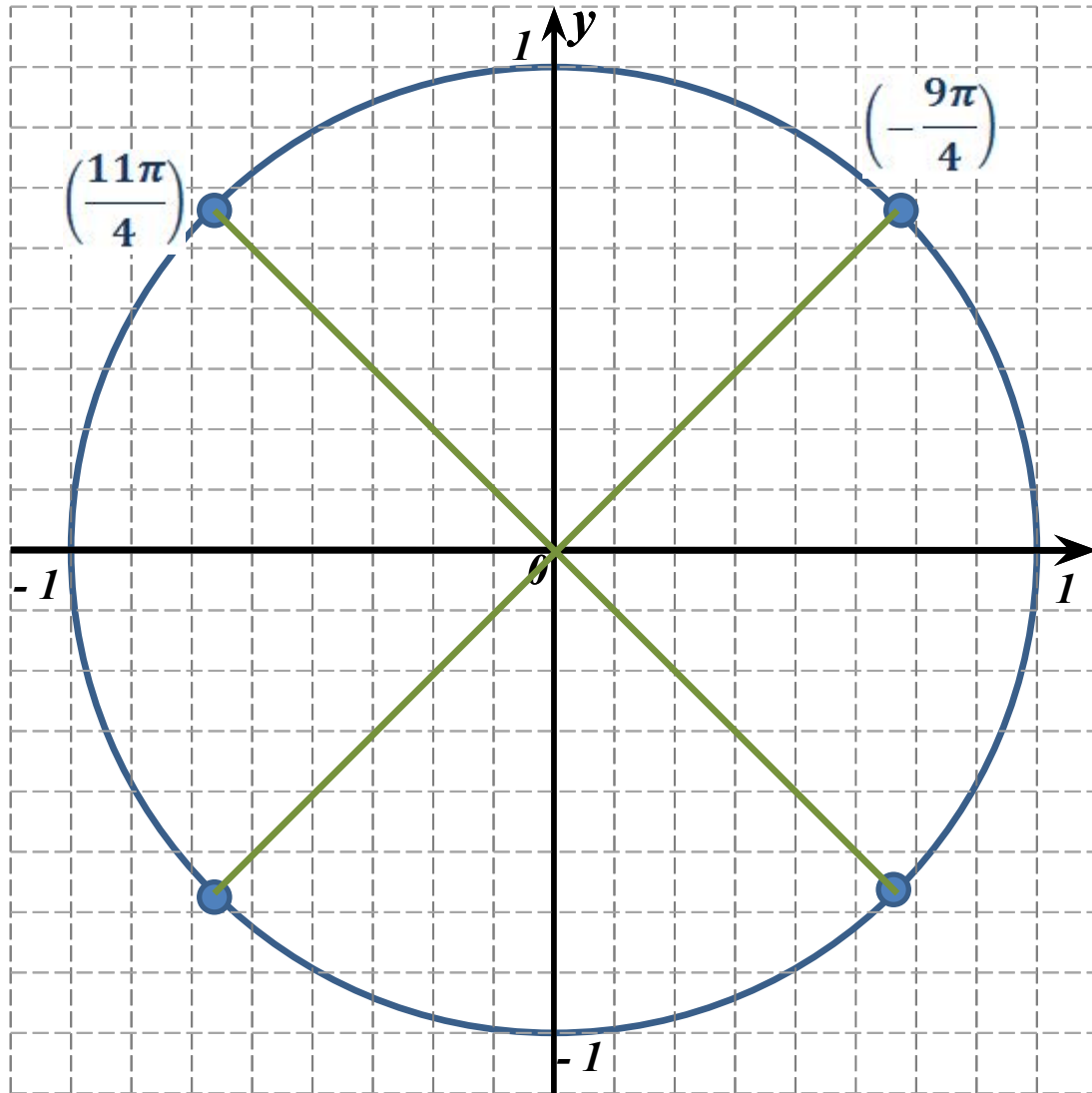
№ 1.2.11



$\frac{3\pi}{4}$   
 $-\frac{\pi}{4}$   
 $\frac{5\pi}{4}$   
 $\frac{7\pi}{2}$   
 $-5\pi$   
 $\frac{9\pi}{4}$



№ 1.2.12



$$-\frac{5\pi}{4}$$

$$\frac{11\pi}{4}$$

$$-\frac{7\pi}{4}$$

$$\frac{13\pi}{4}$$

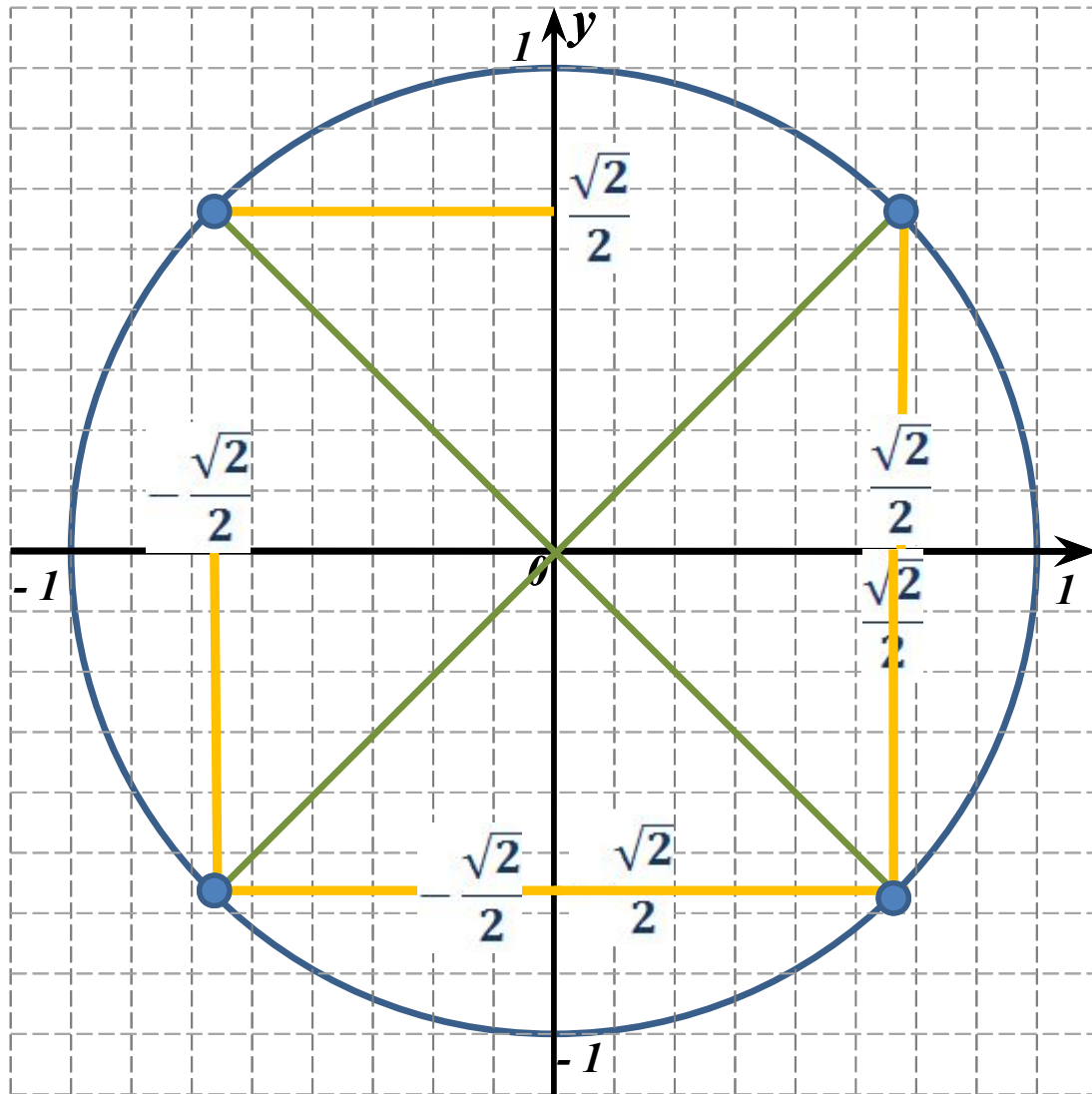
$$-\frac{9\pi}{4}$$

$$\frac{15\pi}{4}$$





# № 1.2.13



$$\cos \frac{\pi}{4} =$$

$$\sin \left( -\frac{3\pi}{4} \right) =$$

$$\cos \frac{5\pi}{4} =$$

$$\sin \left( -\frac{9\pi}{4} \right) =$$

$$\cos \frac{7\pi}{4} =$$

$$\sin \frac{19\pi}{4} =$$



## ***Nº 1.2.14***

$$\sin\left(-\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\cos\left(-\frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\sin\frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\cos\frac{11\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\sin\left(-\frac{5\pi}{2}\right) = \mathbf{0}$$

$$\cos\frac{13\pi}{4} = -\frac{\sqrt{2}}{2}$$



## *Nº 1.2.15*

$$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \left( -\frac{3\pi}{4} \right) = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\sin \left( -\frac{9\pi}{4} \right) = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \frac{19\pi}{4} = \frac{\sqrt{2}}{2}$$



## *Nº 1.2.16*

$$\sin\left(-\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\cos\left(-\frac{5\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\sin\frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\cos\frac{11\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin\left(-\frac{5\pi}{2}\right) = -1$$

$$\cos\frac{13\pi}{4} = -\frac{\sqrt{2}}{2}$$



## *Nº 1.2.17*

$$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \left( -\frac{3\pi}{4} \right) = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\sin \left( -\frac{9\pi}{4} \right) = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \frac{19\pi}{4} = \frac{\sqrt{2}}{2}$$



## ***№ 1.2.18***

$$\sin\left(-\frac{7\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\cos\left(-\frac{5\pi}{2}\right) = 0$$

$$\sin\frac{17\pi}{4} = -\frac{\sqrt{2}}{2}$$

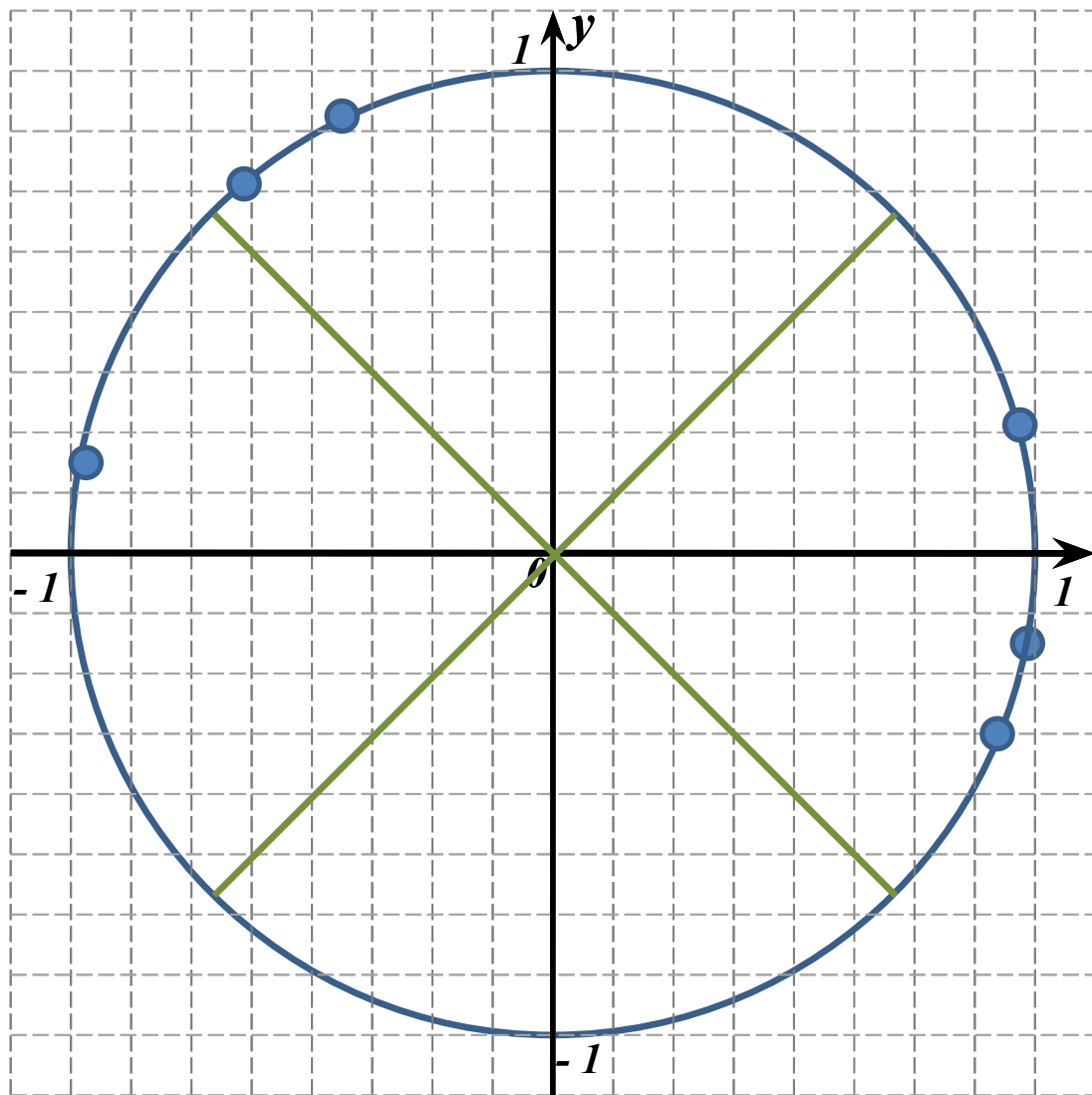
$$\cos 11\pi = -1$$

$$\sin\left(-\frac{15\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\cos\frac{21\pi}{4} = -\frac{\sqrt{2}}{2}$$



*№ 1.2.19*



2

3

- 4

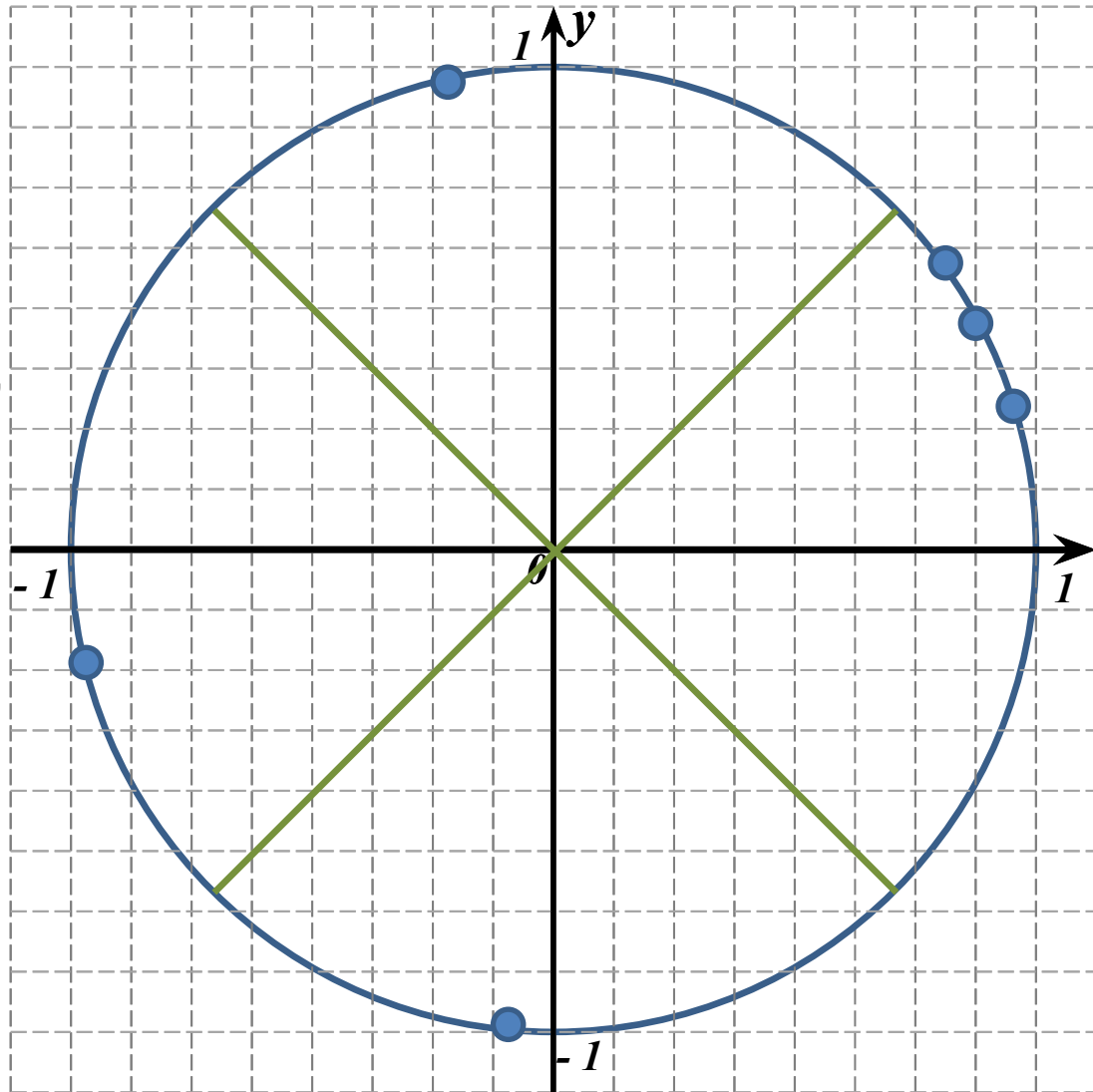
6

- 7

12



*№ 1.2.20*



*1,8*

*3,6*

*4,5*

*- 5,7*

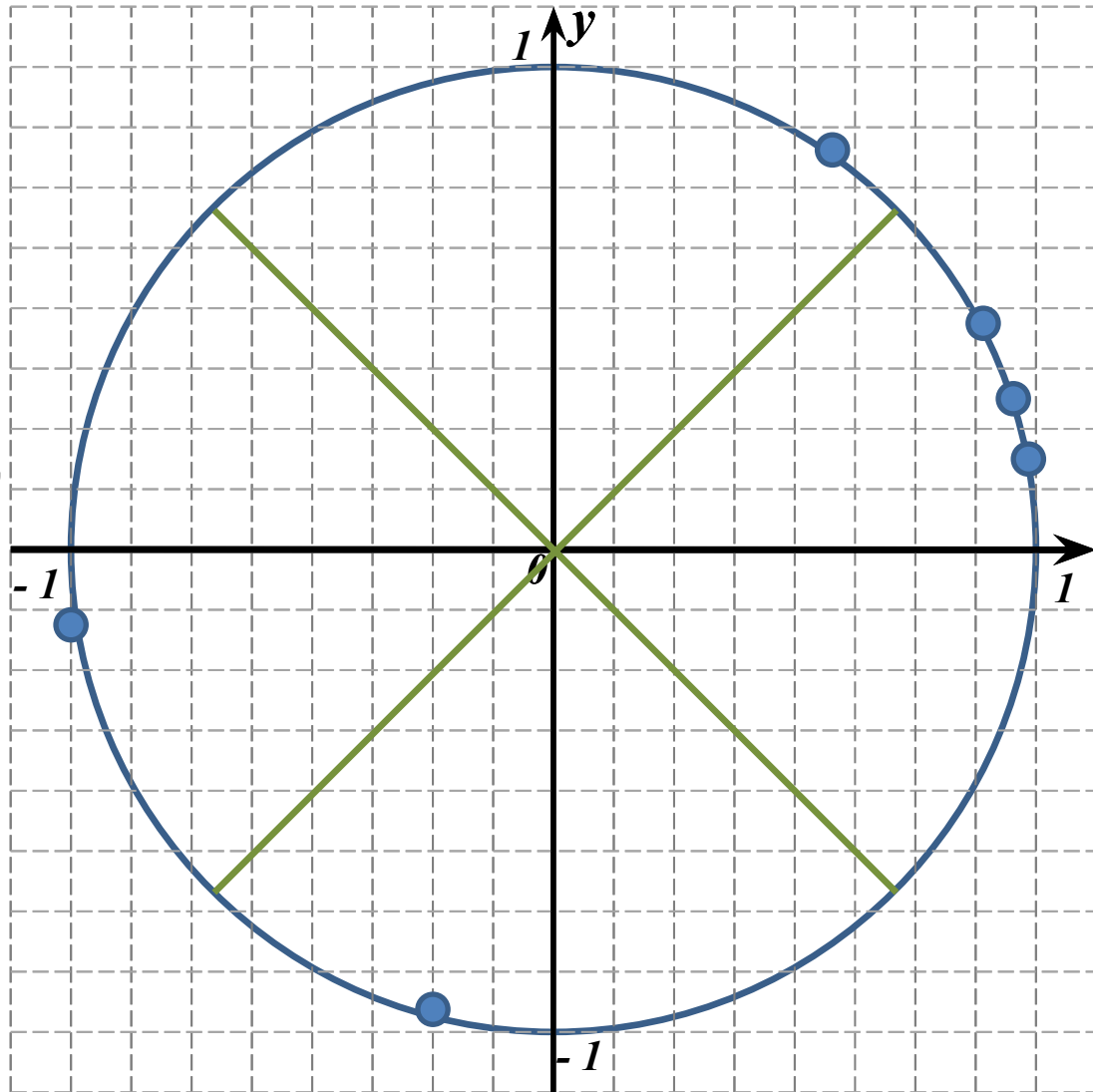
*- 7,8*

*9*





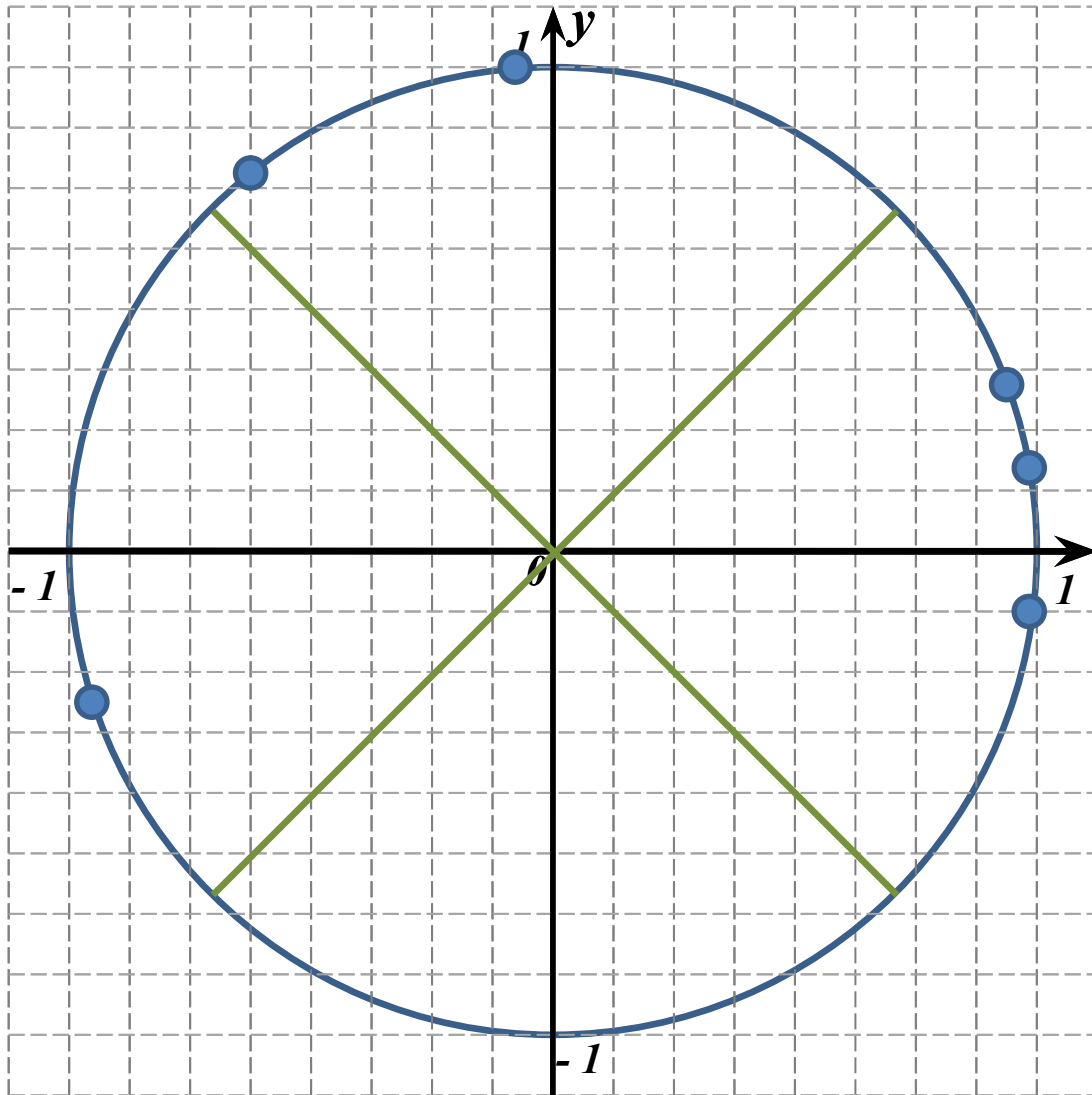
*№ 1.2.21*



*1*  
*4*  
*- 3*  
*- 6*  
*7*  
*- 12*



*№ 1.2.22*



*-2,3*

*3,7*

*-4,5*

*-8*

*-10*

*13*



*№ 1.2.23*

*1,9 € II четверти*

*- 3,8 € IV четверти*

*5 € IV четверти*

*17 € IV четверти*

*- 1,3 € IV четверти*

*- 2,8 € III четверти*



*№ 1.2.24*

*– 5,4 € I четверти*

*2,8 € II четверти*

*3,4 € III четверти*

*– 9 € I четверти*

*16 € IV четверти*

*– 10 € IV четверти*

