Solve the absolute value problems.

1. $|x-2|<8$

   Solution:

$$\begin{aligned} |x-2|<8 \quad &\Longrightarrow \quad -8<x-2<8 \\ &\Longrightarrow \quad -6<x<10 \end{aligned}$$

   In interval form, this is $\boxed{(-6,10)}$.

2. $|8x-2|>9$

   Solution:

$$\begin{aligned} |8x-2|>9 \quad &\Longrightarrow \quad 8x-2>9 \quad \text{or} \quad 8x-2<-9 \\ &\Longrightarrow \quad x>\tfrac{11}{8} \quad \text{or} \quad x<-\tfrac{7}{8} \end{aligned}$$

   In interval form, this is $\boxed{\left(-\infty,-\dfrac{7}{8}\right) \cup \left(\dfrac{11}{8},\infty\right)}$.

3. $\sqrt{16x^2} \leq 24$

   Solution:

   Notice: $\sqrt{a^2}=|a| \implies \sqrt{16x^2}=|4x|$

$$\begin{aligned} |4x| \leq 24 \quad &\Longrightarrow \quad -24 \leq 4x \leq 24 \\ &\Longrightarrow \quad -6 \leq x \leq 6 \end{aligned}$$

   In interval form, this is $\boxed{[-6,6]}$.

4. $|7-x|>60$

   Solution:

$$\begin{aligned} |7-x|>60 \quad &\Longrightarrow \quad 7-x>60 \quad \text{or} \quad 7-x<-60 \\ &\Longrightarrow \quad x<-53 \quad \text{or} \quad x>67 \end{aligned}$$

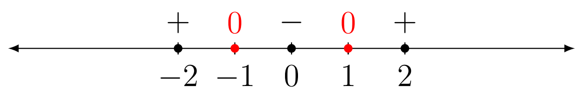
   In interval form, this is $\boxed{(-\infty,-53) \cup (67,\infty)}$.

5. $|x^2 - 5| < 4$

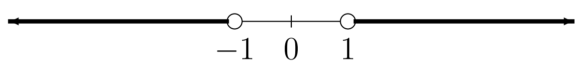
Solution:

$$|x^2 - 5| < 4 \implies -4 < x^2 - 5 < 4 \implies 1 < x^2 \text{ and } x^2 < 9$$

Since $x^2 > 1 \implies x^2 - 1 > 0 \implies (x-1)(x+1) > 0$, we can set up a sign chart with $x = \pm 1$ and test to see on which intervals the product $(x-1)(x+1)$ is positive.

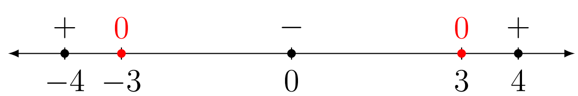


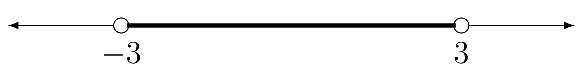
This gives us the following number line:



In interval notation, this is $(-\infty, -1) \cup (1, \infty)$.

Since $x^2 < 9 \implies x^2 - 9 < 0 \implies (x-3)(x+3) < 0$, we can set up another sign chart.





Since x needs to satisfy **both** inequalities, we consider the intersection of these two intervals:

$$\boxed{(-3, -1) \cup (1, 3)}$$