<u>Basic Solving Skills Practice</u>

Use the following information to answer the first question.

Given the following equation, x – 2 = -11, the following statements are made.	
Statement 1	The first step is subtracting 2 from both sides and the solution is x = -9.
Statement 2	The first step is subtracting 2 from both sides and the solution is x = -13.
Statement 3	The first step is adding 2 to both sides and the solution is x = -9.
Statement 4	The first step is adding 2 to both sides and the solution is x = -13.

1. The correct statement is

   A) 1   B) 2   C) 3   D) 4

Use the following information to answer the next question.

A math student was asked to solve the equation, -4x + 1 = 2 + 7. Analyze their work below.	
Step 1	-4x + 1 = 9
Step 2	-4x + 1 + 4 = 9 + 4
Step 3	x + 1 = 13
Step 4	x + 1 – 1 = 13 – 1
Step 5	x = 12

2. The first error occurred in step

   A) 2   B) 3   C) 4   D) 5

3. In order to solve for x in the equation, $\left(\frac{1}{6}\right)x + 4 = 20$, we would

   A) Subtract 4 from both sides of the equation and then multiply every term by 6.
   B) Subtract 4 from both sides of the equation and then divide every term by 6.
   C) Add 4 to both sides of the equation and then multiply every term by 6.
   D) Add 4 to both sides of the equation and then divide every term by 6.

Use the following information to answer the next question.

Consider the 4 equations below and the possible operations that could be applied to each equation for the purpose of solving.		

Equation	Operation
E. $7y = 56$	1. Add
F. $w + 9 = 40$	2. Subtract
G. $-12 + v = -1$	3. Divide
H. $\left(\frac{2}{3}\right)k = \frac{1}{2}$	4. Multiply

4. Using the numbers 1,2,3, and 4, the correct numbers in order that match the equations E, F, G, and H are

    A) 3241   B) 3142   C) 3214   D) 4132

5. The solution to the equation $7x + 1 = 2x + 21$ is _____.

Solve the following equations. Show all work. Verify your solutions.

6. $\left(\frac{1}{4}\right)x - 11 = -2$

7. $2 - 9x = 3x - 15$

8. $4x + 8x - 3 = 10x$

Use the following information to answer the first question.

Given the following equation, x – 2 = -11, the following statements are made.	
Statement 1	The first step is subtracting 2 from both sides and the solution is x = -9.
Statement 2	The first step is subtracting 2 from both sides and the solution is x = -13.
Statement 3	The first step is adding 2 to both sides and the solution is x = -9.
Statement 4	The first step is adding 2 to both sides and the solution is x = -13.

1. The correct statement is

A) 1   B) 2   C) 3   D) 4

Solution

There are two terms on the left side of the equal sign. One is a lettered term and one is an integer. In order to isolate the lettered term, the integer must be moved to the other side of the equal sign. Since the operation in front of the 2 is minus, take the opposite operation, which is adding, and add 2 to both sides of the equal sign.

x – 2 + 2 = -11 + 2

x = -9

The correct answer is C.

Use the following information to answer the next question.

A math student was asked to solve the equation, -4x + 1 = 2 + 7. Analyze their work below.	
Step 1	-4x + 1 = 9
Step 2	-4x + 1 + 4 = 9 + 4
Step 3	x + 1 = 13
Step 4	x + 1 – 1 = 13 – 1
Step 5	x = 12

2. The first error occurred in step

A) 2   B) 3   C) 4   D) 5

Solution

Step 1 is good. The two numbers on the right side of the equal sign were combined into 1 term. (2 + 7) = 9

There is a problem in step 2. On the left side of the equal sign, there are 2 terms; a lettered term (-4x) and an integer (1). In order to isolate the lettered term, the integer must be moved to the other side of the equal sign. Since the operation is +1, we need the opposite operation, and thus need to subtract 1 from both sides.

Step 2 should be:

-4x + 1 – 1 = 9 – 1

The correct answer is A.

3. In order to solve for x in the equation, $\left(\frac{1}{6}\right) x + 4 = 20$, we would

    A) Subtract 4 from both sides of the equation and then multiply every term by 6.
    B) Subtract 4 from both sides of the equation and then divide every term by 6.
    C) Add 4 to both sides of the equation and then multiply every term by 6.
    D) Add 4 to both sides of the equation and then divide every term by 6.

Solution

Subtract from both sides to isolate the lettered term.

$$\left(\frac{1}{6}\right) x + 4 - 4 = 20 - 4$$

$$\left(\frac{1}{6}\right) x = 16$$

In order to get a coefficient of positive 1 for the lettered term, multiply both sides by the reciprocal of $\left(\frac{1}{6}\right)$, which is $\left(\frac{6}{1}\right)$ or 6.

$$\left(\frac{6}{1}\right)\left(\frac{1}{6}\right) x = \left(\frac{6}{1}\right) 16$$

x = 96

The correct answer is A

Use the following information to answer the next question.

Equation	Operation
Consider the 4 equations below and the possible operations that could be applied to each equation for the purpose of solving.	

Equation	Operation
E. 7y = 56	1. Add
F. w + 9 = 40	2. Subtract
G. -12 + v = -1	3. Divide
H. $\left(\frac{2}{3}\right)k = \frac{1}{2}$	4. Multiply

4. Using the numbers 1,2,3, and 4, the correct numbers in order that match the equations E, F, G, and H are

A) 3241   B) 3142   C) 3214   D) 4132

Solution

Equation E

Since the variable is multiplied by 7, in order to isolate it with a coefficient of positive 1, both sides of the equal sign need to be **divided** by 7.

Equation E is matched with #3.

Equation F

Since there are 2 terms on the side of the equal sign that contains the letter, we must **subtract** 9 from both sides since that is the opposite operation to adding 9. This will move the integer term, 9, to the other side of the equal sign.

Equation F is matched with #2.

Equation G

Again, there are 2 terms on the side of the equal sign that contains the letter. Since the integer is negative (-12), we must **add** 12 to both sides in order to isolate the lettered term.

Equation G is matched with #1.

The coefficient of the lettered term is $\left(\frac{2}{3}\right)$. In order to get a coefficient of positive 1, we need to **multiply** each side by its reciprocal, or $\left(\frac{3}{2}\right)$.

Equation H is matched with #4.

In order, the numbers are 3214.

The correct answer is C.

5. The solution to the equation 7x + 1 = 2x + 21 is __4__.

Solution

There are 4 terms in the total equation, 2 on each side of the equal sign. Since there are lettered terms on both sides, we want to gather the lettered terms to one side of the equal sign.

We can either subtract 2x from both sides, or subtract 7x from both sides. I am going to subtract 2x from both sides as this will keep the coefficient positive.

7x – 2x + 1 = 2x – 2x + 21

5x + 1 = 21

Subtract 1 from both sides of the equal sign to isolate the lettered term.

5x + 1 – 1 = 21 – 1

5x = 20

Divide both sides by the number in front of the letter in order to isolate the letter with a coefficient of positive 1.

$$\left(\frac{5x}{5}\right) = \left(\frac{20}{5}\right)$$

x = 4

The value of x is 4.

Solve the following equations. Show all work. Verify your solutions.

6. $\left(\frac{1}{4}\right)x - 11 = -2$

Solution

Add 11 to both sides in order to isolate the lettered term.

$\left(\frac{1}{4}\right)x - 11 + 11 = -2 + 11$

$\left(\frac{1}{4}\right)x = 9$

In order to get a coefficient of positive 1 for the lettered term, multiply both sides by the reciprocal of $\left(\frac{1}{4}\right)$, which is $\left(\frac{4}{1}\right)$ or 4.

$$4\left(\frac{1}{4}\right)x = 4(9)$$

x = 36

<u>Verify</u>

$\left(\frac{1}{4}\right)(36) - 11 = -2$

9 – 11 = -2

-2 = -2

7. 2 – 9x = 3x - 15

Solution

Add 9x to both sides.

2 – 9x + 9x = 3x + 9x – 15

2 = 12x – 15

Add 15 to both sides.

2 + 15 = 12x – 15 + 15

17 = 12x

Divide both sides by 12.

$$\frac{17}{12} = \frac{12x}{12}$$

$$x = \frac{17}{12}$$

<u>Verify</u>

$$2 - 9\left(\frac{17}{12}\right) = 3\left(\frac{17}{12}\right) - 15$$

$$2 - \left(\frac{153}{12}\right) = \left(\frac{51}{12}\right) - 15$$

$$\left(\frac{24}{12}\right) - \left(\frac{153}{12}\right) = \left(\frac{51}{12}\right) - \left(\frac{180}{12}\right)$$

$$\left(\frac{-129}{12}\right) = \left(\frac{-129}{12}\right)$$

8. 4x + 8x – 3 = 10x

Solution

Combine like terms on the left side of the equal sign.

12x – 3 = 10x

Subtract 12x from both sides.

12x – 12x – 3 = 10x – 12x

-3 = -2x

Divide both sides by -2.

$$\frac{-3}{-2} = \frac{-2x}{-2}$$

$$x = \frac{3}{2}$$

$$4\left(\frac{3}{2}\right) + 8\left(\frac{3}{2}\right) - 3 = 10\left(\frac{3}{2}\right)$$

6 + 12 − 3 = 15

18 − 3 = 15

15 = 15