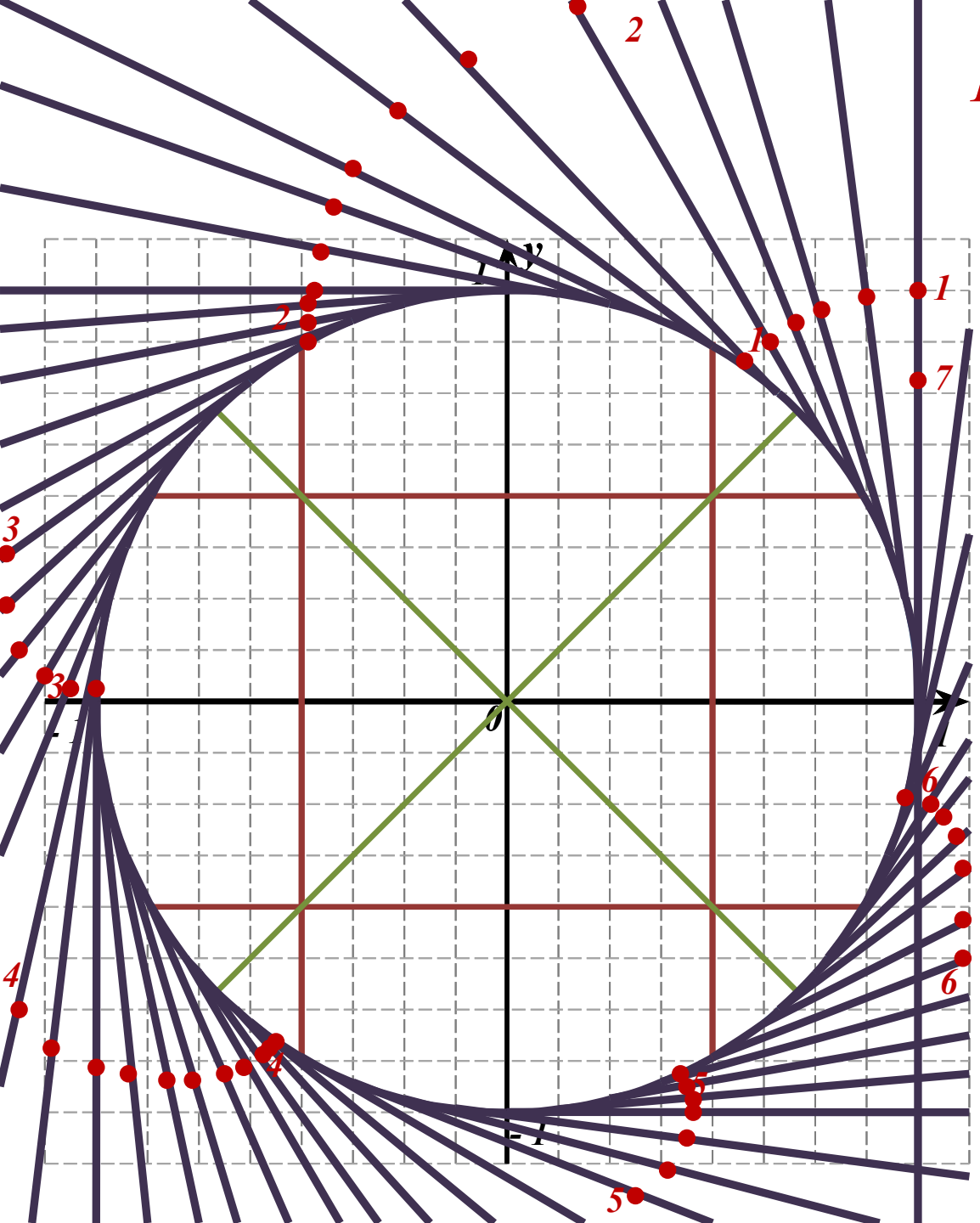
Радианная мера угла

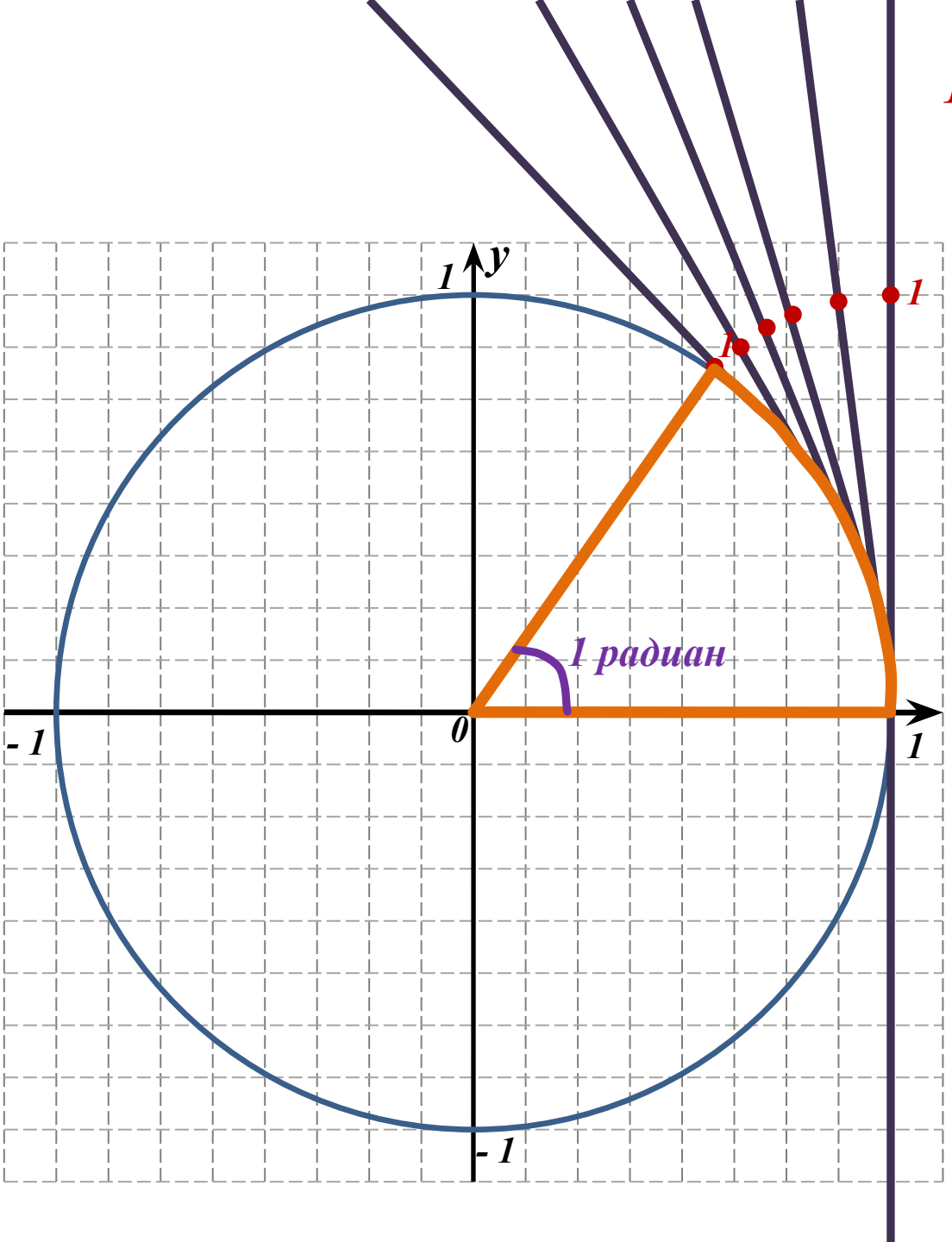


Возьмем числовую ось, начало которой совпадет с концом начального радиуса.

«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.

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

$$C = 2\pi$$

$$360^0 = 2\pi$$

$$1^0 = \frac{2\pi}{360^0}$$

$$1 \text{ рад} = \frac{360^0}{2\pi}$$

$$1 \text{ рад} \approx 57^0$$

$$\alpha^0 = \frac{2\pi}{360^0} \cdot \alpha^0$$

$$\beta \text{ рад} = \frac{360^0}{2\pi} \cdot \beta$$

№ 1.2.1

$$\alpha^0 = \frac{2\pi}{360^0} \cdot \alpha^0$$

$$30^0 = \frac{2\pi}{360^0} \cdot 30^0 = \frac{\pi}{6}$$

$$45^0 = \frac{\pi}{4}$$

$$-60^0 = -\frac{\pi}{3}$$

$$90^0 = \frac{\pi}{2}$$

$$-135^0 = -\frac{3\pi}{4}$$

$$390^0 = \frac{13\pi}{6}$$

№ 1.2.2

$$\alpha^0 = \frac{2\pi}{360^0} \cdot \alpha^0$$

$$120^0 = \frac{2\pi}{3}$$

$$210^0 = \frac{7\pi}{6}$$

$$180^0 = \pi$$

$$330^0 = \frac{5\pi}{3}$$

$$-225^0 = -\frac{5\pi}{4}$$

$$300^0 = \frac{11\pi}{6}$$

№ 1.2.3

$$\beta \text{ рад} = \frac{360^0}{2\pi} \cdot \beta$$

$$\frac{\pi}{5} = \frac{360^0}{2\pi} \cdot \frac{\pi}{5} = 36^0$$

$$\frac{\pi}{10} = 18^0$$

$$\frac{4\pi}{3} = 240^0$$

$$-\frac{\pi}{12} = -15^0$$

$$\frac{\pi}{36} = 5^0$$

$$-\frac{\pi}{18} = -10^0$$

№ 1.2.4

$$\beta \text{ рад} = \frac{360^0}{2\pi} \cdot \beta$$

$$\frac{\pi}{6} = 30^0$$

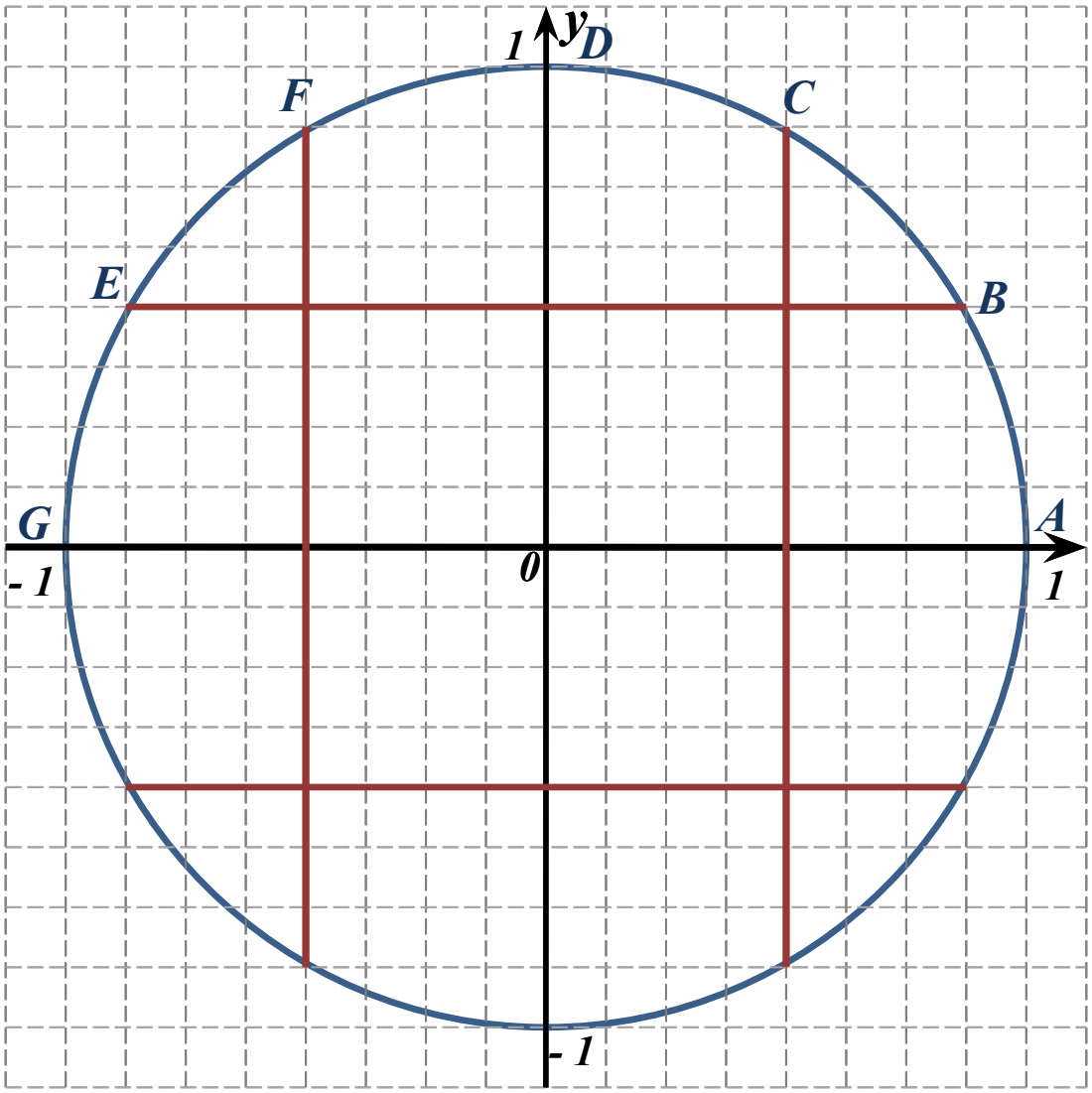
$$\frac{\pi}{24} = 7,5^0$$

$$\frac{5\pi}{6} = 150^0$$

$$2\pi = 360^0$$

$$\frac{17\pi}{6} = 510^0$$

$$-\frac{\pi}{2} = -90^0$$

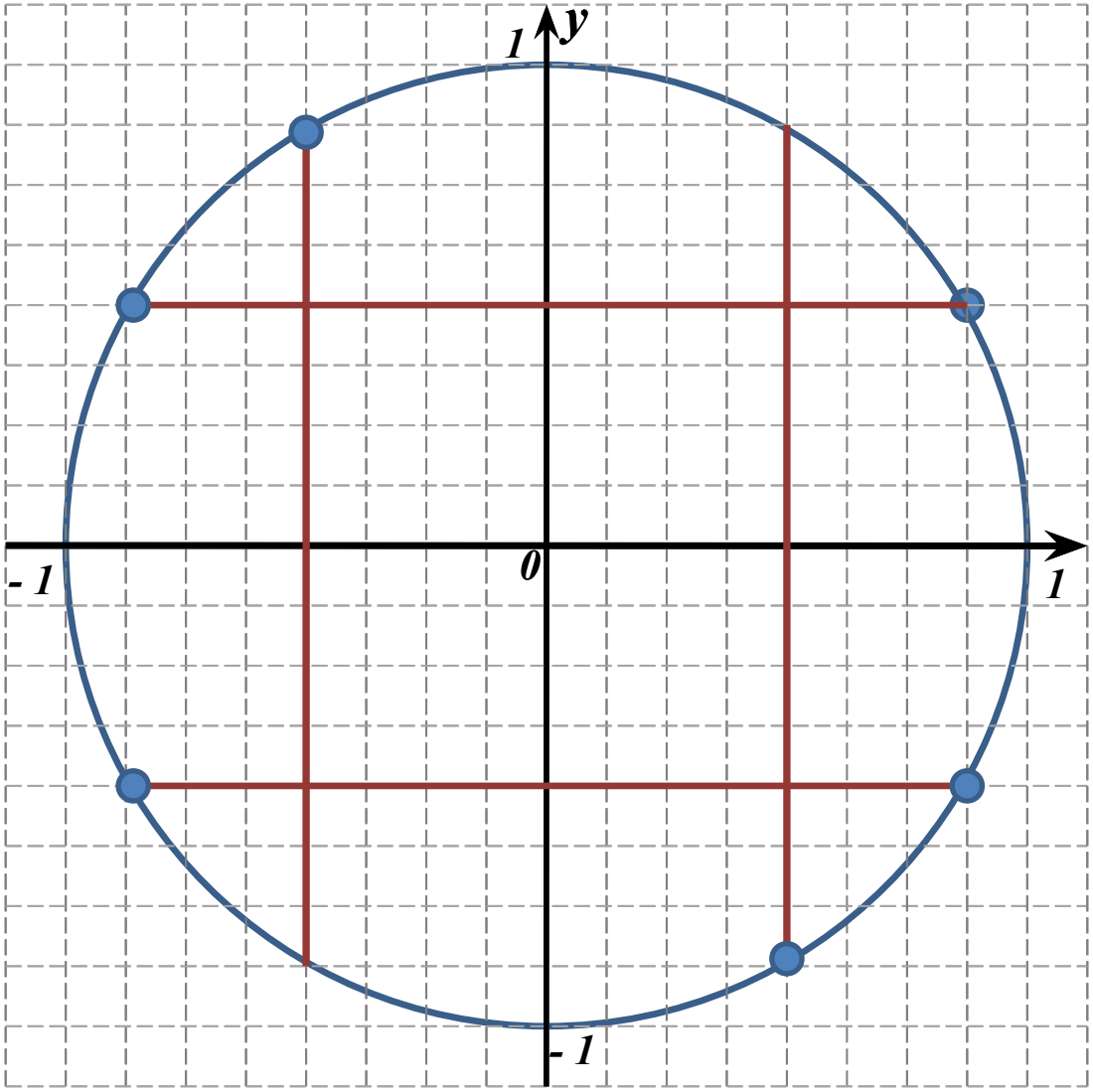


Точки B, C, D, F, E делят дугу AG на равные дуги.

Дуга AG составляет 180^0 или π радиан.

Тогда каждая из дуг AB, BC, CD, DF, FE и EG равна $\frac{\pi}{6}$

№ 1.2.5



$\frac{\pi}{6}$

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

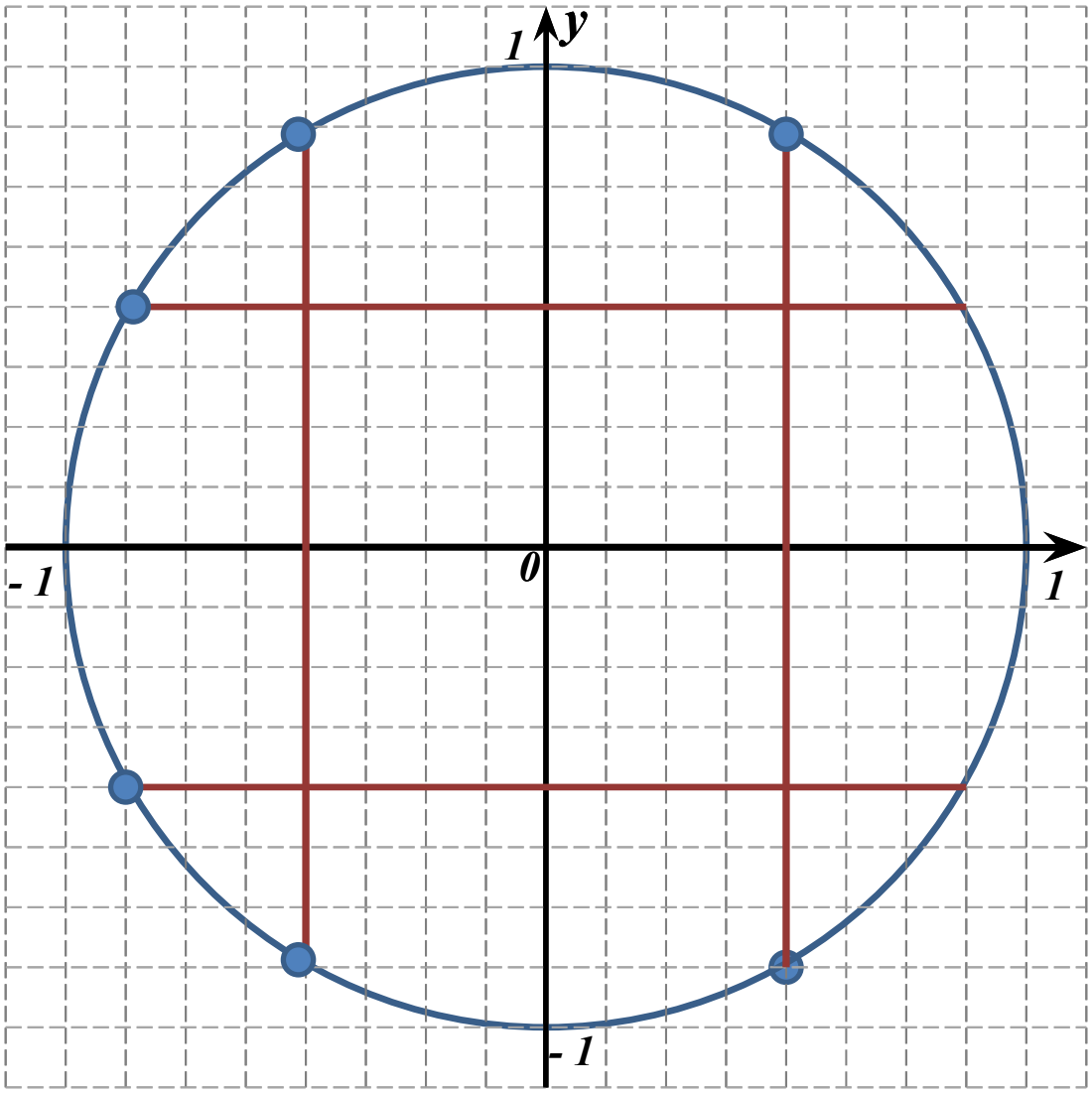
$-\frac{\pi}{3}$

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

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

$\frac{11\pi}{6}$

№ 1.2.6



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

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

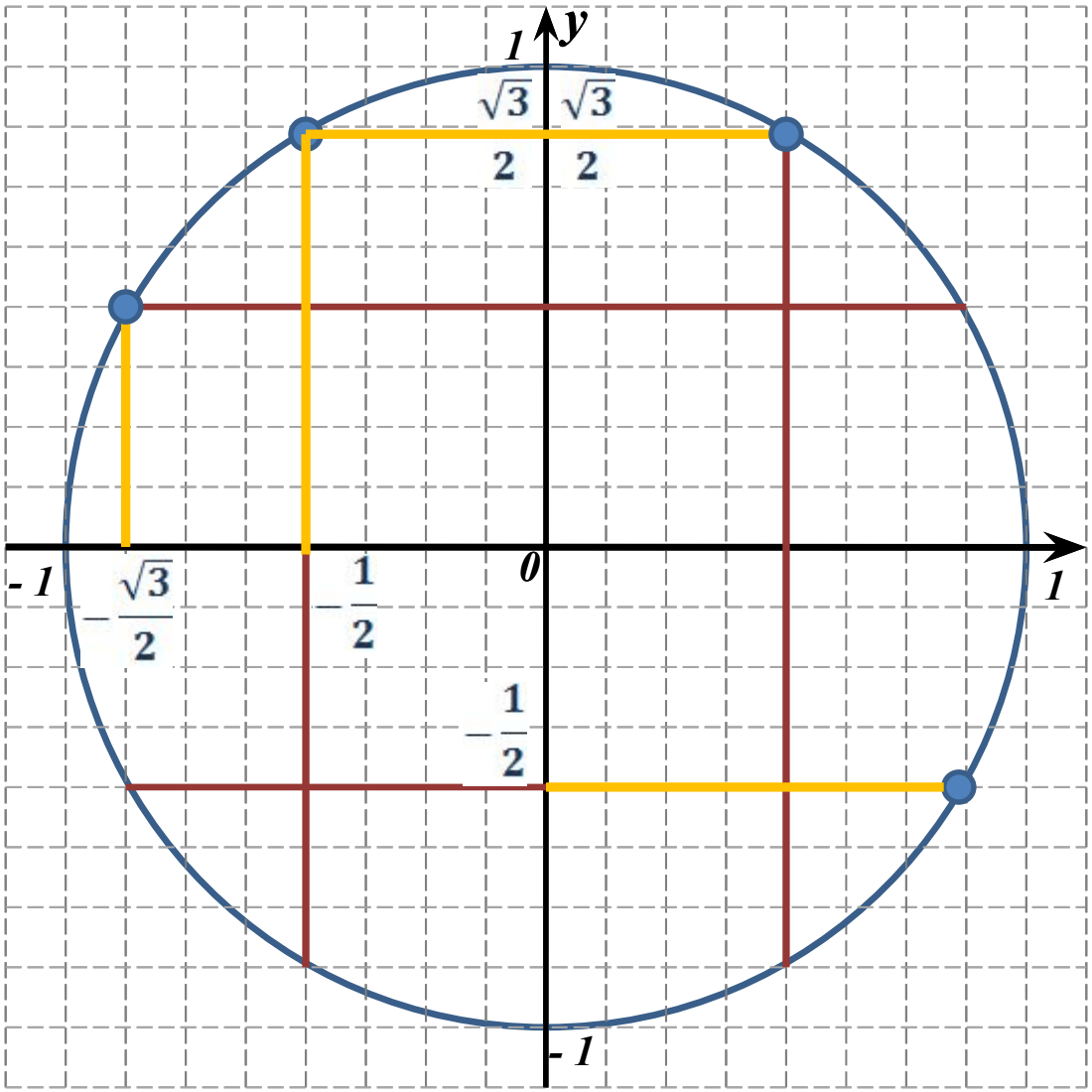
$$\frac{\pi}{3}$$

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

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

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

№ 1.2.7



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

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

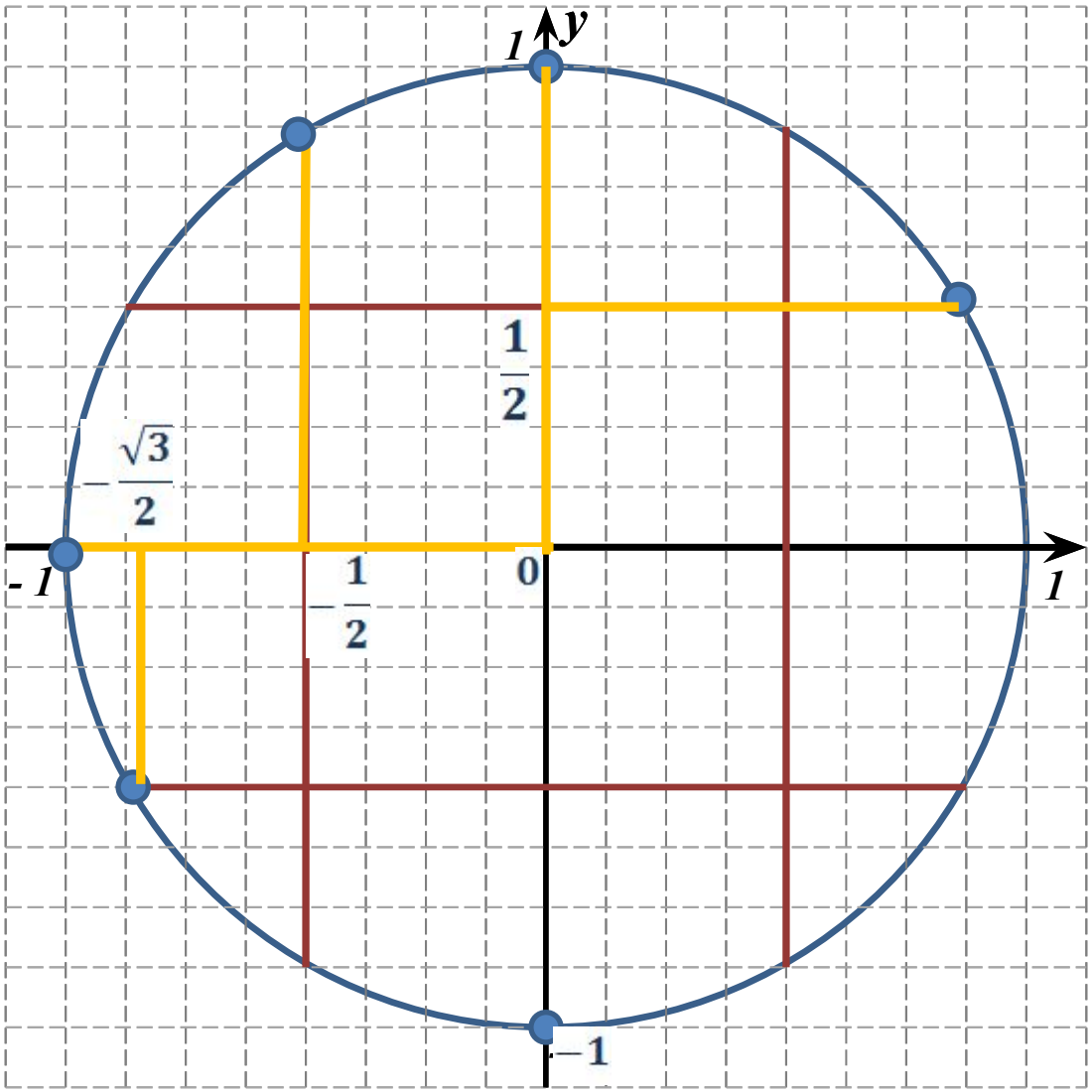
$$\cos\left(-\frac{7\pi}{6}\right) =$$

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

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

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

№ 1.2.8



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

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

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

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

$$\sin\pi =$$

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

№ 1.2.9

$$\cos 2\pi = 1$$

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

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

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

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

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

№ 1.2.10

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

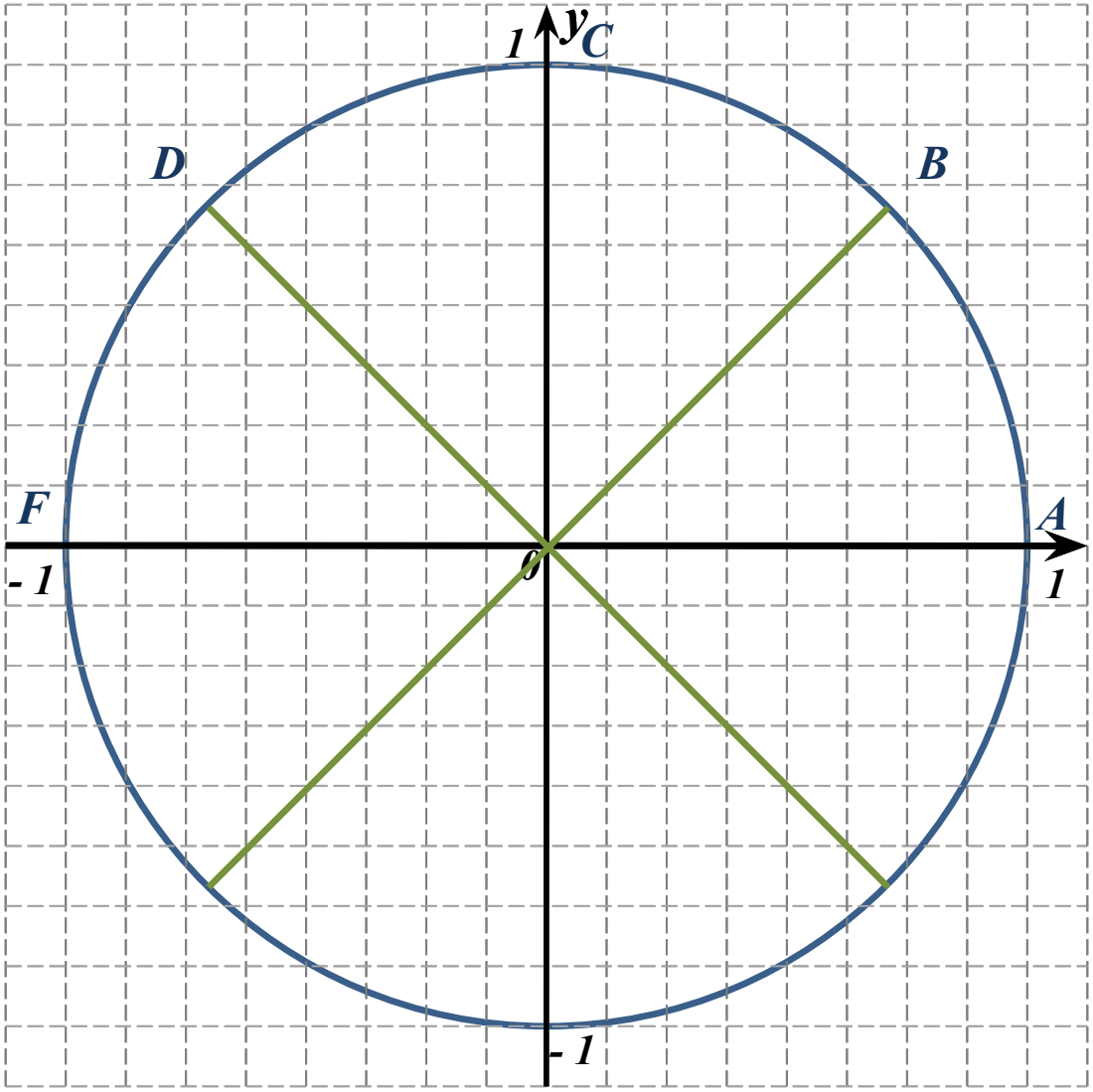
$$\cos\frac{13\pi}{6} = \frac{\sqrt{3}}{2}$$

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

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

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

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

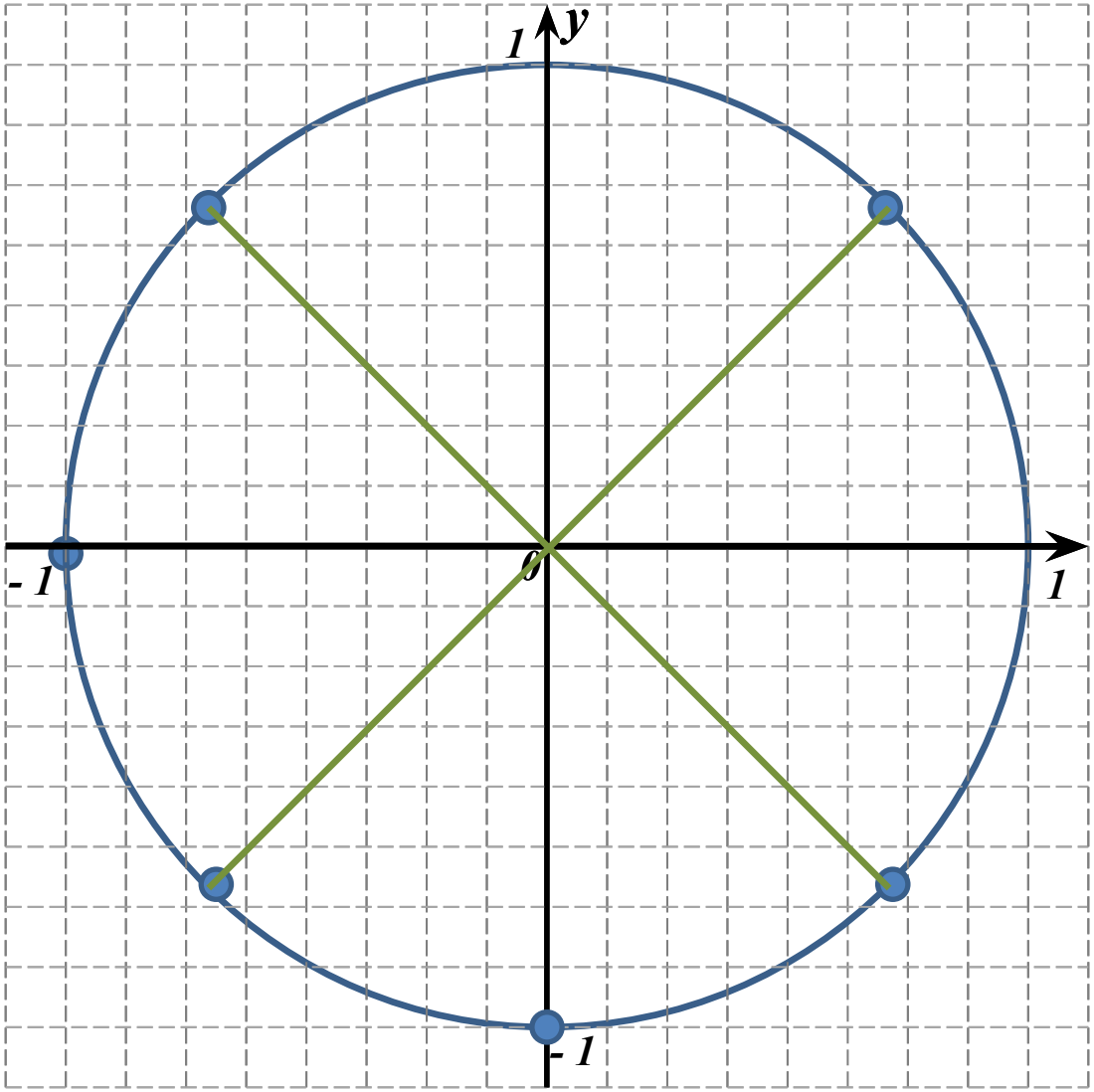


Точки B, C, D делят дугу AF на равные дуги.

Дуга AF составляет 180^0 или π радиан.

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

№ 1.2.11



$\frac{3\pi}{4}$

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

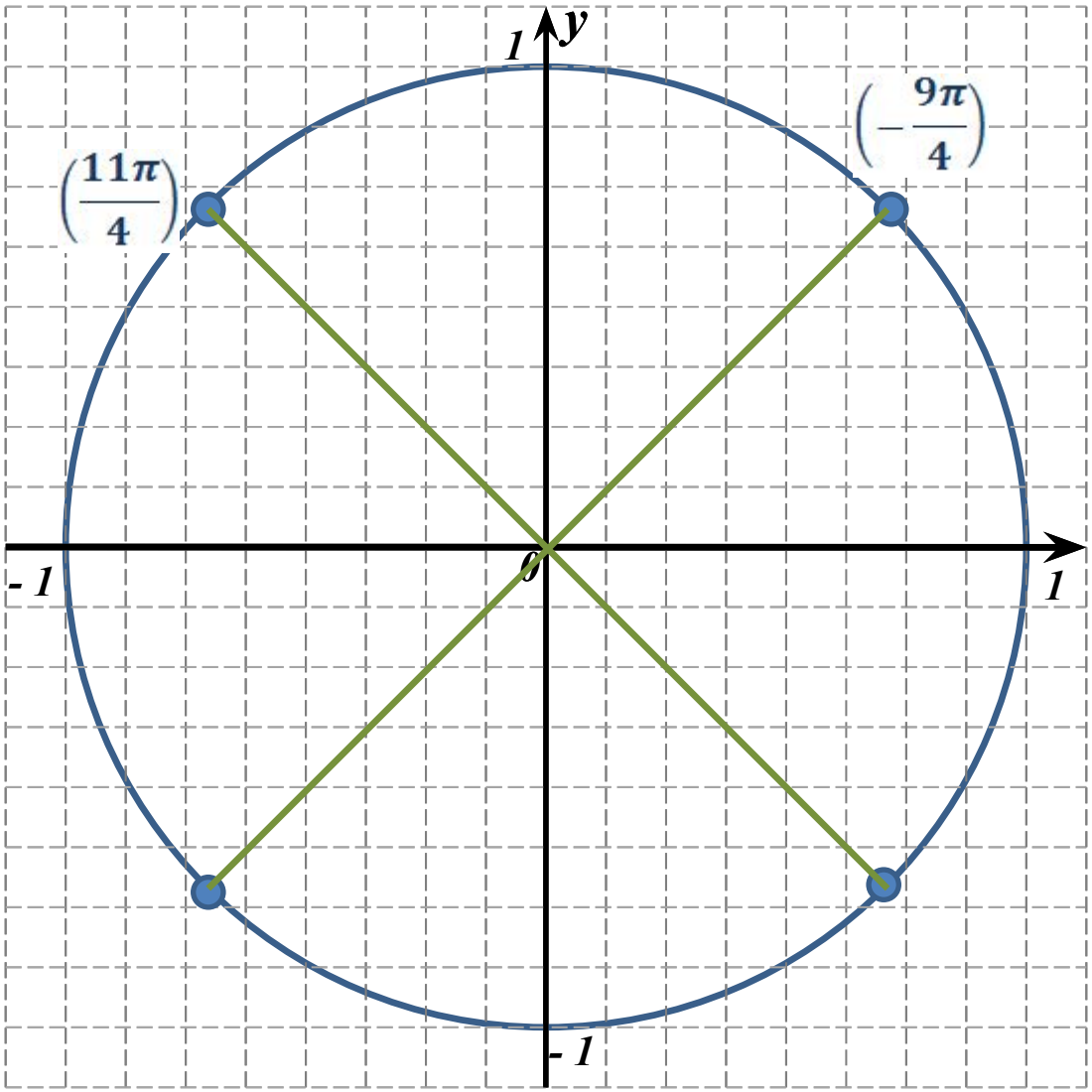
$\frac{5\pi}{4}$

$\frac{7\pi}{2}$

-5π

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

№ 1.2.12



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

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

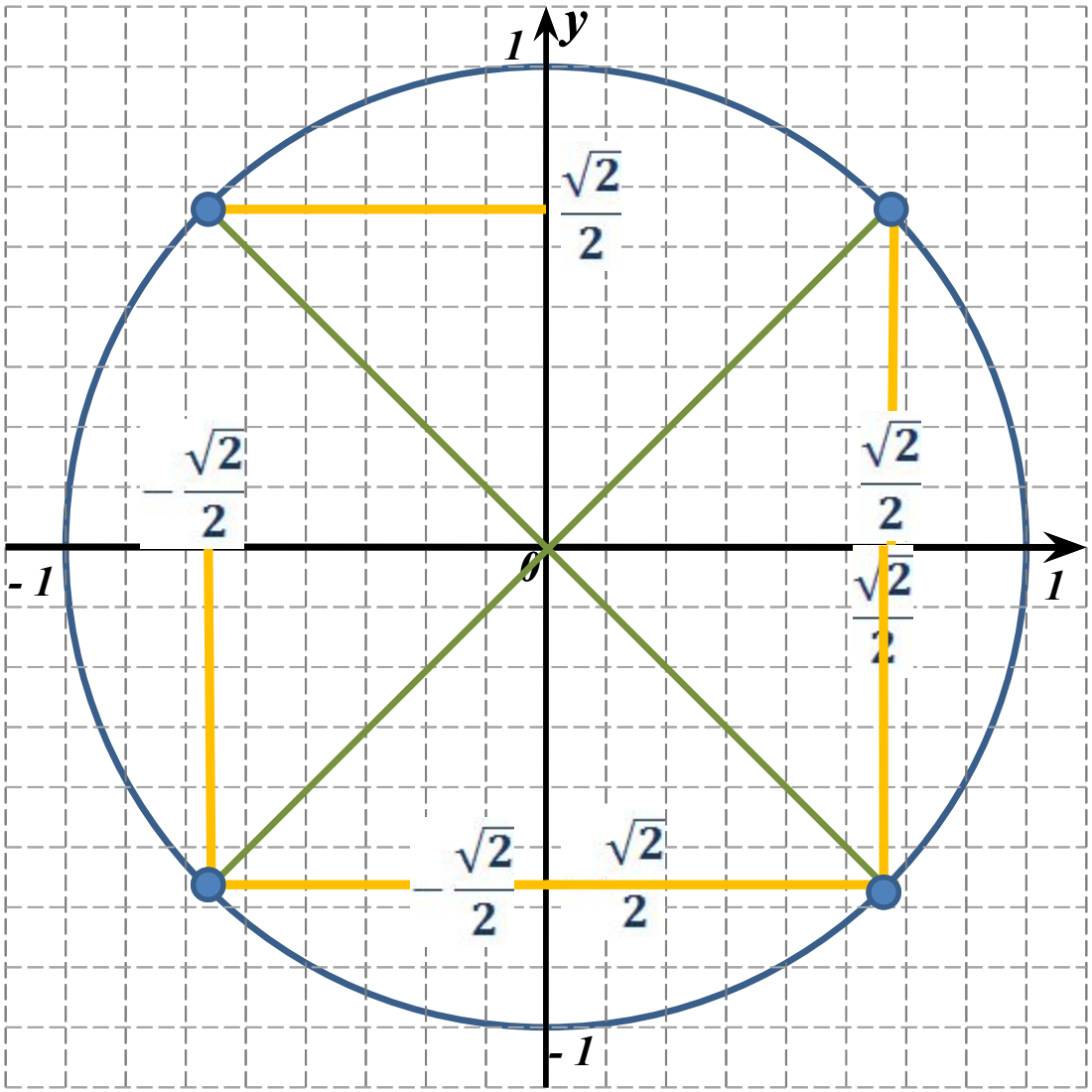
$-\frac{7\pi}{4}$

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

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

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

№ 1.2.13



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

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

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

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

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

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

№ 1.2.14

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

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

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

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

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

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

№ 1.2.15

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

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

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

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

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

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

№ 1.2.16

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

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

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

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

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

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

№ 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

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

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

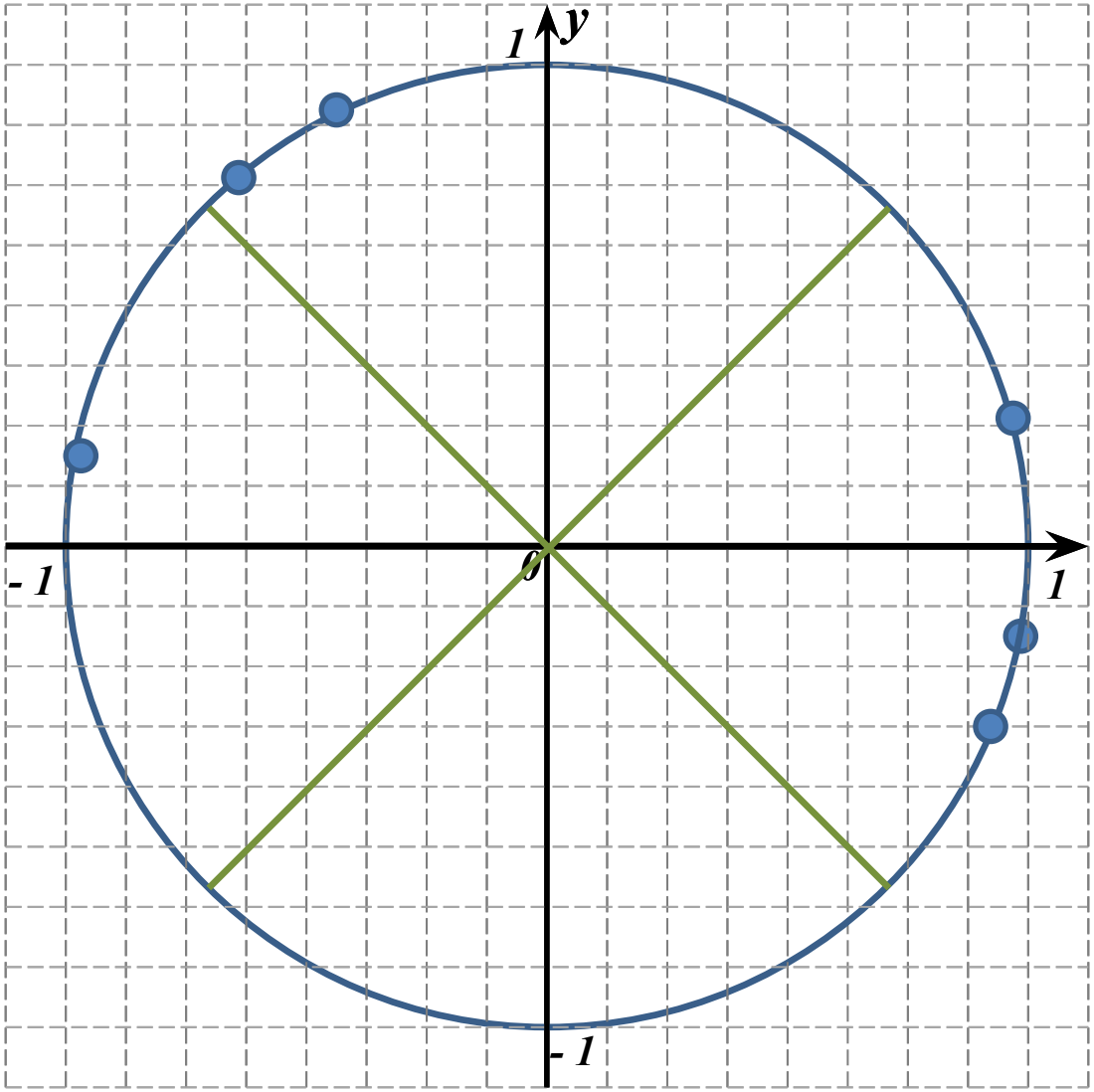
$$\sin\frac{17\pi}{4} = -\frac{\sqrt{2}}{2}$$

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

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

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

№ 1.2.19

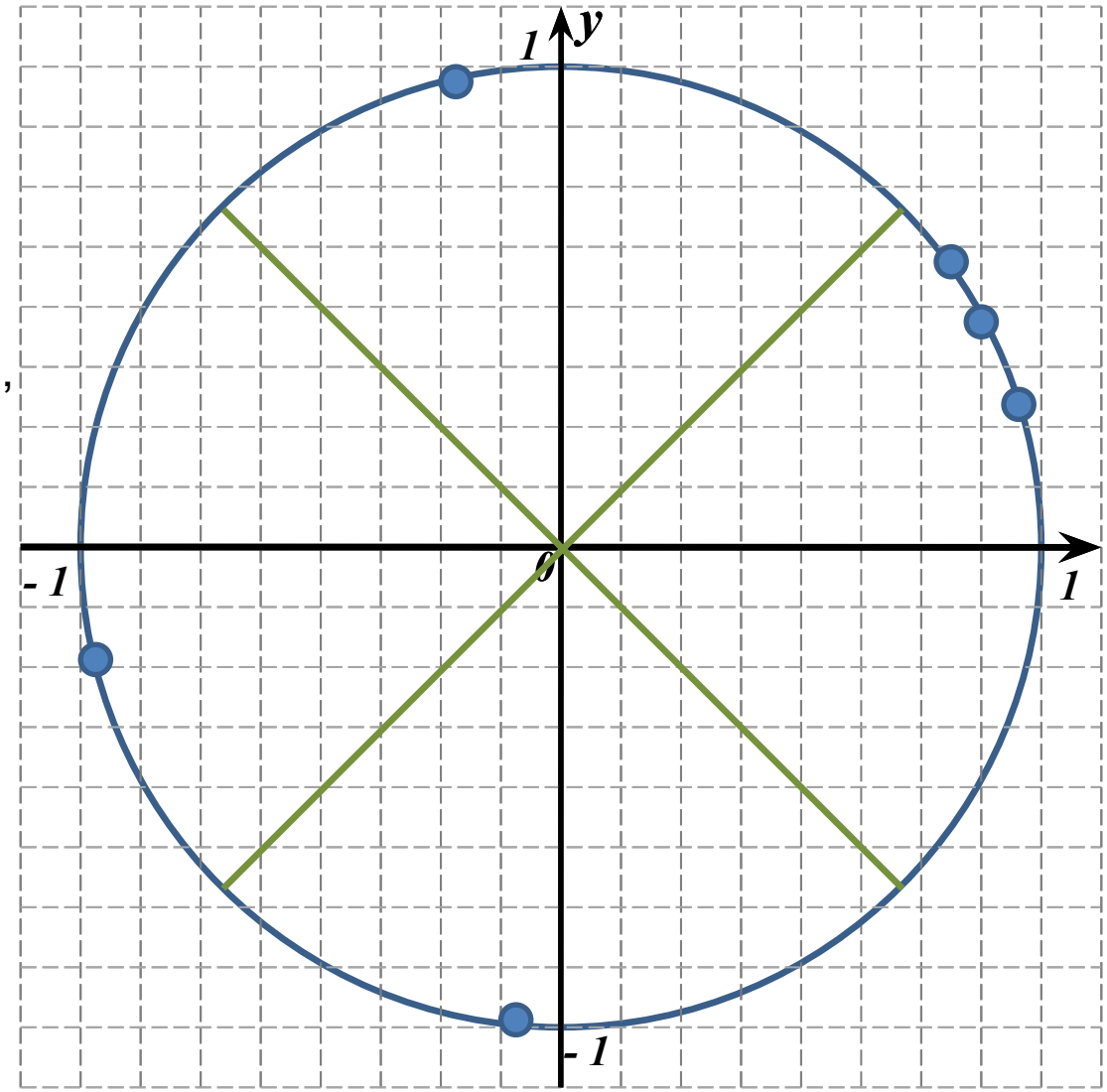


$\frac{2}{3}$

$-\frac{4}{6}$

$-\frac{7}{12}$

№ 1.2.20



,

1,8

3,6

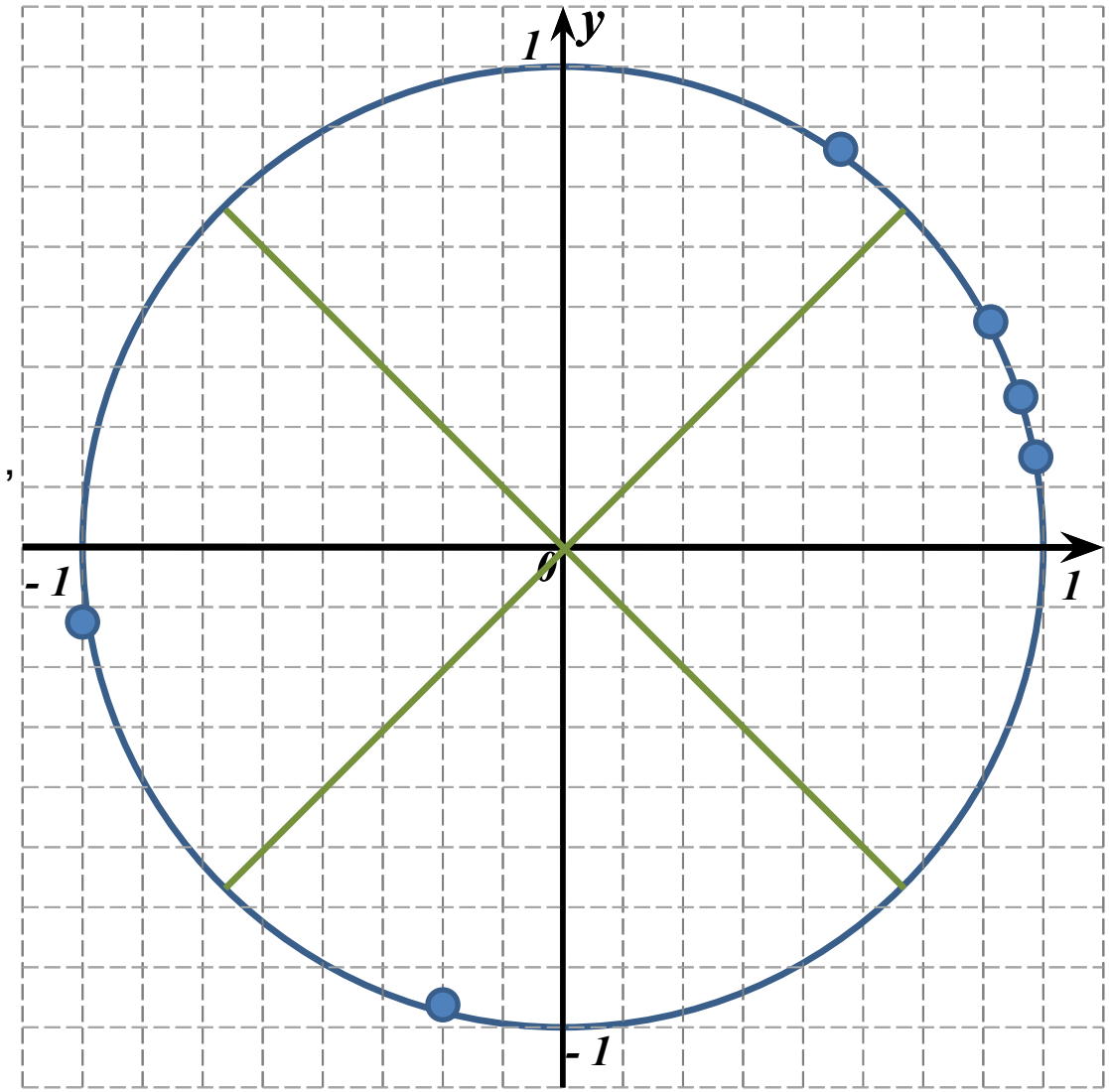
4,5

– 5,7

– 7,8

9

№ 1.2.21



,

1

4

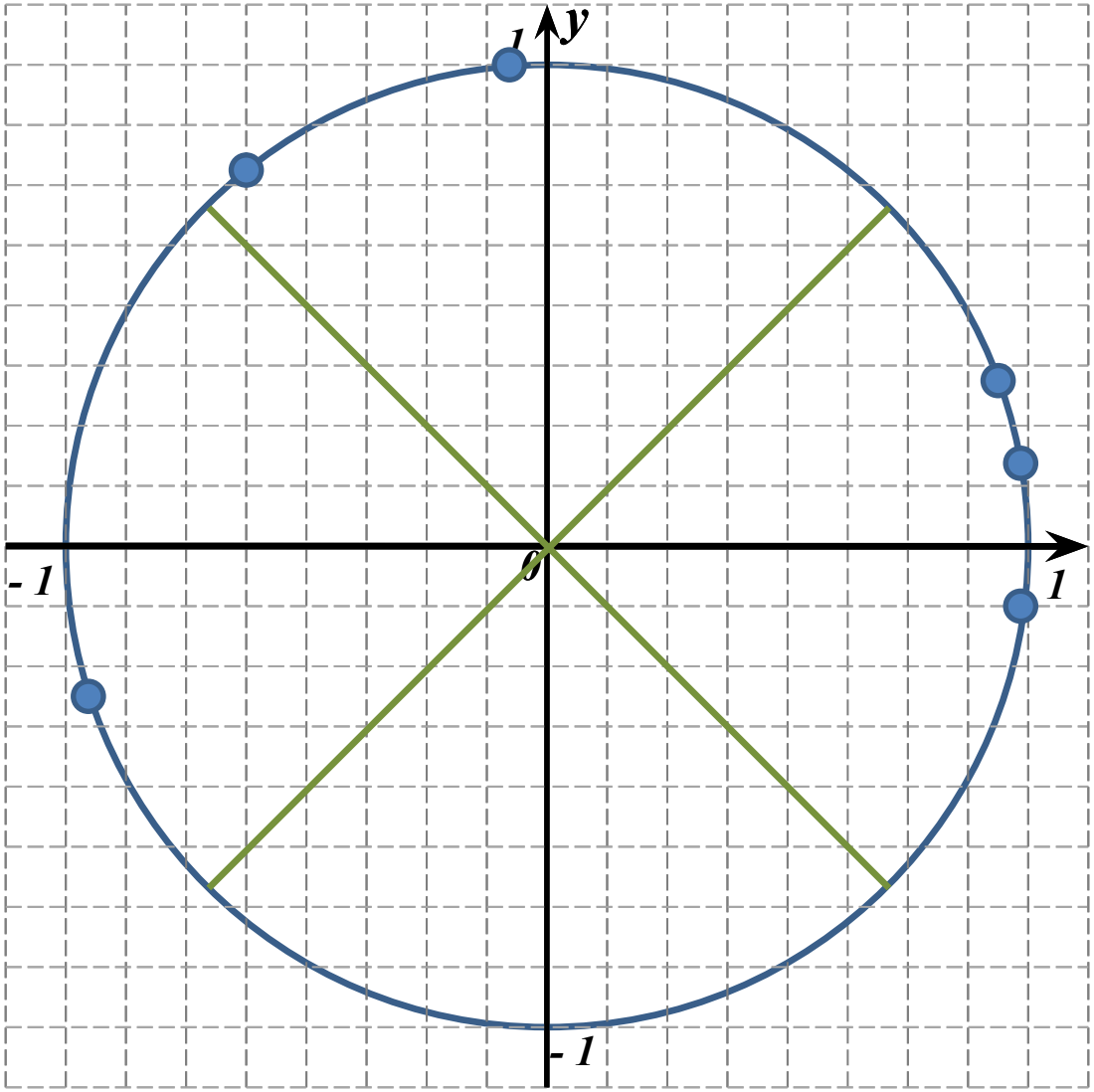
– 3

– 6

7

– 12

№ 1.2.22



– 2,3

3,7

– 4,5

– 8

– 10

13

№ 1.2.23

$1{,}9 \in$ II четверти

$-3{,}8 \in$ IV четверти

$5 \in$ IV четверти

$17 \in$ IV четверти

$-1{,}3 \in$ IV четверти

$-2{,}8 \in$ III четверти

№ 1.2.24

$-5{,}4 \in$ I четверти

$2{,}8 \in$ II четверти

$3{,}4 \in$ III четверти

$-9 \in$ I четверти

$16 \in$ IV четверти

$-10 \in$ IV четверти