Day 3/4 Guided Notes

Name: ANSWER KEY Date: 6-20 | 6-21

OBJECTIVE: SWBAT calculate a missing value for a number puzzle that can be represented by a linear equation in one variable and explain a solution method.

Brainstorm:

State what you think a number puzzle is:

N/A

Definition:

1. A ***number puzzle*** is a series of operations on a number, and the final result, where you have to find out the original number.

Example Problems

1. In a basketball game, Elena scores twice as many points (= ×2) as Tyler. Tyler scores four points fewer (↳ −4) than Noah, and Noah scores three times (= ×3) as many points as Mai. If Mai scores 5 points, how many points (↳ units) did Elena score? Explain your reasoning.

Method: Table Method

Names	Elena	Tyler	Noah	Mai
operation	Tyler × 2	Noah −4	Mai × 3	~~X~~
points	11 × 2 = 22	15 − 4 = 11	5 × 3 = 15	5

Solution: Elena scored 22 points.

2. Andre and Elena are reading the same book over the summer. Andre says he has read half of the book. Elena says she has read 20 more pages than Andre. If Elena is on page 55, how many pages are in the book?

Name	Andre	Elena
Operation	$\frac{1}{2}$ book	Andre +20
pages	35	55

Elena (E) = Andre(A)+20
↳ 55 = A + 20
↳ A = 35 pages
Andre (A) has read half of the book
↳ P = # of pages
↳ 35 = $\frac{1}{2}$P
↳ P = 70
So there are 70 pages total.

Solution: There are 70 pages total.

3. Lin ran twice as far as Diego. Diego ran 300 m farther than Jada. Jada ran half the distance that Noah ran. Noah ran 1200 m. How far did Lin run?

Name	Lin	Diego	Jada	Noah
Operation	Diego × 2	Jada + 300	Noah × $\frac{1}{2}$	
Distance	900 × 2 = 1800	600 + 300 = 900	1200 × $\frac{1}{2}$ = 600	1200

Solution: Lin ran 1800 m.

4. Clare asks Andre to play the following number puzzle:

Choose a variable bic we are solving for original number so we don't actually know the number YET.

- Pick a number → m

now we add 2 to our unknown number "m"

- Add 2 → m+2

next we need to multiply our number by 3, but we need to be careful how we write that since 3m+2 is not the same as 3(m+2)

- Multiply by 3 → multiply 3 to your number 3(m+2)
- Subtract 7 → 3(m+2) −7

Andre's final result is 27. Which number did he start with?

Write an equation to represent this number puzzle.

$3(m+2)-7=27$

$3m+6-7=27$

$+7 \quad +7$

$3m+6=34$

$-6 \quad -6$

$3m=28$

$m=\frac{28}{3}$

Student 1's Method:

$3(m+2)-7=27$

$3m+6-7=27$

$3m-1=27$

$+1 \quad +1$

$\frac{3m}{3}=\frac{28}{3}$

$m=9.\overline{3}$

5. Gabriel, Christine, and Denny are all practicing their driving. Denny drove four times more hours than Gabriel. Gabriel drove for seven more hours than Christine. Christine drove for 30 hours. How many hours did Denny drive for?

- Christine (C) drove 30 hours
- Gabriel (G) drove 7 more than C : 30 + 7 = 37
- Denny drove 4x more than G : 4·G = 4(37) = 148

↳ Denny drove for 148 hours.

6. Sarah challenges David with the following number puzzle:

- Begin with a number → x
- Add 8 → $x+8$
- Divide by 2 → $\frac{(x+8)}{2}$
- Subtract 3 → $\frac{x+8}{2}-3$
- Multiply by 6 → $6\left(\frac{x+8}{2}-3\right)$

The final result is 90. What was the number he started with?

Write an equation to represent this number puzzle.

$$6\left(\frac{x+8}{2}-3\right)=90$$

7. **CHALLENGE QUESTION: Solve number puzzle 6 and show your steps!**

[student work]

(1) student 1: work backwards by using inverse operations:

1. divide by 6: $\frac{90}{6}=15$
2. add 3: $15+3=18$
3. multiply by 2: $18\cdot 2=36$
4. subtract by 8: $36-8=28$

2) student 2 work (whiteboard)

$$\begin{array}{r} 90 \\ \div\ 6 \\ \hline 15 \\ +\ 3 \\ \hline 18 \\ \times\ 2 \\ \hline 36 \\ -\ 8 \\ \hline 28 \end{array}$$

student 3:

$$\frac{6\left(\frac{(x+8)}{2}-3\right)}{6}=\frac{90}{6}$$

$$\left(\frac{x+8}{2}\right)-3=15$$

$$+3 \qquad +3$$

$$2\times\frac{x+8}{2}=18$$

$$\times 2$$

$$x+8=36$$

$$-8 \quad -8$$

$$\boxed{x=28}$$