Equations in one variable

Circle those equations that have no solution

1.) $e^{2x} = 3$

2.) $\log_e(x-4) = 5$

3.) $\sqrt{2x-1} = -3$

4.) $e^{3x-4} = 0$

5.) $(2x-5)^2 = 0$

6.) $\log_e(2x-1) = -7$

7.) $e^{4x} = -5$

8.) $\left(2x+\frac{1}{x}\right)^2 = -4$

Find the implied domains of the equations

9.) $e^{x^2-3x} = 4$

$\mathbb{R}$

10.) $(3x^4-2x)^2 = 3$

$\mathbb{R}$

11.) $\log_e(x-7) = -10$

$x-7>0 \Rightarrow \underline{\underline{x>7}}$

12.) $\log_2(x-4) + \log_2(x+3) = 1$

$x-4>0$ and $x+3>0$

$\Rightarrow$

$x>4$ and $x>-3$

$\Rightarrow$

$\underline{\underline{x>4}}$

Simplify

13.) $e^x e^{x+1}$

e^{2x+1}

14.) $\log_e(x+2) + \log_e(x-4)$

$\log_e((x+2)(x-4))$

15.) $(e^{x-3})^2$

$e^{2(x-3)}$

16.) $\log_e(x) - \log_e(x-1)$

$\log_e\left(\frac{x}{x-1}\right)$

Write the next step in solving each equation

17.) $e^{3x-7} = 2$

$3x-7 = \log_e(2)$

18.) $\log_e(2x-4) = 3$

$2x-4 = e^3$

19.) $(2x-7)^2 = 25$

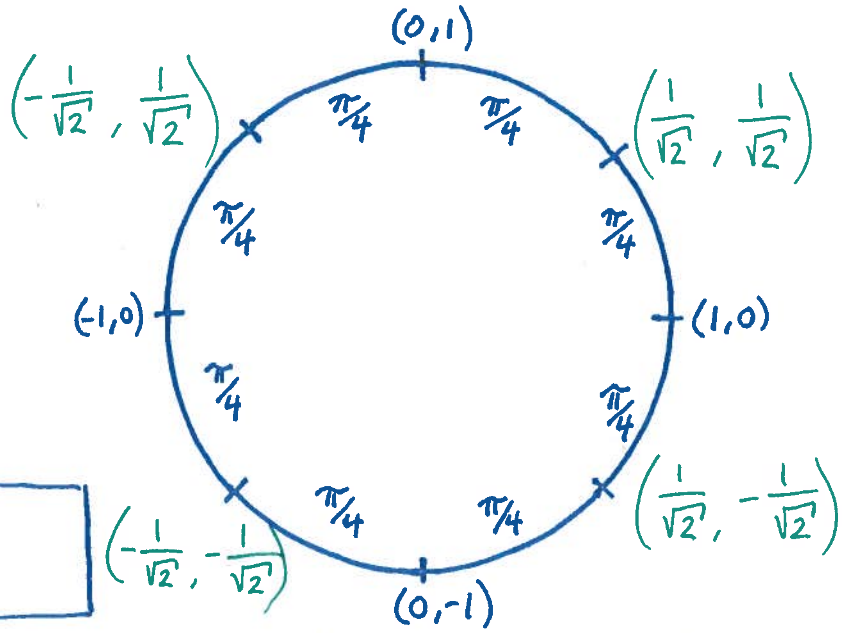
$2x-7 = 5$ or $2x-7 = -5$

20.) $\log_e(x+1) = \log_e(3)$

$x+1 = 3$

Angles

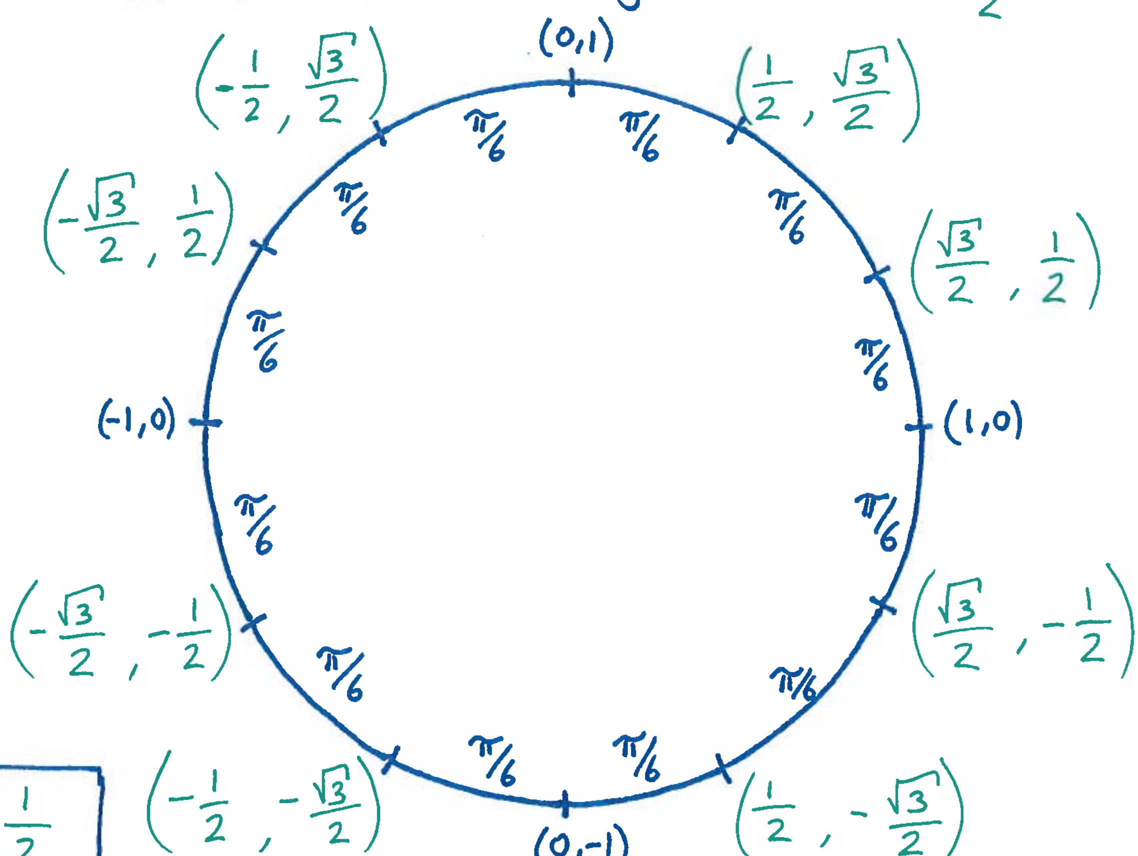
What's the only positive number you'll use to write the coordinates of the unlabelled points below? $\frac{1}{\sqrt{2}}$



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

Which are the only two positive numbers you'll use to label the coordinates below? $\frac{1}{2}$, $\frac{\sqrt{3}}{2}$

Which of the two is greatest? $\frac{1}{2} < \frac{\sqrt{3}}{2}$



$\cos\left(-\frac{\pi}{3}\right) = \frac{1}{2}$

Polar Coordinates

1.) What's the norm of $(-2,7)$?

$$\sqrt{(-2)^2+7^2}=\sqrt{4+49}=\sqrt{53}$$

2.) What's the norm of $(3,-1)$?

$$\sqrt{3^2+(-1)^2}=\sqrt{9+1}=\sqrt{10}$$

3.) Write $(-2,7)$ in polar coordinates.

$$\sqrt{53}\left(\frac{-2}{\sqrt{53}},\frac{7}{\sqrt{53}}\right)$$

4.) Write $(3,-1)$ in polar coordinates.

$$\sqrt{10}\left(\frac{3}{\sqrt{10}},\frac{-1}{\sqrt{10}}\right)$$

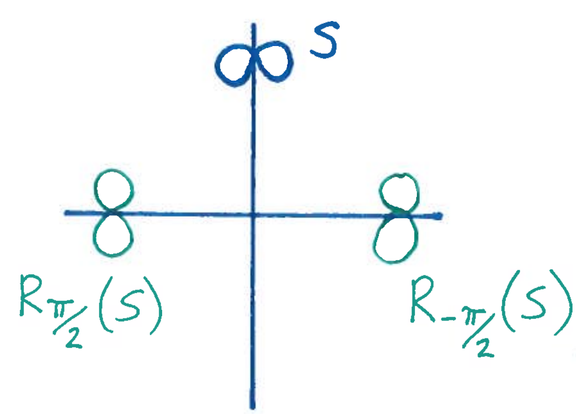
5.) Rotate $3(\cos(4),\sin(4))$ <u>counterclockwise</u> by an angle of 7.

$$3(\cos(4+7),\sin(4+7))=3(\cos(11),\sin(11))$$

6.) Rotate $2(\cos(10),\sin(10))$ <u>clockwise</u> by an angle of 6.

$$2(\cos(10-6),\sin(10-6))=2(\cos(4),\sin(4))$$

7.) Draw $R_{\pi/2}(S)$ and $R_{-\pi/2}(S)$ on the axes to the right.



8.) Write $R_{-\pi/3}$ as a matrix.

$$\begin{pmatrix} \cos(-\pi/3) & -\sin(-\pi/3) \\ \sin(-\pi/3) & \cos(-\pi/3) \end{pmatrix} = \begin{pmatrix} \frac{1}{2} & \frac{\sqrt{3}}{2} \\ -\frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix}$$

9.) Write $R_{\frac{5\pi}{4}}$ as a matrix.

$$\begin{pmatrix} \cos\left(\frac{5\pi}{4}\right) & -\sin\left(\frac{5\pi}{4}\right) \\ \sin\left(\frac{5\pi}{4}\right) & \cos\left(\frac{5\pi}{4}\right) \end{pmatrix} = \begin{pmatrix} -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \end{pmatrix}$$

10.) Rotate $(5,7)$ <u>clockwise</u> by an angle of $\pi/3$.

$$R_{-\pi/3}(5,7) = \begin{pmatrix} \frac{1}{2} & \frac{\sqrt{3}}{2} \\ -\frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix}\begin{pmatrix} 5 \\ 7 \end{pmatrix} = \begin{pmatrix} \frac{5}{2} + \frac{7\sqrt{3}}{2} \\ -\frac{5\sqrt{3}}{2} + \frac{7}{2} \end{pmatrix} = \begin{pmatrix} \frac{5+7\sqrt{3}}{2} \\ \frac{7-5\sqrt{3}}{2} \end{pmatrix}$$

11.) Rotate $(3,11)$ <u>counterclockwise</u> by an angle of $5\pi/4$.

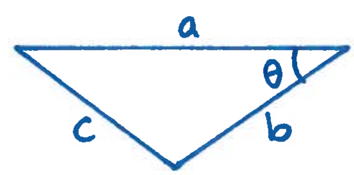
$$R_{\frac{5\pi}{4}}(3,11) = \begin{pmatrix} -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \end{pmatrix}\begin{pmatrix} 3 \\ 11 \end{pmatrix} = \begin{pmatrix} -\frac{3}{\sqrt{2}} + \frac{11}{\sqrt{2}} \\ -\frac{3}{\sqrt{2}} - \frac{11}{\sqrt{2}} \end{pmatrix} = \begin{pmatrix} \frac{8}{\sqrt{2}} \\ \frac{-14}{\sqrt{2}} \end{pmatrix}$$

<u>Triangles</u>

1.) State the Law of Sines

$$\frac{\sin(\alpha)}{a} = \frac{\sin(\beta)}{b}$$

2.) State the Law of Cosines



$$c^2 = a^2 + b^2 - 2ab\cos(\theta)$$