

§13.9 Eqns. of Cs by Completing the Square

$$(x-h)^2 + (y-k)^2 = r^2$$

Center: (h, k) radius = r

$$\textcircled{1} x^2 - 8x + y^2 - 10y = 8$$

$$x^2 - 8x + \underline{16} + y^2 - 10y + \underline{25} = 8 + \underline{16} + \underline{25}$$

$$(x-4)(x-4) + (y-5)(y-5) = 49$$

$$(x-4)^2 + (y-5)^2 = 49$$

center: $(4, 5)$

$$r = 7$$

$$\textcircled{2} \frac{4x^2 - 36x + 4y^2 - 24y + 36}{4} = \frac{0}{4}$$

$$x^2 - 9x + y^2 - 6y + 9 = 0$$

$$x^2 - 9x + \underline{\frac{81}{4}} + y^2 - 6y + \underline{9} = \cancel{-9} + \underline{\frac{81}{4}} + \cancel{9}$$

$$(x - \frac{9}{2})(x - \frac{9}{2}) + (y-3)(y-3) = \frac{81}{4}$$

$$(x - \frac{9}{2})^2 + (y-3)^2 = \frac{81}{4}$$

center: $(\frac{9}{2}, 3)$ $r = \frac{9}{2}$

1. you op
do on 2
2. m2 and
MB

$$\frac{3x^2 + 12x + 3y^2 - 9y - 20}{3} = 0$$

$$x^2 + 4x + y^2 - 3y - \frac{20}{3} = 0$$

$$x^2 + 4x + \frac{4}{4} + y^2 - 3y + \frac{9}{4} = \frac{20}{3} + 4 + \frac{9}{4}$$

$$(x+2)(x+2) + (y-\frac{3}{2})(y-\frac{3}{2}) = \frac{80}{12} + \frac{48}{12} + \frac{81}{12}$$

$$\boxed{(x+2)^2 + (y-\frac{3}{2})^2 = \frac{155}{12}}$$

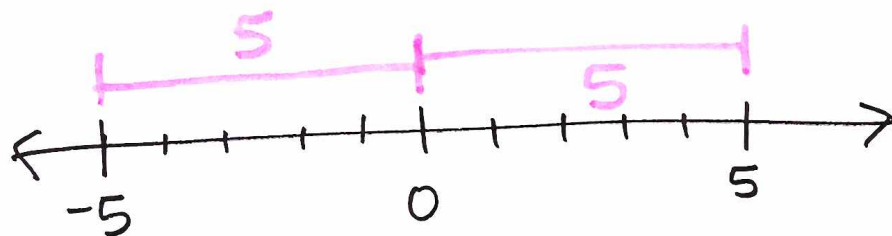
$$\text{center: } (-2, \frac{3}{2})$$

$$r = \sqrt{\frac{155}{12}} \quad \sqrt{\frac{3}{3}}$$

$$= \frac{\sqrt{465}}{6}$$

13.10 Absolute Value Eqns. & Inequalities in One Variable.

if $|x| = c$, then $x = c$ or $-x = c$



*distance from zero

$$|5| = 5$$

$$|-5| = 5$$

$$\textcircled{1} |x - 12| = 5$$

$$x - 12 = 5$$

or

$$-(x - 12) = 5$$

$$x = 17$$

or

$$x - 12 = 5$$

$$x = 7$$

$$\textcircled{2} |2x + 6| = 20$$

$$2x + 6 = 20$$

or

$$-(2x + 6) = 20$$

$$2x = 14$$

$$2x + 6 = -20$$

$$2x = -26$$

$$x = 7$$

$$x = -13$$

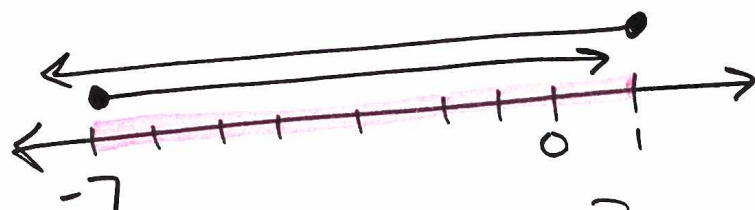
$$x = 7 \text{ or } x = -13$$

3) $|2x-1| = \textcircled{-6}$ dist. cannot be negative!
NO solution.

4) $|2y+6| \leq 8$

$$\begin{aligned} 2y+6 &\leq 8 \\ 2y &\leq 2 \\ y &\leq 1 \end{aligned}$$

$$\begin{aligned} \text{or } -(2y+6) &\leq 8 \\ 2y+6 &\geq -8 \\ 2y &\geq -14 \\ y &\geq -7 \end{aligned}$$



$$\{y \mid -7 \leq y \leq 1\}$$

$$\begin{aligned} |y+2| &\geq -4 \\ |y+2| &\geq 0 \\ \hline |y+2| &\leq -4 \\ \{ \} \end{aligned}$$

5) $|4y-1| \geq 7$

$$\begin{aligned} 4y-1 &\geq 7 \\ 4y &\geq 8 \\ y &\geq 2 \end{aligned}$$

$$\begin{aligned} -(4y-1) &\geq 7 \\ 4y-1 &\leq -7 \\ 4y &\leq -6 \\ y &\leq -\frac{3}{2} \end{aligned}$$



$$\{y \mid y \leq -\frac{3}{2} \text{ or } y \geq 2\}$$