

Quiz 1: Math 135, Sections 1-3

Note: Calculators are **not** allowed on this quiz.

1. Solve the following inequality for x . Use *interval* notation.

$$|4x - 2| \leq 6$$

2. Solve the following equation in the interval $[0, 2\pi)$:

$$(\sin x)(\cos x) = 0$$

3. What is the center and radius of the following circle?

$$x^2 - 12x + y^2 + 8y - 48 = 0$$

Solutions.

1. We have two equations to solve:

$$\begin{array}{rcl} 4x - 2 \leq 6 & - & (4x - 2) \leq 6 \\ 4x \leq 8 & & -4x + 2 \leq 6 \\ & & -4x \leq 4 \\ x \leq 2 & & x \geq -1 \end{array}$$

So our solution is the interval $[-1, 2]$.

2. Again, this reduces to solving two equations:

$$\begin{array}{rcl} \sin x = 0 & \cos x = 0 \\ x = 0, \pi & x = \frac{\pi}{2}, \frac{3\pi}{2} \end{array}$$

So our solutions are $\{0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}\}$.

3. Completing the square:

$$\begin{aligned} x^2 - 12x + y^2 + 8y - 48 &= (x^2 - 12x + 36) + (y^2 + 8y + 16) - 36 - 16 - 48 \\ &= (x - 6)^2 + (y + 4)^2 - 100 \end{aligned}$$

So

$$(x - 6)^2 + (y + 4)^2 = 100$$

Meaning our circle has center $(6, -4)$ and radius 10.