

1. Solve the equation below that you've been assigned by reversing operations. Show your steps and check your solutions. Be prepared to share your steps with your group.

K. $3|x-5|+11=20 \rightarrow \frac{3|x-5|=9}{-11 \quad -11} \rightarrow |x-5|=3 \begin{cases} x-5=3 \rightarrow x=8 \\ x-5=-3 \rightarrow x=2 \end{cases}$

Q. $5(x+1)^2+6=186 \rightarrow \frac{5(x+1)^2=180}{-6 \quad -6} \rightarrow (x+1)^2=36 \begin{cases} x+1=6 \rightarrow x=5 \\ x+1=-6 \rightarrow x=-7 \end{cases}$

J. $\frac{x-5}{3}-4=-11 \rightarrow \frac{x-5}{3}=-7 \rightarrow x-5=-21 \rightarrow x=-16$

A. $X \cdot (\frac{5}{x} - \frac{3x}{x-1} = -3) \cdot X \rightarrow (5 - \frac{3x^2}{x-1} = -3x) \cdot (x-1) \rightarrow 5x-5 - \frac{3x^2}{x-1} = -3x^2+3x$

10. $\frac{1}{2}\sqrt{x+1}-5=-3 \rightarrow \frac{1}{2}\sqrt{x+1}=2 \rightarrow \sqrt{x+1}=4 \rightarrow x+1=16 \rightarrow x=15$

9. $4-5|x+1|=-21 \rightarrow -5|x+1|=-25 \rightarrow |x+1|=5 \begin{cases} x+1=5 \rightarrow x=4 \\ x+1=-5 \rightarrow x=-6 \end{cases}$

8. $4(x-2)^3-7=101 \rightarrow 4(x-2)^3=108 \rightarrow (x-2)^3=27 \rightarrow x-2=3 \rightarrow x=5$

6. $|x-4|=2x \begin{cases} x-4=2x \rightarrow x=-4 \\ x-4=-2x \rightarrow x=4/3 \end{cases}$

Handwritten notes on the left:
 $1-3(x+2)=10 \rightarrow 1-3x-6=10 \rightarrow -3x=15 \rightarrow x=-5$

2. Exchange your card with someone at your table and complete the assigned problem by reversing operations.

Extra Practice: Complete problems in your math notebook. There isn't enough space on this page.

3. Radical Equations: Use a similar technique to solve the equations below. Show your steps and check your solutions.

a. $\sqrt{x-1}+2=5 \rightarrow \sqrt{x-1}=3 \rightarrow x-1=9 \rightarrow x=10$

b. $-12+4\sqrt{x+1}=-8 \rightarrow 4\sqrt{x+1}=4 \rightarrow \sqrt{x+1}=1 \rightarrow x+1=1 \rightarrow x=0$

c. $2\sqrt{3x-2}+4=16 \rightarrow 2\sqrt{3x-2}=12 \rightarrow \sqrt{3x-2}=6 \rightarrow 3x-2=36 \rightarrow 3x=38 \rightarrow x=38/3$

Challenge: Try it out, but don't worry if you get stuck. What makes this one harder than (a) - (c)?
 d. $(\sqrt{x+2})^2 = 6^2 \rightarrow x+2=x^2 \rightarrow 0=x^2-x-2 \rightarrow 0=(x-2)(x+1) \rightarrow x=2, x=-1$

4. Describe a general strategy for solving Radical Equations like parts (a) - (c) above (in the form $a\sqrt{x-h}+k=d$). What is a typical number of solutions for these equations? Is it possible to get more solutions than typical? Fewer than typical solutions? Explain fully.

1) Subtract k
 2) Divide a
 3) Square both sides
 4) Add h.
 Usually 1 solution.

5. Quadratic Equations (Graphing Form Only): Reverse operations to solve each equation below.

Show your steps and check your solutions.

- a. $(x-4)^2 - 3 = 22$
 $+3 +3 \rightarrow \sqrt{(x-4)^2} = \sqrt{25} \rightarrow x-4 = 5 \rightarrow x = 9$
 $x-4 = -5 \rightarrow x = -1$
- b. $3(x-1)^2 + 17 = 20$
 $-17 -17 \rightarrow \frac{3(x-1)^2}{3} = \frac{3}{3} \rightarrow (x-1)^2 = 1 \rightarrow x-1 = 1 \rightarrow x = 2$
 $x-1 = -1 \rightarrow x = 0$
- c. $2(x+3)^2 + 8 = 12.5$
 $-8 -8 \rightarrow \frac{2(x+3)^2}{2} = \frac{4.5}{2} \rightarrow (x+3)^2 = 2.25 \rightarrow x+3 = 1.5 \rightarrow x = -1.5$
 $x+3 = -1.5 \rightarrow x = -4.5$
- d. $-16(x-4)^2 - 10 = 86$
 $+10 +10 \rightarrow -16(x-4)^2 = 96 \rightarrow (x-4)^2 = -6$ — Error.

e. What was different about equation d? What happened when you tried to solve it? Write a note in your math journal about solving quadratic equations.

Can't square root a negative.

6. A model rocket is launched from a platform in a field. The path of the rocket followed the equation $p(t) = -16(t-2)^2 + 70$, where t represents time after igniting the rocket's engine and $p(t)$ represents the rocket's height in feet. Use the equation to:

- a. Determine the height of the platform.
 Plug in $t=0$. $p(0) = -16(0-2)^2 + 70 = -16(-2)^2 + 70 = -16(4) + 70 = -64 + 70 = 6$.
- b. Determine the maximum height the rocket reached.
 Look at graph. Height is 70 ft at the max.
- c. A low cloud settled over the field at 50 feet obscuring the rocket during its flight. Write and solve an equation to determine the amount of time the rocket was hidden by the cloud.

6 feet high

7. Quadratic Equations (Graphing Form) $-16(t-2)^2 + 70 = 50 \rightarrow \frac{-16(t-2)^2}{-16} = \frac{-20}{-16}$

- a. Describe a general strategy for solving Quadratic Equations in Graphing form.
 Add/subtract, Divide, square root, finish it.
- b. Why do you typically get two solutions?
 Because 2 negatives = positive
- c. Is it possible to solve an equation in the form $a(x-h)^2 + k = d$ and get 1 solution? What about no solutions? Explain fully.
 Yes if $k=d$, there is 1 solution.
 If you square root a negative, there are 0 solutions.

8. Solve the equations below: Check your solutions:
- a. $5(x-1)^3 + 1 = -4$
 $-1 -1 \rightarrow \frac{5(x-1)^3}{5} = \frac{-5}{5} \rightarrow \sqrt[3]{(x-1)^3} = \sqrt[3]{-1} \rightarrow x-1 = -1 \rightarrow x = 0$
- b. $\frac{\sqrt[3]{x+4}}{2} - 1 = \frac{1}{2}$
 $+1 +1 \rightarrow \frac{\sqrt[3]{x+4}}{2} = \frac{3}{2} \rightarrow \sqrt[3]{x+4} = 3 \rightarrow x+4 = 27 \rightarrow x = 23$
- c. $3\sqrt{x-4} + 2 = 5$
 $-2 -2 \rightarrow \frac{3\sqrt{x-4}}{3} = \frac{3}{3} \rightarrow (\sqrt{x-4})^2 = (1)^2 \rightarrow x-4 = 1 \rightarrow x = 5$

9. Solve the equations below by reversing operations. Check your answers.

- a. $|x-6| - 2 = 14$
 $+2 +2 \rightarrow |x-6| = 16 \rightarrow x-6 = 16 \rightarrow x = 22$
 $x-6 = -16 \rightarrow x = -10$
- b. $5|x+3| + 1 = 26$
 $-1 -1 \rightarrow \frac{5|x+3|}{5} = \frac{25}{5} \rightarrow |x+3| = 5 \rightarrow x+3 = 5 \rightarrow x = 2$
 $x+3 = -5 \rightarrow x = -8$
- c. $2 - 3|x+11| = -13$
 $-2 -2 \rightarrow -3|x+11| = -15 \rightarrow |x+11| = 5 \rightarrow x+11 = 5 \rightarrow x = -6$
 $x+11 = -5 \rightarrow x = -16$