Exam 2 Review

Circle the equations that have no solution.

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

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

③ $\sqrt{2x-1} = -3$ $\sqrt{}$ can't be negative

④ $e^{3x-4} = 0$ exponentials can't be zero

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

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

⑦ $e^{4x} = -5$ exponentials can't be negative

⑧ $(2x+\frac{1}{x})^2 = -4$ Squares (even powers) can't be negative

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Find the implied domains of the equations.

9) $e^{x^2-3x} = 4$ $\mathbb{R}$

10) $(3x^4-2x)^2 = 3$ $\mathbb{R}$

11) $\log_e(x) = -10$ $(0, \infty)$

12) $\log_2(x-4) = 1$ $(4, \infty)$

Write the next step in solving.

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

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

14) $\log_e(2x-4) = 3$

$2x-4 = e^3$

15) $(2x-7)^2 = 25$

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

16) $\log_e(x+1) = \log_e(3)$

$x+1 = 3$

Sketch the solutions to the following equations.

17) $y = x^2$ ↻

18) $x^2+y^2 = 1$ ⊙

19) $x^2+y^2 = 0$ •

20) $x^2 = 1$ ↕↕

21) $xy = 1$

22) $x^2-y^2 = 0$ ✕

24) $y^2 = 1$ ⇄

25) $x^2 = 0$ ↕

26) $x^2 = -1$ no solutions

27) $x^2+y^2 = -1$ no solution

28) $\frac{x^2}{4} + \frac{y^2}{4} = 1$ ◯

29) $\frac{x^2}{9} + \frac{y^2}{4} = 1$ ⬭

30) $xy = -1$

31) $xy = 2$

32) $xy = 0$ ✛

Triangles

1) Find the length of the missing side.

$$5^2 + x^2 = 7^2$$

$$25 + x^2 = 49$$

$$x^2 = 49 - 25$$

$$x^2 = 24 \qquad x = \sqrt{24}$$

7

5
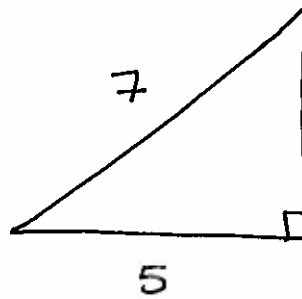
2) Find the missing angle.
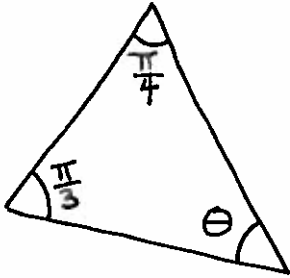
$$\theta + \frac{\pi}{3} + \frac{\pi}{4} = \pi$$

$$\theta + \frac{4\pi}{12} + \frac{3\pi}{12} = \pi$$

$$\theta + \frac{7\pi}{12} = \pi \qquad \theta = \frac{5\pi}{12}$$

3) Find the missing angle

$$\frac{\pi}{6} + \frac{2\pi}{3} + \theta = \pi$$

$$\frac{\pi}{6} + \frac{4\pi}{6} + \theta = \pi$$

$$\theta = \frac{\pi}{6}$$

Angles

Write the coordinates of the unlabelled points below.

A)

$(0,1)$

$\left(\frac{-1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ $\frac{\pi}{4}$ $\frac{\pi}{4}$ $\left(\frac{1}{\sqrt{2}}, \sqrt{2}\right)$

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

$(-1,0)$ $(1,0)$

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

$\left(\frac{-1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}\right)$ $\frac{\pi}{4}$ $\frac{\pi}{4}$ $\left(\frac{1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}\right)$

$(0,-1)$

$*\left(\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}\right)$

B)

$\left(\frac{-1}{2}, \frac{\sqrt{3}}{2}\right)$ $(0,1)$ $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

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

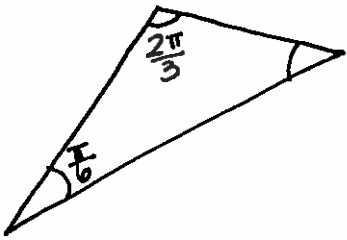$\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$ $\frac{\pi}{6}$ $\frac{\pi}{6}$ $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

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

$(-1,0)$ $(1,0)$

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

$\left(\frac{-\sqrt{3}}{2}, \frac{-1}{2}\right)$ $\frac{\pi}{6}$ $\frac{\pi}{6}$ $\left(\frac{\sqrt{3}}{2}, \frac{-1}{2}\right)$

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

$\left(\frac{-1}{2}, \frac{-\sqrt{3}}{2}\right)$ $(0,-1)$ $\left(\frac{1}{2}, \frac{-\sqrt{3}}{2}\right)$
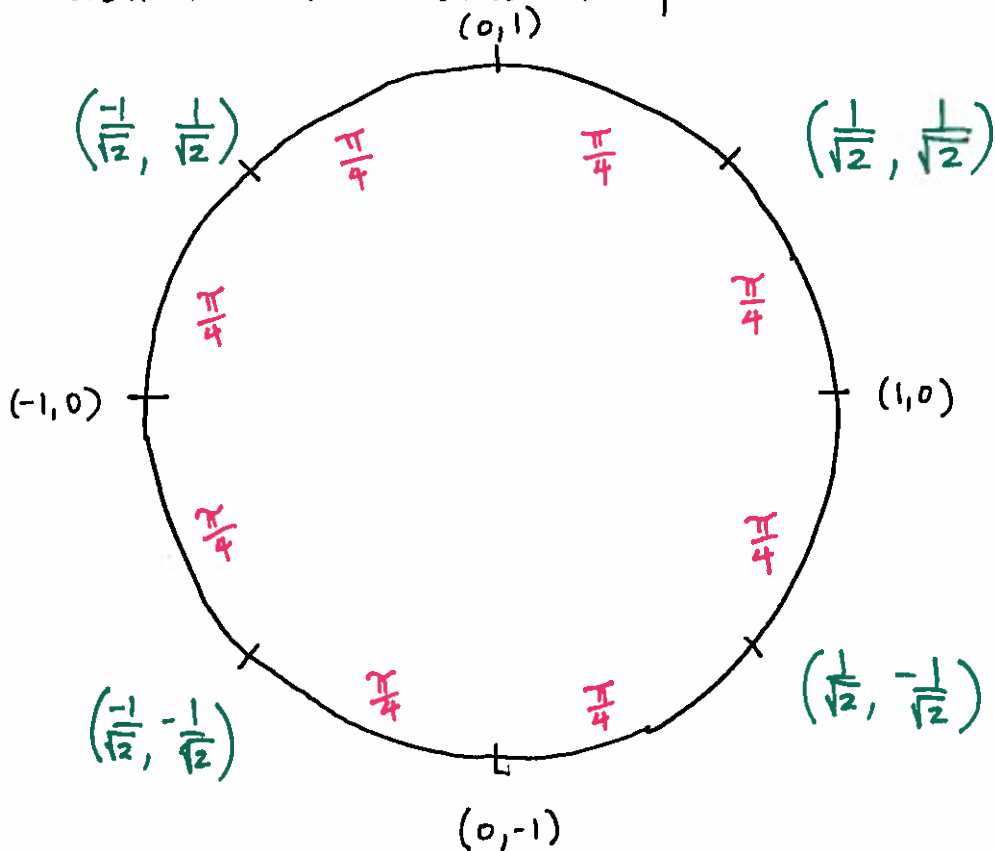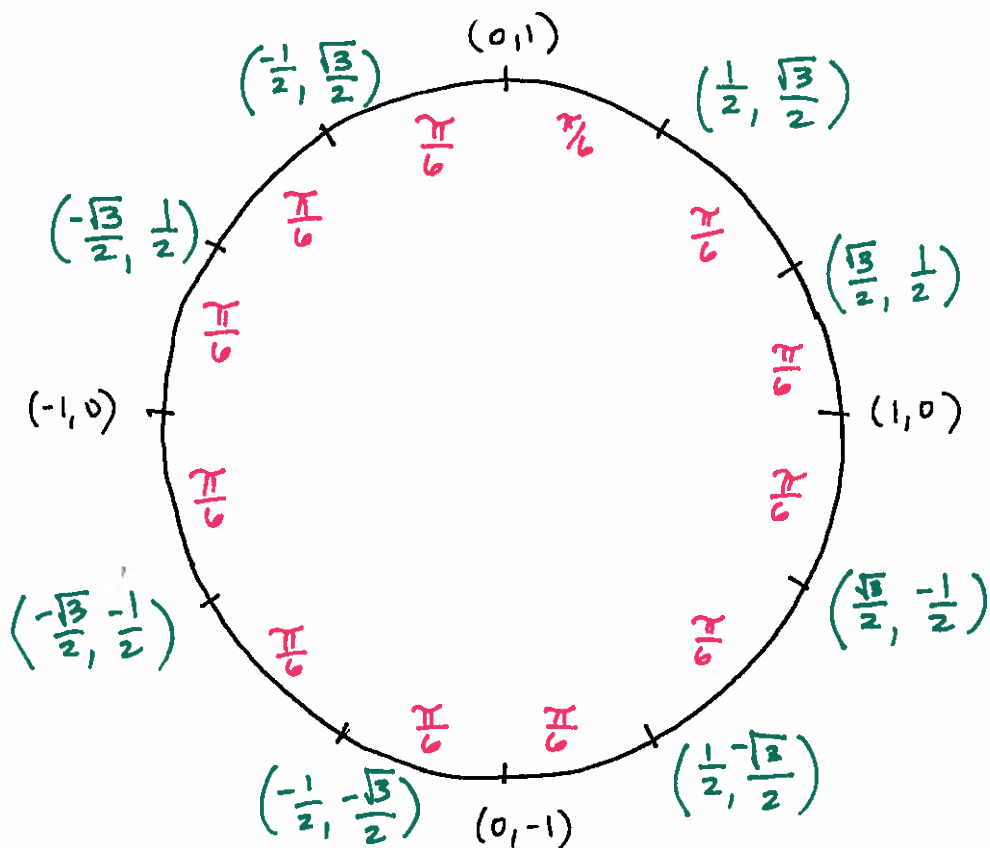
Angles

1) What is the only positive number you used to label points on Circle A.?

$$\frac{1}{\sqrt{2}} \quad \left(= \frac{\sqrt{2}}{2}\right)$$

2) What are the two positive numbers you used to label points in circle B? Which is bigger?

$$\frac{1}{2} < \frac{\sqrt{3}}{2}$$

3) Find wind (θ):

$$\text{wind}\left(\frac{\pi}{6}\right) = \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right) \qquad \text{wind}\left(\frac{4\pi}{3}\right) = \left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$$

$$\text{wind}\left(\frac{3\pi}{4}\right) = \left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right) \qquad \text{wind}\left(\frac{2\pi}{3}\right) = \left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$$

$$\text{wind}\left(\frac{11\pi}{3}\right) = \left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right) \qquad \text{wind}\left(\frac{7\pi}{4}\right) = \left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$$

$$\text{wind}\left(-\pi\right) \qquad \qquad \text{wind}\left(\frac{-13\pi}{3}\right) = \left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$$

$$(-1, 0)$$

Distance and Norm

1) Find the distance between $(2,3)$ and $(-3, 11)$.

$$\sqrt{(2-(-3))^2 + (3-11)^2}$$

$$= \sqrt{5^2 + 8^2}$$

$$= \sqrt{25+64} = \sqrt{89}$$

2) Find the distance between $(0,4)$ and $(-3,8)$.

$$\sqrt{(0+3)^2 + (4-8)^2}$$

$$= \sqrt{3^2 + 4^2}$$

$$= \sqrt{9+16} = \sqrt{25} = \boxed{5}$$

3) Find $\|(2,3)\|$

$$\sqrt{2^2 + 3^2} = \sqrt{4+9} = \sqrt{13}$$

4) Find $\|(-1, 2)\|$

$$\sqrt{1+4} = \sqrt{5}$$

5) Find $\left\|\left(\frac{1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}\right)\right\|$

$$\sqrt{\left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{-1}{\sqrt{2}}\right)^2}$$

$$= \sqrt{\frac{1}{2} + \frac{1}{2}} = \sqrt{1} = 1$$

Equations

Solve for x.   Show all your work.

1) $(2x-5)^2 = 0$

$2x-5 = 0$

$2x = 5$

$x = \frac{5}{2}$

$$\boxed{\frac{5}{2}}$$

2) $\sqrt{\log_e (x-7)} = 2$

$\log_e (x-7) = 4$

$x-7 = e^4$

$x = e^4 + 7$

$$\boxed{e^4 + 7}$$

3) $(2x-7)^2 = 25$

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

$2x = 12$ $2x = 2$

$x = 6$ or $x = 1$

$$\boxed{1,6}$$

4) $\log_e (x+1) = \log_e (3)$

$x+1 = 3$

$x = 2$

$$\boxed{2}$$