01
Foundation

Solving Linear Equations - 1

Solve simple linear equations, including those which involve expanding the expressions and collecting like terms. CCSS.MATH.CONTENT.8.EE.C.7.B | G8M4C20E1

FUTURE SCHOOL

Your team has defeated King Gravedanger and the other ghosts. In case they return, let's design body protector vests for the safety of the museum workers.

1 The expression 3a + (7 × 3) - a - 11 gives the number of people that work in the museum. Simplify the expression and write your answer in the boxes given below.

Simplify 7 × 3 and group the like terms, to get:

☐ a - a + ☐ ☐ - ☐ ☐

The equivalent form of the given expression is ___. Check the correct box.

◯ 2a + 10   ◯ a + 10   ◯ 2a - 10

2 From the given equation, find the number of body protector vests (c) needed for the gatekeepers of the museum by following the steps. Write your answer in the boxes given below. Equation: 25c - 12c = (9 × 5) + 7
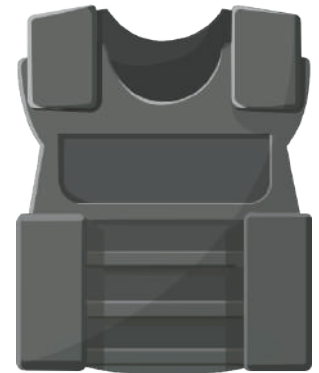
Step 1: Simplify (9 × 5)

☐ ☐ c - ☐ ☐ c = ☐ ☐ + 7

Step 2: Simplify 25c - 12c and add the constant terms.

☐ ☐ c = ☐ ☐

Step 3: Divide both sides by 13.

Number of body protector vests needed, c = ☐

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3 Follow the provided steps to solve the given equation and find the number of protector vests (a) needed for the rest of the museum workers. Write your answer in the boxes given below. Equation: $3a - 250 = 450 - 0.5a$

Step 1: Group the like terms.

☐ $a +$ ☐ . ☐ $a = 450 +$ ☐☐☐

Step 2: Simplify the terms.

☐ . ☐ $a =$ ☐☐☐

Step 3: Divide both sides by 3.5 and Check the box with the correct value of "a".

◯ 20 protector vests   ◯ 200 protector vests   ◯ 2000 protector vests

4 The relation between money spent (m) (in thousands of dollars) and the number of body protector vests purchased (b) is given by the equation $0.5m + 12 = \frac{3}{2}m - 5b$. Follow the steps to find the amount of money spent for 4 protector vests. Write your answer in the boxes given below and circle the correct option.

Hint: Separate like terms first and simplify.

Step 1: Group the like terms.

$12 + 5b =$ ☐ . ☐ $m -$ ☐ . ☐ m

Step 2: Simplify RHS.

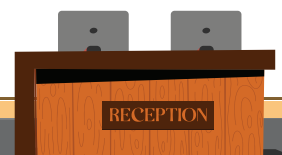$12 + 5b =$ ☐ m

Step 3: Substitute the value of "b".

$12 + 5 \times$ ☐ $= m$

The amount of money spent is: $20,000 $12,000 $32,000

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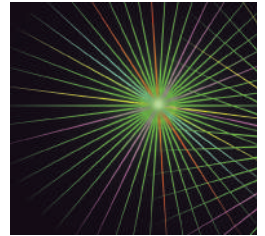
Let's arrange some equipment around the museum that might help to keep the ghosts away.

1 The expression $\frac{2}{3}$ b + 45 + $\frac{1}{3}$ b - $\frac{25}{5}$ shows the number of laser pointers that should be arranged around the museum. Simplify and write your answer in the boxes given below.

Step 1: Rewrite the expression by separating the like terms.

$$\frac{\boxed{}}{\boxed{}} \text{ b} + \frac{1}{3} \text{ b} + \boxed{}\boxed{} - \frac{25}{5}$$

Step 2: Simplify ($\frac{2}{3} + \frac{1}{3}$) and $\frac{25}{5}$ $\boxed{}$ b + 45 - $\boxed{}$

Step 3: Simplify the constant terms. Circle the number of laser pointers that are arranged around the museum.

b + 40   b - 40   b + 30   b - 30

2 In the equation 8x + 22 - 2x = 34 + 2x + 88, "x" represents the number of lamps kept around the museum to scare the ghosts away. Solve the equation and find the number of lamps kept. Write your answer in the boxes given below.

Step 1: Group the like terms.   8x - 2x - $\boxed{}$ x = 34 + 88 - $\boxed{}\boxed{}$

Step 2: Simplify the expression and circle the equivalent equation obtained.

4x = 120   4x = 100   5x = 100   5x = 120

Therefore, the number of lamps kept around the museum (x) is $\boxed{}\boxed{}$.

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3

Your team also lights up some magic lights (l) to protect the museum. The relation between the number of magic lights (l) and the laser pointers (L) is given by the equation $2(0.75l - 23.25L) = \left(\dfrac{3.4}{0.4}\right)L - \left(\dfrac{57}{6}\right)l$. Find the number of magic lights that your team lights up if the number of laser pointers is 4. Write your answer in the boxes given below.

Step 1: Simplify the LHS of the equation.

$$\boxed{}.\boxed{}\ l - \boxed{}\boxed{}.\boxed{}\ L = \left(\dfrac{3.4}{0.4}\right)L - \left(\dfrac{57}{6}\right)l$$

Step 2: Separate the like terms.

$$\boxed{}.\boxed{}\ l + \dfrac{57}{6}\ l = \dfrac{3.4}{0.4}\ L + \boxed{}\boxed{}.\boxed{}\ L$$

Step 3: Simplify the constant terms and check the correct equation obtained.

◯ $1.5\,l + 9.5\,l = 7.25\,L + 46.75\,L$ ◯ $1.5\,l + 9.5\,l = 8.5\,L + 46.5\,L$

Step 4: Write the equation obtained on further simplification.

$$\boxed{}\boxed{}\ l = \boxed{}\boxed{}\ L$$
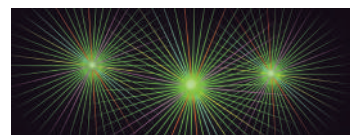
Step 5: Divide both sides by 11. Check the box that corresponds to the correct relation between l and L.

◯ $l = 5\,L$ ◯ $L = 5\,l$ ◯ $l = \dfrac{1}{5}\,L$ ◯ $l = L$

Step 6: Substitute the given number of laser pointers in the above equation and find the number of magic lights.

The number of magic lights lit by your team is $\boxed{}\boxed{}$.

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05
Create

Solving Linear Equations - 1

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Apart from the protector vests, a magic machine is designed to detect the presence of ghosts. The machine prevents the ghosts from entering the museum. Let's activate the machine by adding solutions.

You need to fill the magic machine with magic solutions to activate it. Follow the guidelines and solve the equation given below to find the amount of Solution 1 (S_1) (in mL) that has to be filled in the machine. Write your answers in the boxes given below.

The equation to find the amount of Solution 1 (S_1) that has to be filled is:

$$aS_1 - 12 + bS_1 = 0.4S_1 + c$$

Follow the guidelines to choose the values of the variables in the given equation.

Guidelines:
- The value of "a" should be less than 2 and a multiple of 0.4.
- The value of "b" should be twice the value of "a".
- The value of "c" should be a multiple of 4 and should be less than 32.

The equation to find the amount of Solution 1 to be added in the machine:
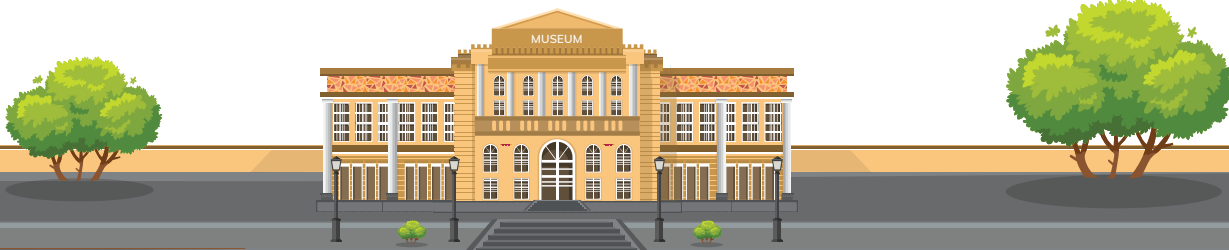
$\boxed{}.\boxed{}$ $S_1 - 12 +$ $\boxed{}.\boxed{}$ $S_1 = 0.4S_1 +$ $\boxed{\,}$

Rewriting the equation by separating the like terms,

$\boxed{}.\boxed{}$ $S_1 +$ $\boxed{}.\boxed{}$ $S_1 - 0.4S_1 = 12 +$ $\boxed{\,}$

On further simplification,

$\boxed{}.\boxed{}$ $S_1 =$ $\boxed{\,}$.

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On simplifying further for S_1 (and rounding off to a single decimal place), we get,

Amount of magic solution S_1 that has to be filled = ☐☐.☐ mL

After adding the required amount of Solution 1, we need to add Solution 2. Find the amount of Solution 2 that has to be filled by solving the linear equation given below.

The equation to find the amount of Solution 2 (S_2) is: $S_1 \times S_2 - 2S_2 = m - 5$
Here "S_1" is the amount of Solution 1 filled into the machine.

Follow the guideline below to choose the value of "m". Write your answer in the boxes given below.tt

Guideline:
● The value of "m" should be a multiple of 5 and lie between 10 to 40 (both are exclusive).

The expression to find the amount of Solution 2 to be filled in the machine is:

☐☐.☐ S_2 - 2S_2 = ☐☐ - 5

On simplifying further, we get,

☐☐.☐ S_2 = ☐☐

$\Rightarrow S_2 = $ ☐.☐ mL (round off to one decimal place)

Amount of magic solution, S_2 that has to be filled = ☐.☐ mL

Great! You and your team successfully activate the machine by filling it with the required amount of solutions. Now, no ghost can enter the museum.

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