Warm up

Find the exact ratio of the trig functions below.

1. $\sin 60°$
2. $\cos 45°$
3. $\tan 30°$
4. $\tan \frac{\pi}{4}$
5. $\cos \frac{\pi}{6}$
6. $\sin \frac{\pi}{6}$

Find the complement and supplement of the angle

7. $\frac{2\pi}{7}$
8. $93°$
9. Convert the radian angle to a degree angle. $\frac{11\pi}{6}$
10. Convert the degree angle to a radian angle. $270°$

Dec 20-8:08 AM

GO COUGARS!

p 290 Homework Questions

In Exercises 7–12, determine the quadrant in which each angle lies. (The angle measure is given in radians.)

7. (a) $\frac{\pi}{5}$ (b) $\frac{7\pi}{5}$

9. (a) $-\frac{\pi}{12}$ (b) -2

11. (a) 3.5 (b) 2.25

In Exercises 17–20, determine two coterminal angles (one positive and one negative) for each angle. Give your answers in radians.

19. (a) $\theta = \frac{2\pi}{3}$ (b) $\theta = \frac{\pi}{12}$

In Exercises 21–24, find (if possible) the complement and supplement of each angle.

21. (a) $\frac{\pi}{3}$ (b) $\frac{3\pi}{4}$ 22. (a) $\frac{\pi}{12}$ (b) $\frac{11\pi}{12}$

23. (a) 1 (b) 2 24. (a) 3 (b) 1.5

In Exercises 31–34, determine the quadrant in which each angle lies.

31. (a) 130° (b) 285°

33. (a) $-132° 50'$ (b) $-336°$

In Exercises 39–42, determine two coterminal angles (one positive and one negative) for each angle. Give your answers in degrees.

41. (a) $\theta = 240°$ (b) $\theta = -180°$

42. (a) $\theta = -420°$ (b) $\theta = 230°$

In Exercises 43–46, find (if possible) the complement and supplement of each angle.

43. (a) 18° (b) 115° 44. (a) 3° (b) 64°

45. (a) 79° (b) 150° 46. (a) 130° (b) 170°

In Exercises 47–50, rewrite each angle in radian measure as a multiple of π. (Do not use a calculator.)

47. (a) 30° (b) 150° 48. (a) 315° (b) 120°

49. (a) $-20°$ (b) $-240°$ 50. (a) $-270°$ (b) 144°

In Exercises 51–54, rewrite each angle in degree measure. (Do not use a calculator.)

51. (a) $\frac{3\pi}{2}$ (b) $\frac{7\pi}{6}$ 52. (a) $\frac{7\pi}{12}$ (b) $\frac{\pi}{9}$

53. (a) $\frac{7\pi}{3}$ (b) $-\frac{11\pi}{30}$ 54. (a) $\frac{11\pi}{6}$ (b) $\frac{34\pi}{15}$

$\frac{3\pi}{2} \cdot \frac{90}{\pi} = 270$

In Exercises 55–62, convert the angle measure from degrees to radians. Round to three decimal places.

55. 115° 56. 87.4°

57. $-216.35°$ 58. $-48.27°$

59. 532° 60. 345°

61. $-0.83°$ 62. 0.54°

In Exercises 63–70, convert the angle measure from radians to degrees. Round to three decimal places.

63. $\frac{\pi}{7}$ 64. $\frac{5\pi}{11}$

65. $\frac{15\pi}{2}$ 66. $\frac{13\pi}{2}$

67. -4.2π 68. 4.8π

69. -2 70. -0.57

$-2 \cdot \frac{180}{\pi} = -\frac{360}{\pi}$

In Exercises 71–74, convert each angle measure to decimal degree form.

71. (a) 54° 45' (b) $-128° 30'$

72. (a) 245° 10' (b) 2° 12'

73. (a) 85° 18' 30" (b) 330° 25"

74. (a) $-135° 36'$ (b) $-408° 16' 20"$

In Exercises 75–78, convert each angle measure to D° M' S" form.

75. (a) 240.6° (b) $-145.8°$

76. (a) $-345.12°$ (b) 0.45°

77. (a) 2.5° (b) $-3.58°$

78. (a) $-0.355°$ (b) 0.7865°

Feb 2-9:51 PM

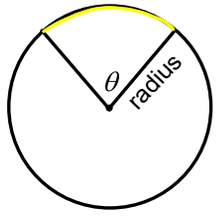
4.1 Day 2 Radian and Degree Measure

Arc Length
Angular Speed
Linear Speed
Area of a Sector

Jan 10-1:17 PM

Arc length = $\frac{\text{deg}}{360} \bullet 2\pi r$

Arc Length

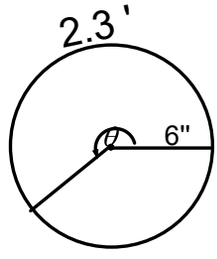


θ is the central angle

$\frac{2\pi}{360} \cdot deg \cdot r$

$\frac{\pi}{180} \cdot deg \cdot r$

AL = radians · radius



find θ in radians

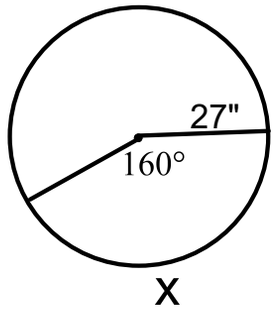
$2.3' = \theta \cdot 6''$

$2.3' \frac{12 in}{1'} = \theta \cdot 6''$

$\frac{27.6'' = \theta \cdot 6''}{6''}$

$4.6 rad = \theta$

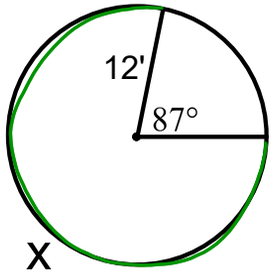
Jan 7-4:10 PM



AL = radians · radius

$160 \cdot \frac{\pi}{180} \cdot 27"$

AL = 75.4"



AL = 57.18' AL = 18.22'

$(360 \cdot 87)\frac{\pi}{180} \cdot 12$

Jan 10-1:08 PM

Angular Speed - the rate at which an angle grows
- measured in radians/time
(rad/sec, rad/hr, etc)

Linear Speed - the rate at which the arc length grows
- measured in length/time
(ft/sec, m/hr, meters/min, etc)

Jan 9-7:26 AM

To find angular speed:

AS = revolutions x 2π $\frac{1 \text{ rev}}{\text{min}} \cdot \frac{2\pi}{1 \text{ rev}}$

A circular blade on a saw rotates 2400 revolutions per minute. Find the angular speed in radians per second.

$\frac{2400 \text{ rev}}{\text{min}} \cdot \frac{2\pi}{1 \text{ rev}} = 4800\pi \text{ rad/min} = 15079.64 \frac{\text{rad}}{\text{min}}$

$15079.64 \frac{\text{rad}}{\text{min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}}$

251.33 rad/sec

Jan 9-7:33 AM

To find Linear speed:
LS = radius x radians (same as Arc Length!)
LS = radius x AS

The saw blade from the previous problem has a diameter of 8 inches. Find the linear speed of the blade tip in inches per second.

$AS = 251.33 \frac{\text{rad}}{\text{sec}}$

$LS = 251.33 \frac{\text{rad}}{\text{sec}} \cdot \frac{4 \text{ in}}{1 \text{ rad}}$

$= 1005.31 \frac{\text{in}}{\text{sec}}$

How fast is the wheel moving in mph?

Jan 9-7:35 AM

The second hand of a clock is 8 cm long. Find the linear speed of the tip of the second hand as it passes around the clock face.

$$AS = \frac{1 \text{ rev}}{60 \text{ sec}} \cdot \frac{2\pi}{1 \text{ rev}}$$

$$= \frac{2\pi \text{ rad}}{60 \text{ sec}}$$

$$LS = \frac{\pi \text{ rad}}{30 \text{ sec}} \cdot \frac{8 \text{ cm}}{1 \text{ rad}}$$

$$.84 \text{ cm/sec}$$

Jan 2-12:07 PM

A 12-inch diameter wheel is traveling 35 mph. What is the angular speed of the wheel? What is the rate of revolution in seconds?

$r = 6$in

$LS = 35$ mph

$AS = ?$ 369600 rad/hr

rev/sec $= ?$ 1634 rev/sec

$\frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot 35 \text{ mi/h} = AS \cdot 6\text{in}$

2217600 in/hr $= \frac{AS \cdot 6\text{in}}{6\text{in}}$

$\frac{369600 \text{ rad/hr}}{(2\pi)} = \frac{AS}{2\pi \cdot \text{rev}}$

58823.67 rev/hr $\cdot \frac{1 \text{ hr}}{3600 \text{ sec}}$

16.34

EX 6 and EX 7 in book pg 264

Jan 9-7:42 AM

Area of a Sector

$$A = \frac{1}{2} r^2 \theta, \ \theta \text{ is measured in radians}$$

A sprinkler on a golf course is set to spray water over a distance of 75 feet and rotates though and angle of 135°. Find the area of the fairway watered by the sprinkler.

$r = 75$ ft
$\theta = 135^\circ$

$A = \frac{1}{2}(135)\left(\frac{\pi}{180}\right) \cdot 75^2$

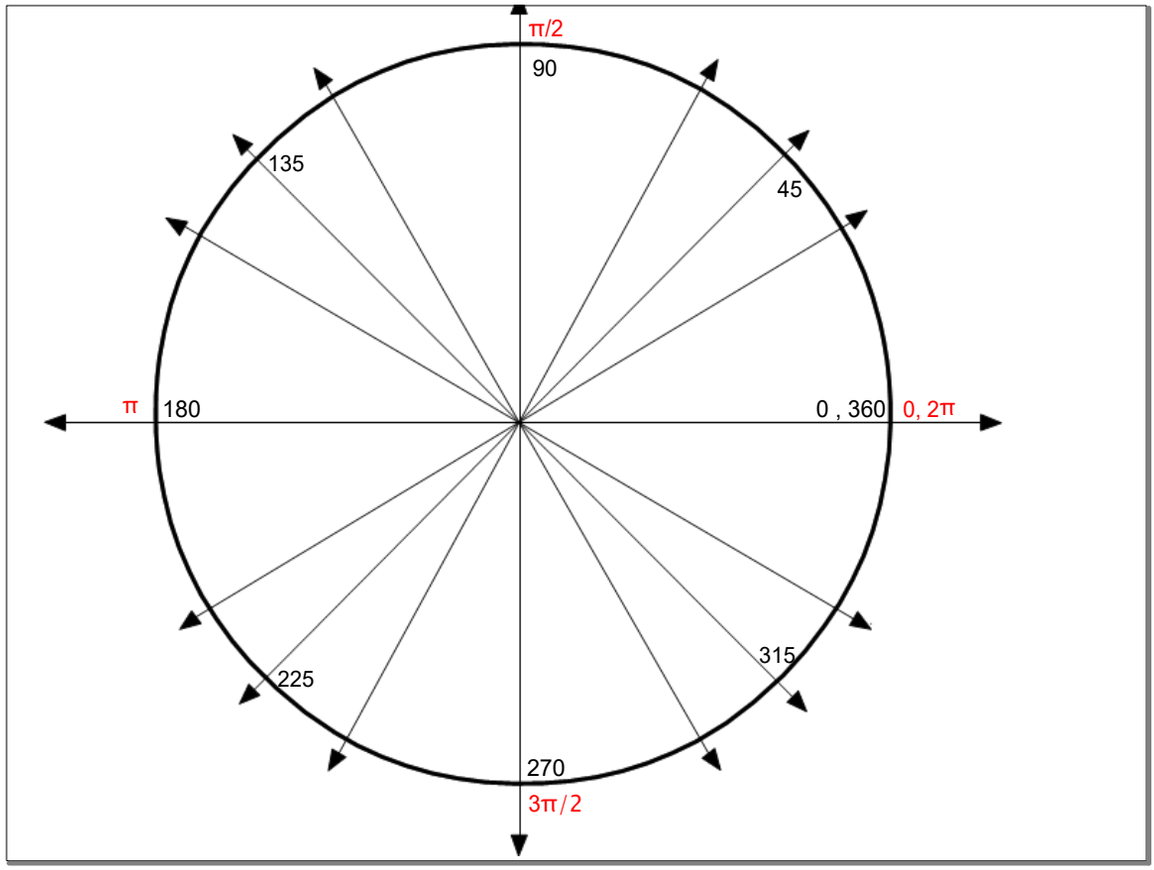
$= 6626.8 \text{ ft}^2$

Jan 2-12:12 PM

HOMEWORK

p 292 79-115 odd

Aug 29-6:38 AM



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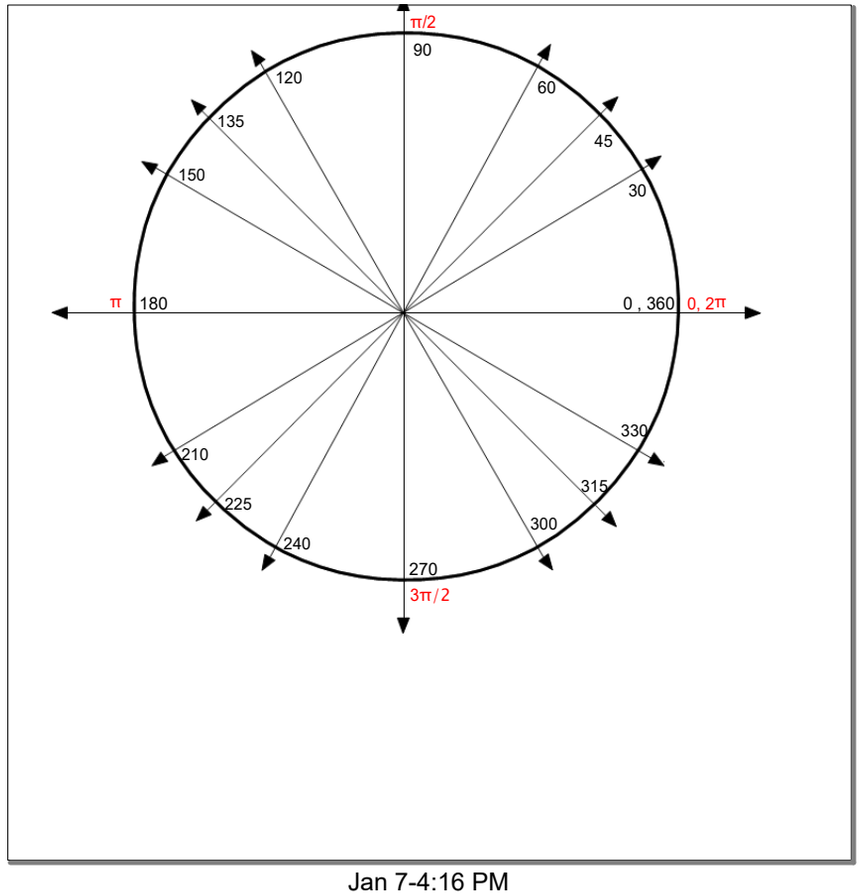

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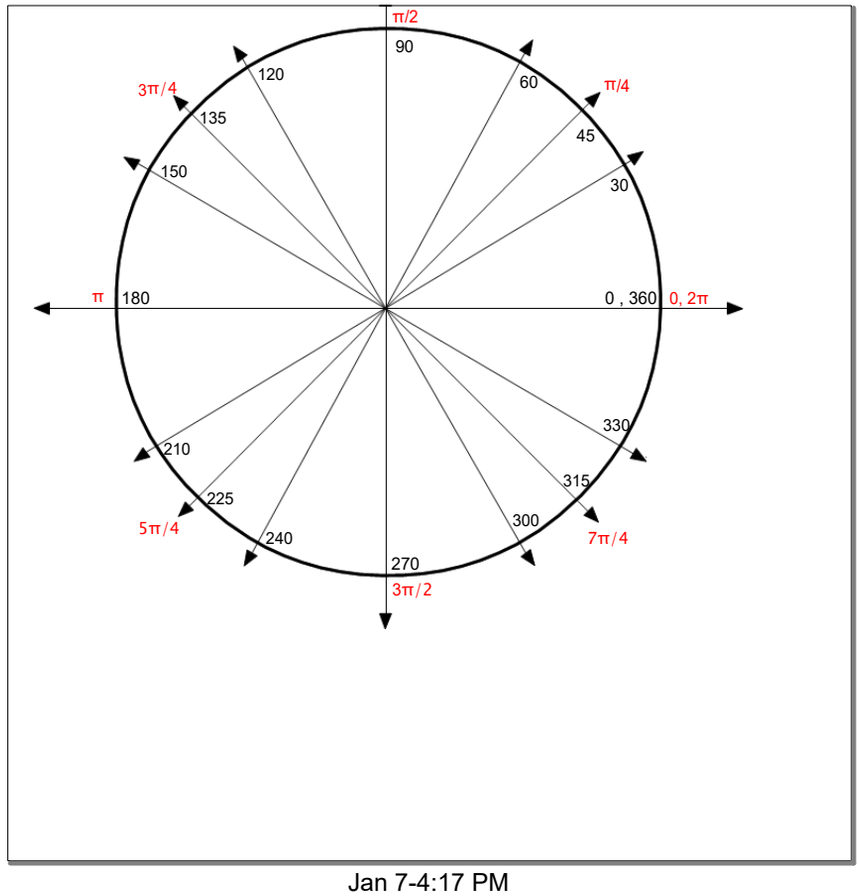

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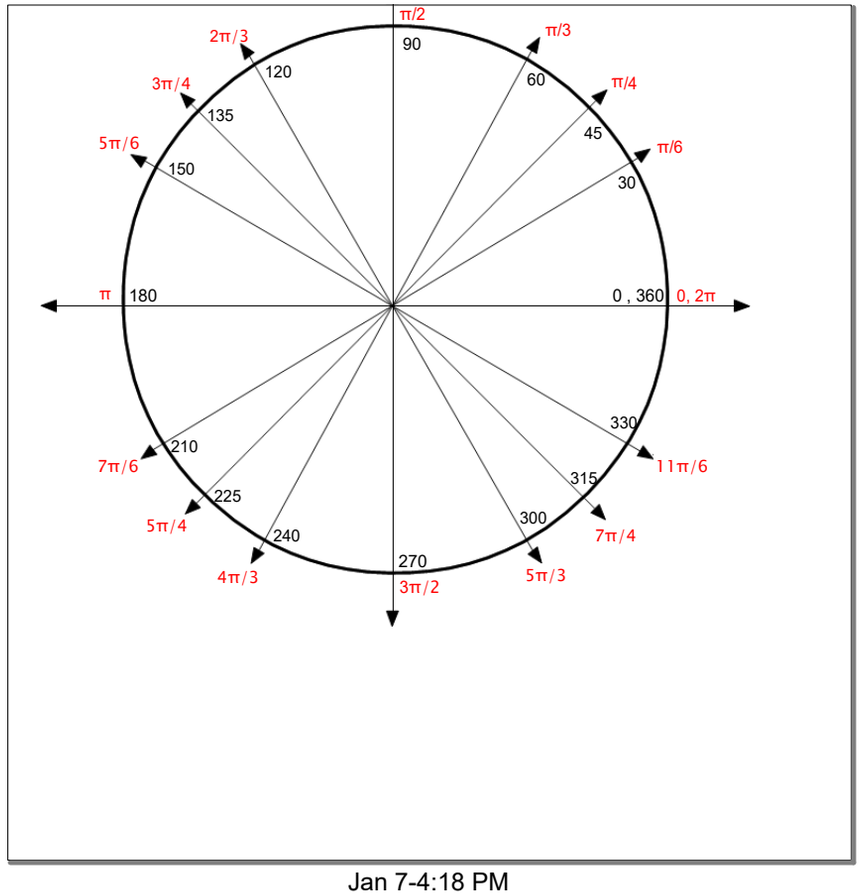

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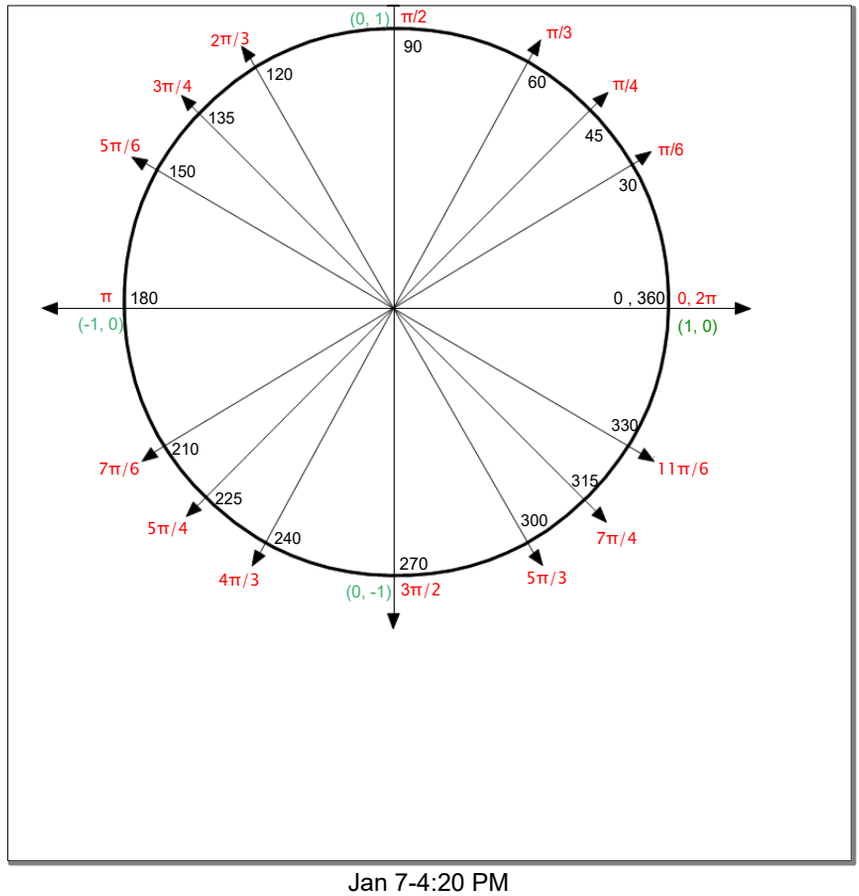

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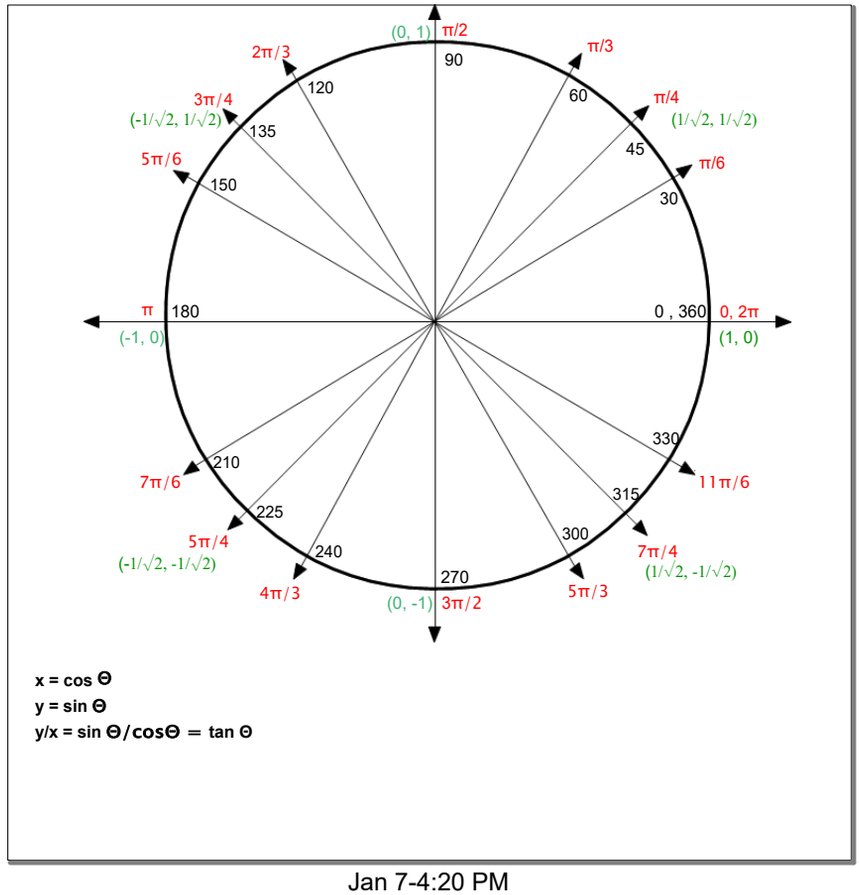

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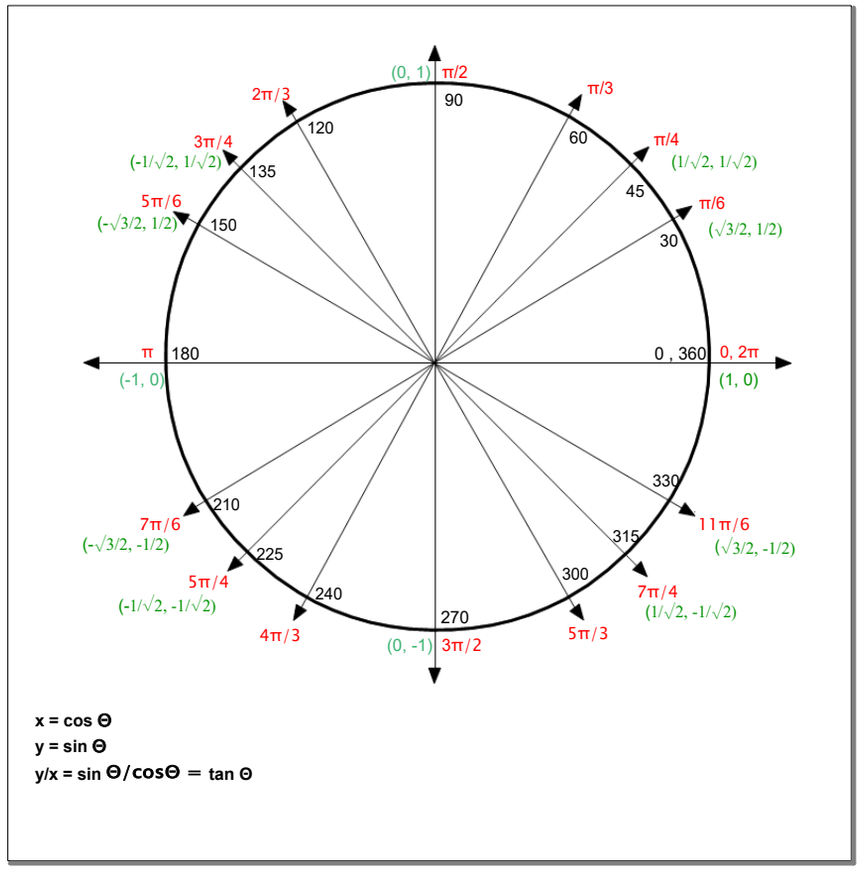

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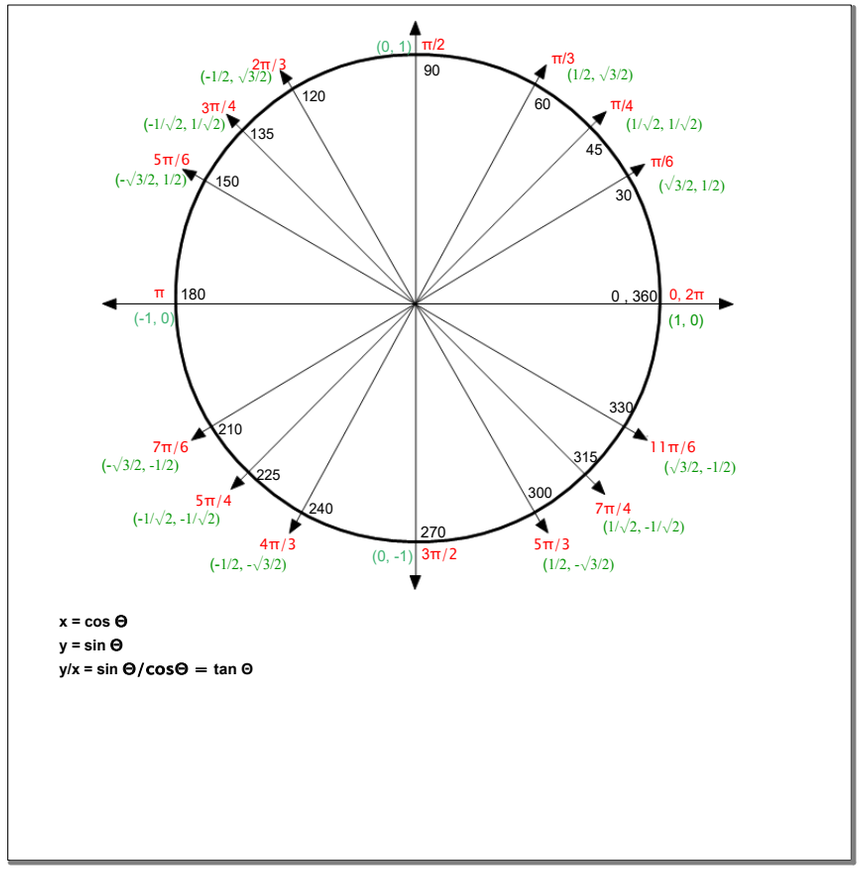

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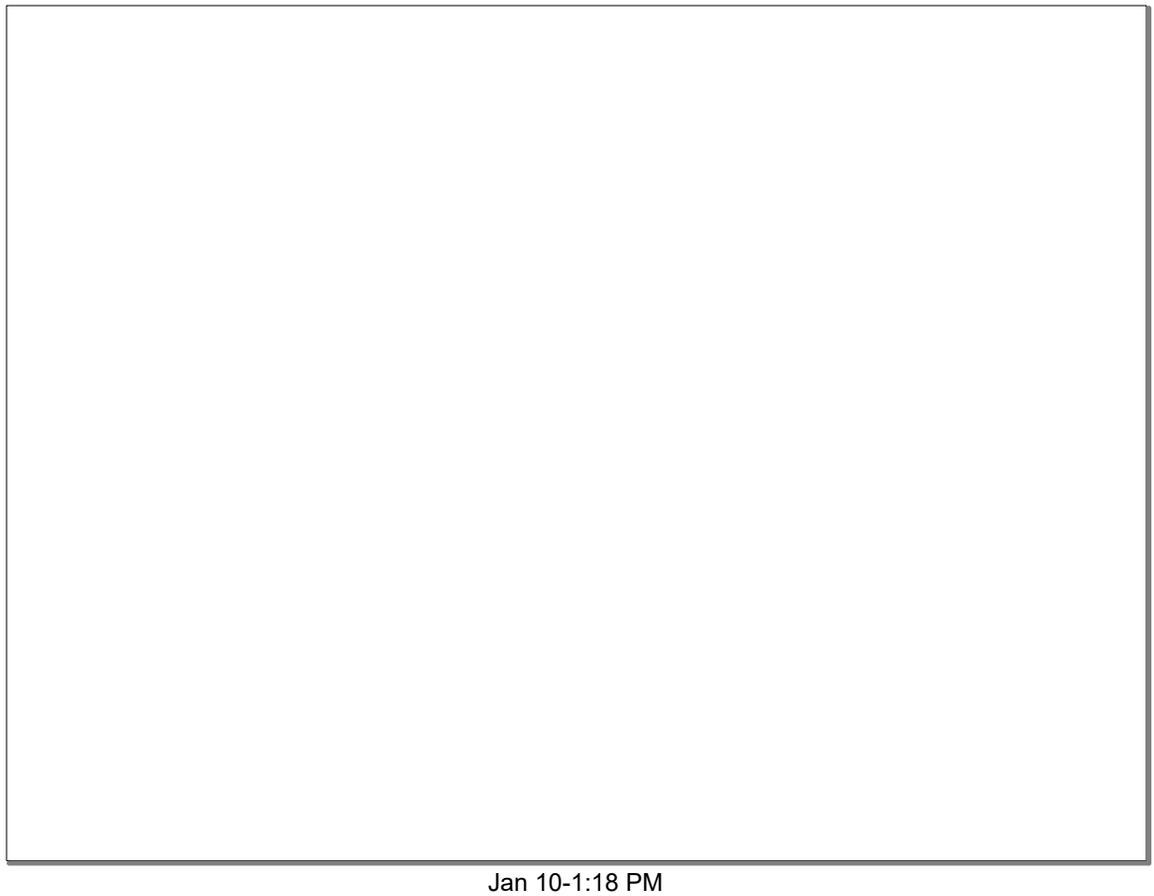

Jan 10-1:18 PM