Problem Set 2 Answers

Write each of the following statements using symbolic language.

1. **Bruce bought two books. One book costs $\$4.00$ more than three times the other. Together, the two books cost him $\$72$.**

   Let x be the cost of the less expensive book. Then, $x + 4 + 3x = 72$.

2. **Janet is three years older than her sister Julie. Janet's brother is eight years younger than their sister Julie. The sum of all of their ages is 55 years.**

   Let x be Julie's age. Then, $(x + 3) + (x - 8) + x = 55$.

3. **The sum of three consecutive integers is $1,623$.**

   Let x be the first integer. Then, $x + (x + 1) + (x + 2) = 1623$.

4. **One number is six more than another number. The sum of their squares is 90.**

   Let x be the smaller number. Then, $x^2 + (x + 6)^2 = 90$.

5. **When you add 18 to $\frac{1}{4}$ of a number, you get the number itself.**

   Let x be the number. Then, $\frac{1}{4}x + 18 = x$.

6. **When a fraction of 17 is taken away from 17, what remains exceeds one-third of seventeen by six.**

   Let x be the fraction of 17. Then, $17 - x = \frac{1}{3} \cdot 17 + 6$.

7. **The sum of two consecutive even integers divided by four is 189.5.**

   Let x be the first even integer. Then, $\frac{x+(x+2)}{4} = 189.5$.

8. **Subtract seven more than twice a number from the square of one-third of the number to get zero.**

   Let x be the number. Then, $\left(\frac{1}{3}x\right)^2 - (2x + 7) = 0$.

9. **The sum of three consecutive integers is 42. Let x be the middle of the three integers. Transcribe the statement accordingly.**

   $(x - 1) + x + (x + 1) = 42$

① let x = a number $x-3^2$

$(x-3)^2$ Num

④ let x = a # $7x+5.2$ Lin

② let x = a number

$17-2\div x = 17-\frac{2}{x}$ Non

③ let x = a number

$13+2x$ Lin

⑤ let x = tickets we start with

Monday = 35

Tuesday = $\frac{x-35}{2}$

Wednesday = 14

Lin

Altogether = $35+\frac{x-35}{2}+14$

⑩. The sum of twice a number and four times a number subtracted from the number squared

Let x = a number

$x^2-(2x+4x)$

Lesson 3: Linear Equations in x

Classwork

Exercises

1. Is the equation a true statement when $x = -3$? In other words, is -3 a solution to the equation $6x + 5 = 5x + 8 + 2x$? Explain.

$6x+5=5x+8+2x$

$6\cdot-3+5=5\cdot-3+8+2\cdot-3$

$-18+5=-15+8+-6$

$-13=-7+-6$

$-13=-13$ Yes, $x=-3$ is a solution.

STILL FOLLOW ~~PEMDAS~~

2. Does $x = 12$ satisfy the equation $16 - \frac{1}{2}x = \frac{3}{4}x + 1$? Explain.

$16-\frac{1}{2}x=\frac{3}{4}x+1$

$16-\frac{1}{2}\cdot12=\frac{3}{4}\cdot12+1$

$16-6=9+1$

$10=10$ Yes, $x=12$ is a solution.

3. Chad solved the equation $24x + 4 + 2x = 3(10x - 1)$ and is claiming that $x = 2$ makes the equation true. Is Chad correct? Explain.

$24x + 4 + 2x = 3(10x - 1)$

$24 \cdot 2 + 4 + 2 \cdot 2 = 3(10 \cdot 2 - 1)$

$48 + 4 + 4 = 3(20 - 1)$

$52 + 4 = 3(19)$

$56 = 57$

No, if $x = 2$ is the solution we would have the left hand side = right hand side!

4. Lisa solved the equation $x + 6 = 8 + 7x$ and claimed that the solution is $x = -\frac{1}{3}$. Is she correct? Explain.

$-\frac{1}{3} + 6 = 8 + 7 \cdot -\frac{1}{3}$

LCD = 3

$\frac{-1}{3} + \frac{6 \cdot 3}{3} = \frac{8 \cdot 3}{3} + \frac{-7}{3}$

$\frac{-1}{3} + \frac{18}{3} = \frac{24}{3} + \frac{-7}{3}$

$\frac{17}{3} = \frac{17}{3}$

$-\frac{1 \cdot 3}{3} + 6 \cdot 3 = 8 \cdot 3 + \frac{-7 \cdot 3}{3}$

$-1 + 18 = 24 + -7$

$17 = 17$

Yes, Lisa is correct.

$3x+1=9$

$2x+7=9$

Does,

$3x+1=2x+7$

5. Angel transformed the following equation from $6x + 4 - x = 2(x + 1)$ to $10 = 2(x + 1)$. He then stated that the solution to the equation is $x = 4$. Is he correct? Explain.

6. Claire was able to verify that $x = 3$ was a solution to her teacher's linear equation, but the equation got erased from the board. What might the equation have been? Identify as many equations as you can with a solution of $x = 3$.

7. Does an equation always have a solution? Could you come up with an equation that does not have a solution?