

Practice

Solving Equations: Solving Equations Containing Absolute Values

Answer these problems, then check your answers using the key on the next page. If you missed something, look at the solutions after the answer key, and if you still don't understand, watch the review video again.

#1) Solve: $|2x - 7| = 5$

#2) Solve: $|2t - 9| = 11$

#3) Solve: $2|3 - 2x| = 18$

#4) Solve: $4|3a-10|=8$

#5) Solve: $4|3x+1|+3=19$

#6) Solve: $27=6+7|5-4n|$

#7) Solve: $-2|3-2x|=18$

Answers:

#1) $x=1, x=6$

#2) $t=-1, t=10$

#3) $x=-3, x=6$

#4) $a=\frac{8}{3}, a=4$

#5) $x=\frac{-5}{3}, x=1$

#6) $n=2, n=\frac{1}{2}$

#7) No solution

Solutions:

#1) Solve: $|2x-7|=5$

$$\begin{array}{l} \swarrow \quad \searrow \\ 2x-7=-5 \quad 2x-7=5 \\ \hline +7 \quad +7 \quad \quad +7 \quad +7 \\ \hline 2x=2 \quad \quad 2x=12 \\ \hline \frac{2x}{2}=\frac{2}{2} \quad \quad \frac{2x}{2}=\frac{12}{2} \\ \hline \boxed{x=1} \quad \quad \boxed{x=6} \end{array}$$

#2) Solve: $|2t-9|=11$

$$\begin{array}{l} \swarrow \quad \searrow \\ 2t-9=-11 \quad 2t-9=11 \\ \hline +9 \quad +9 \quad \quad +9 \quad +9 \\ \hline 2t=-2 \quad \quad 2t=20 \\ \hline \frac{2t}{2}=\frac{-2}{2} \quad \quad \frac{2t}{2}=\frac{20}{2} \\ \hline \boxed{t=-1} \quad \quad \boxed{t=10} \end{array}$$

#3) Solve: $\sqrt[2]{|3-2x|}=18$

$$\begin{array}{l} |3-2x|=9 \\ \swarrow \quad \searrow \\ 3-2x=-9 \quad 3-2x=9 \\ \hline -3 \quad -3 \quad \quad -3 \quad -3 \\ \hline -2x=-12 \quad \quad -2x=6 \\ \hline \frac{-2x}{-2}=\frac{-12}{-2} \quad \quad \frac{-2x}{-2}=\frac{6}{-2} \\ \hline \boxed{x=6} \quad \quad \boxed{x=-3} \end{array}$$

#4) Solve: $\sqrt[4]{|3a-10|}=8$

$$\begin{array}{l} |3a-10|=2 \\ \swarrow \quad \searrow \\ 3a-10=-2 \quad 3a-10=2 \\ \hline +10 \quad +10 \quad \quad +10 \quad +10 \\ \hline 3a=8 \quad \quad 3a=12 \\ \hline \frac{3a}{3}=\frac{8}{3} \quad \quad \frac{3a}{3}=\frac{12}{3} \\ \hline \boxed{a=\frac{8}{3}} \quad \quad \boxed{a=4} \end{array}$$

#5) Solve: $4|3x+1|+3=19$

$$\frac{4|3x+1|}{4} = \frac{16}{4}$$

$$|3x+1|=4$$

$3x+1 = -4$ $\begin{array}{r} -1 \quad -1 \\ \hline 3x = -5 \\ \frac{3}{3} \quad \frac{3}{3} \\ \hline x = -\frac{5}{3} \end{array}$	$3x+1 = 4$ $\begin{array}{r} -1 \quad -1 \\ \hline 3x = 3 \\ \frac{3}{3} \quad \frac{3}{3} \\ \hline x = 1 \end{array}$
--	---

#6) Solve: $27 = 6 + 7|5-4n|$

$$\frac{21}{7} = \frac{7|5-4n|}{7}$$

$$3 = |5-4n|$$

$5-4n = 3$ $\begin{array}{r} -5 \quad -5 \\ \hline -4n = -2 \\ \frac{-4}{-4} \quad \frac{-4}{-4} \\ \hline n = \frac{1}{2} \end{array}$	$5-4n = -3$ $\begin{array}{r} -5 \quad -5 \\ \hline -4n = -8 \\ \frac{-4}{-4} \quad \frac{-4}{-4} \\ \hline n = 2 \end{array}$
---	--

#7) Solve: $-2|3-2x|=18$

$$|3-2x| = -9$$

no solution (because absolute value can never produce a negative value)