Chapter 3. Solving Linear Equations

Exercise 3.3

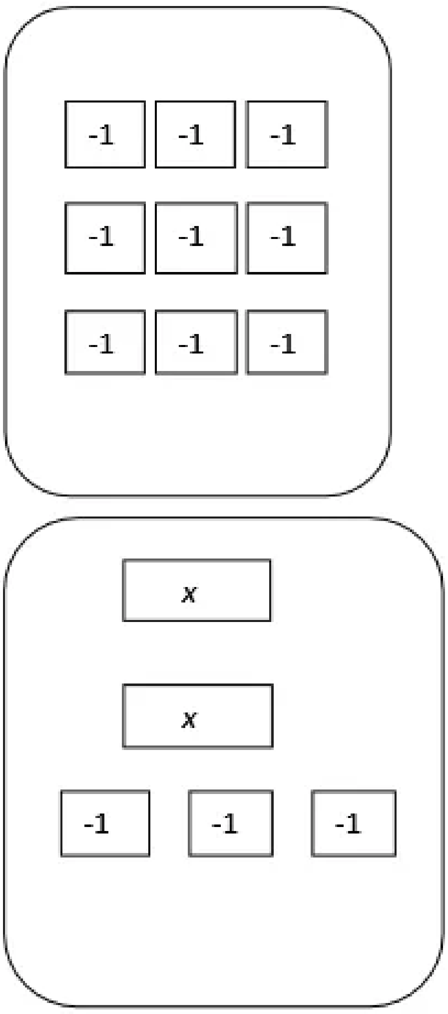
Answer 1AA.

Solving an equation involves operations like addition, subtraction, multiplication and division. Consider the expression,

$2x-3=-9$ ......(1)

Equation(1) is solved in the following ways.

Step 1: Model the equation.



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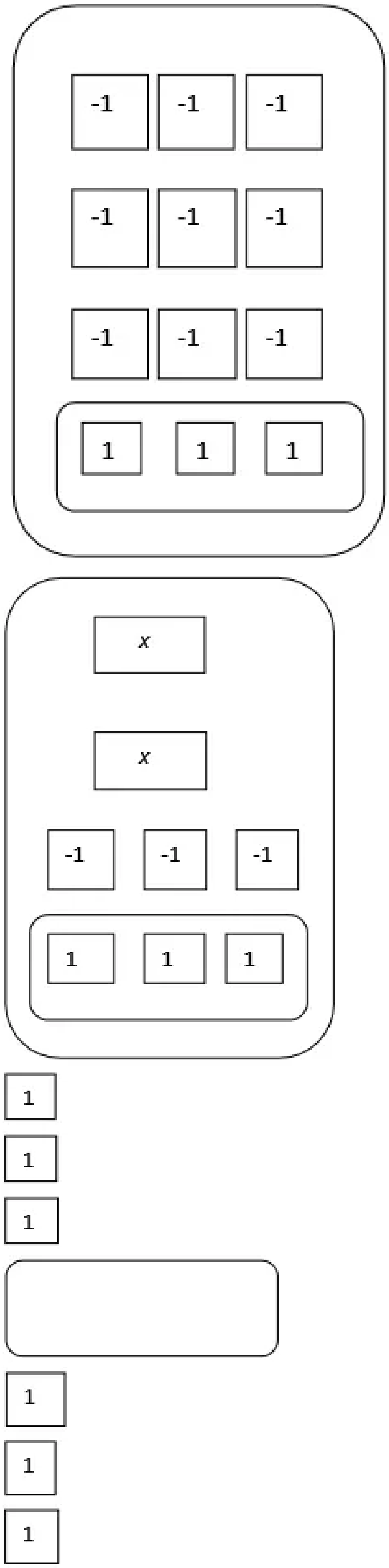
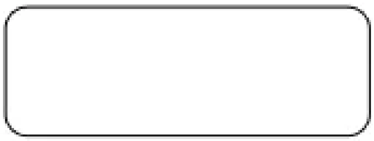
$2x - 3 = -9$

Place 2 *x* tiles and 3 negative 1 tiles on side of the mat. Place 9 negative 1 tiles on the other side of the mat.

Step 2 : Isolate the *x* term.





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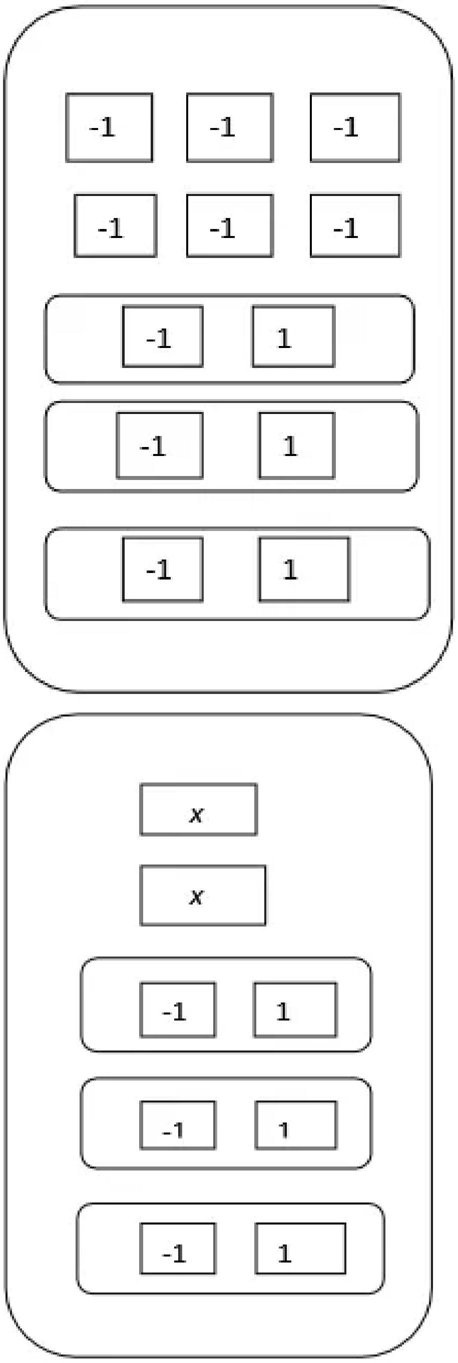
$$2x-3+3=-9+3$$

Since there are 3 negative 1 tiles with the *x* tiles, add 3 positive 1 tiles to each side to form zero pairs.

Step 3 : Remove zero pairs.



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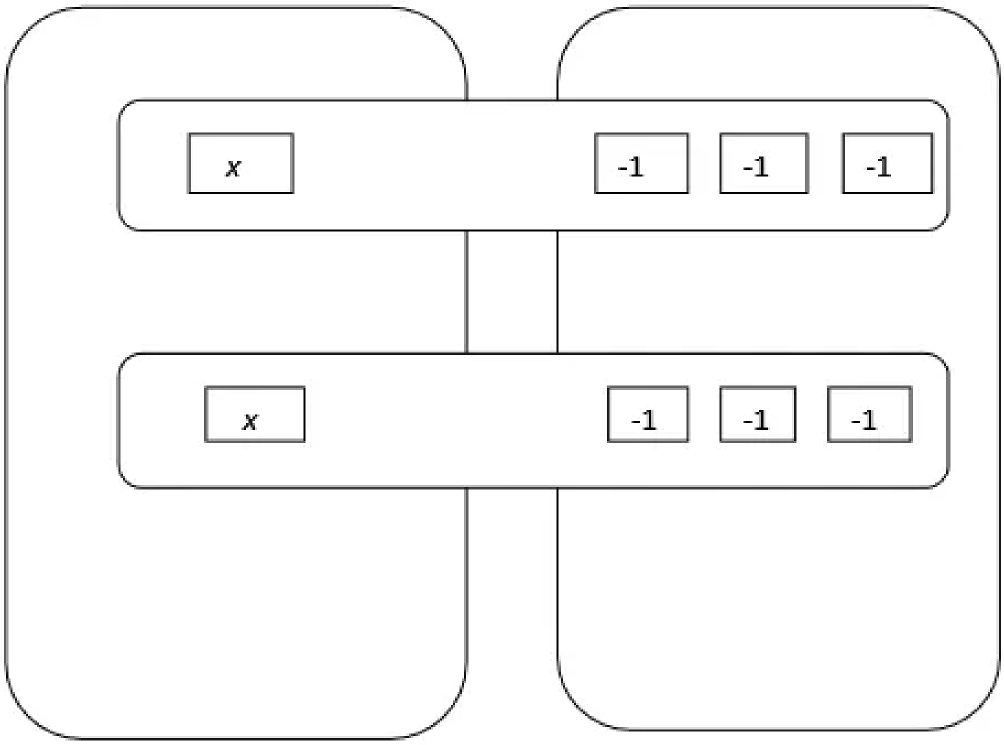
$$2x=-6$$

Group the tiles to form zero pairs and remove the zero pairs.

Step 4: Group the tiles.



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$$\frac{2x}{2} = \frac{-6}{2}$$

Separate the tiles into 2 equal groups to match the 2 *x* tiles. Each *x* tile is paired with 3 negative 1 tiles. Thus, $x = -3$

Answer 1CU.

For any numbers *a*, *b* and *c* if $a = b$, then $ac = bc$.

Consider the equation,

$2x = -6$ ......(1)

Equation(1) can be solved as,

$$2x = -6 \quad \text{original equation}$$
$$\frac{2x}{2} = \frac{-6}{2} \quad \text{divide by 2 on each side}$$
$$x = -3 \quad \text{check this result}$$

Thus, we get the solution of equation(1) is $x = -3$.

CHECK

$$2x = -6 \quad \text{original equation}$$
$$2(-3) = -6 \quad \text{substitute } -3 \text{ for } x$$
$$-6 = -6 \quad \text{The solution is } -3$$

Therefore, $2x = -6$ is the required equation which has a solution $x = -3$

Answer 1PQ.

Consider the statement,

The surface area S of a sphere equals four times π times the square of the radius r.

This statement can be expressed in symbol as:

$$\underbrace{\text{The surface area S of a sphere}}_{S}\ \underbrace{\text{equals}}_{=}\ \underbrace{\text{four}}_{4}\ \underbrace{\text{times}}_{\times}\ \underbrace{\pi}_{\pi}\ \underbrace{\text{times}}_{\times}\ \underbrace{\text{the square of the radius } r}_{r^2}$$

$$S = 4\pi r^2$$

Therefore, the required formula is, Surface area $S = 4\pi r^2$

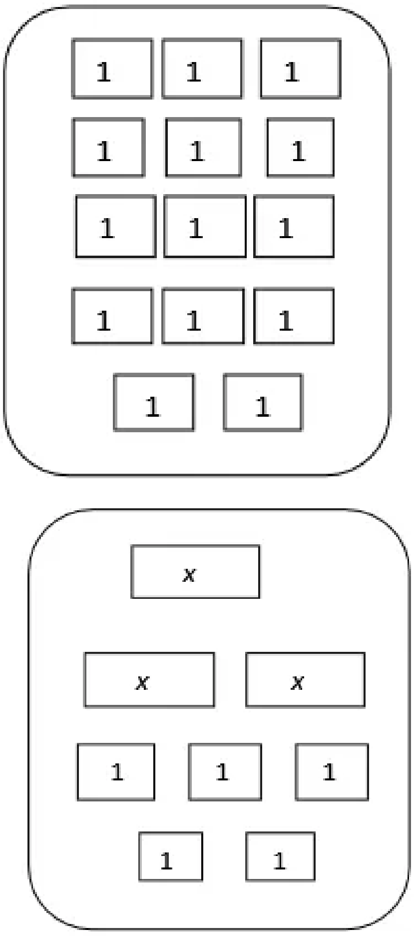
Answer 2AA.

Solving an equation involves operations like addition, subtraction, multiplication and division. Consider the expression,

$3x + 5 = 14$ ......(1)

Equation(1) is solved in the following ways.

Step 1: Model the equation.



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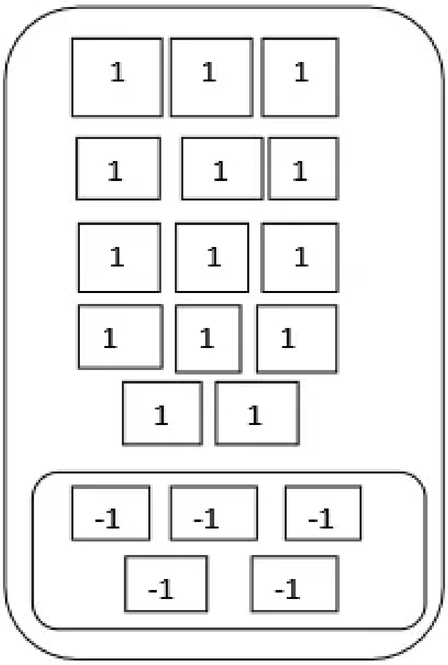
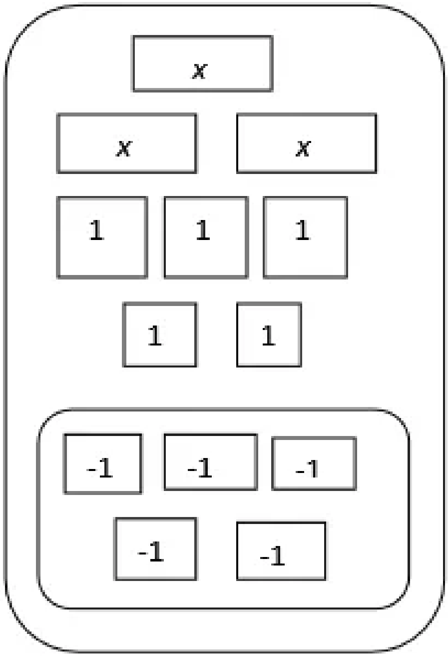
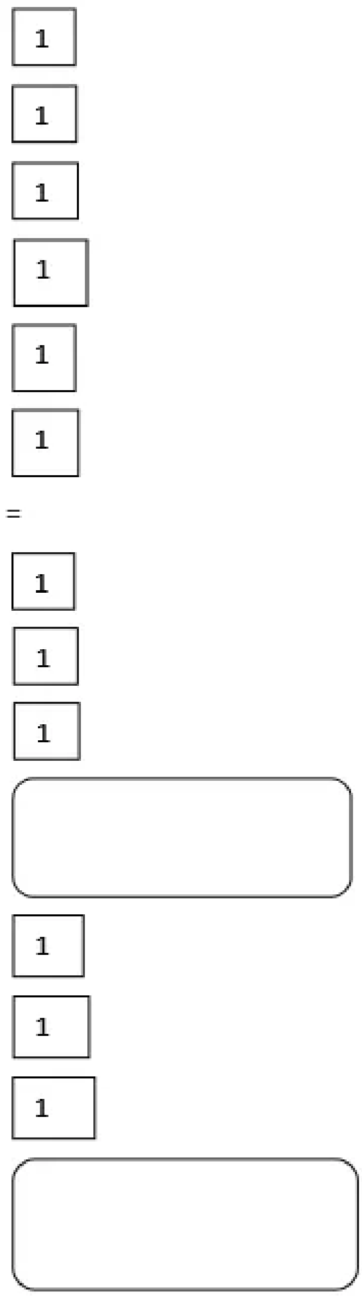
$3x + 5 = 14$

Place 3 x tiles and 5 positive 1 tiles on side of the mat. Place 14 positive 1 tiles on the other side of the mat.

Step 2 : Isolate the x term.


1 1 1
1 1 1
1 1 1
1 1 1
1 1
-1 -1 -1
-1 -1

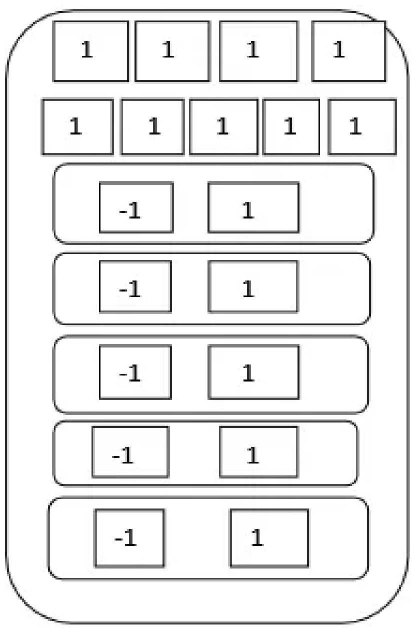

x
x x
1 1 1
1 1
-1 -1 -1
-1 -1



$$3x + 5 - 5 = 14 - 5$$

Since there are 5 positive 1 tiles with the *x* tiles, add 5 negative 1 tiles to each side to form zero pairs.

Step 3 : Remove zero pairs.



x *x* *x*

-1 1

-1 1

-1 1

-1 1

-1 1

1

1

1

1

1

1

1

1

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1

-1

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1

-1

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-1

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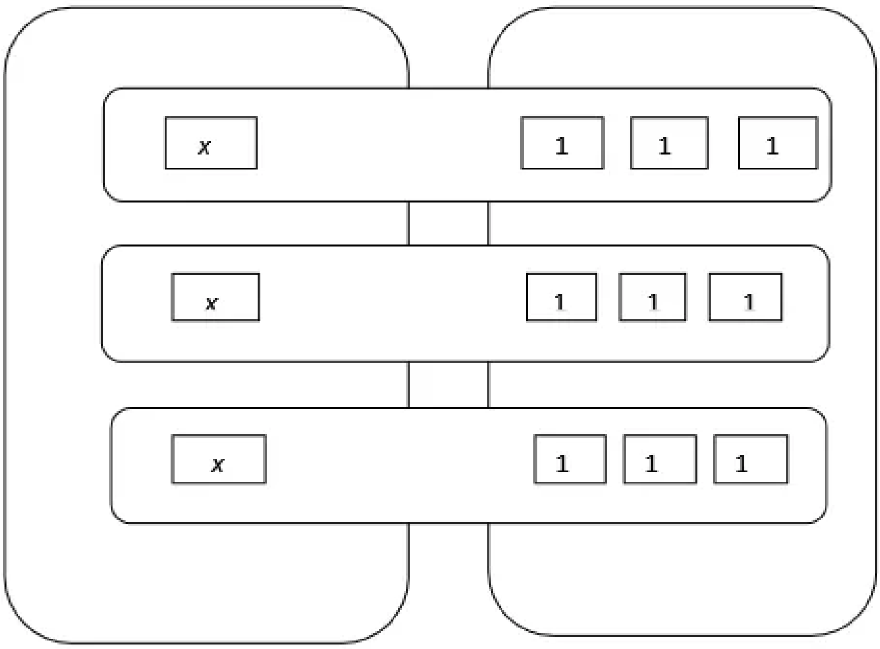
1

-1

$3x = 9$

Group the tiles to form zero pairs and remove the zero pairs.

Step 4: Group the tiles.



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$$\frac{3x}{3} = \frac{9}{3}$$

Separate the tiles into 3 equal groups to match the 3 *x* tiles. Each *x* tile is paired with 3 positive 1 tiles. Thus, $x = 3$

Answer 2CU.

Recollect that the multiplication property of equality

For any numbers *a*, *b* and *c*, if $a = b$, then $ac = bc$ ...... (1)

Division Property of equality

In particular, for $c \neq 0$, we have $\frac{a}{c} = \frac{b}{c}$ ...... (2)

For any non-zero number *n*, consider the reciprocal of the number $\frac{1}{n}$ .Let us assume that $a = b$ is true for any two numbers *a* and *b*.

Then, by multiplication property of equality we have,

$\frac{a}{n} = \frac{b}{n}$ .... (3)

Equation (3) can be compared with equation (2), which is division property of equality.

Hence, for every non-zero number Multiplication property of equality and Division property of equality can be considered as the same.

Answer 2PQ.

The surface area S of a sphere is, $S = 4\pi r^2$ where r is the radius of the sphere ......(1)

Substitute $r = 7\text{ cm}$ in equation(1).Therefore, equation(1) becomes

$$S = 4\pi r^2 \quad \text{original equation}$$

$$S = 4 \cdot \frac{22}{7} \cdot (7)^2 \text{ substitute } \frac{22}{7} \text{ for } \pi \textit{ and } 7 \text{ for } r$$

$$S = \frac{4312}{7} \quad \text{simplify}$$

$$S = 616\text{ cm}^2$$

Therefore, the surface area S of the sphere whose radius $r = 7\text{ cm}$ is,

$S = 616$ centimeter square .

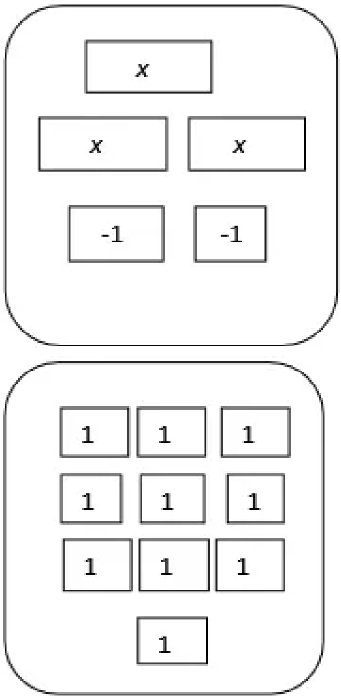
Answer 3AA.

Solving an equation involves operations like addition, subtraction, multiplication and division.
Consider the expression,

$3x - 2 = 10$ ......(1)

Equation(1) is solved in the following ways.

Step 1: Model the equation.



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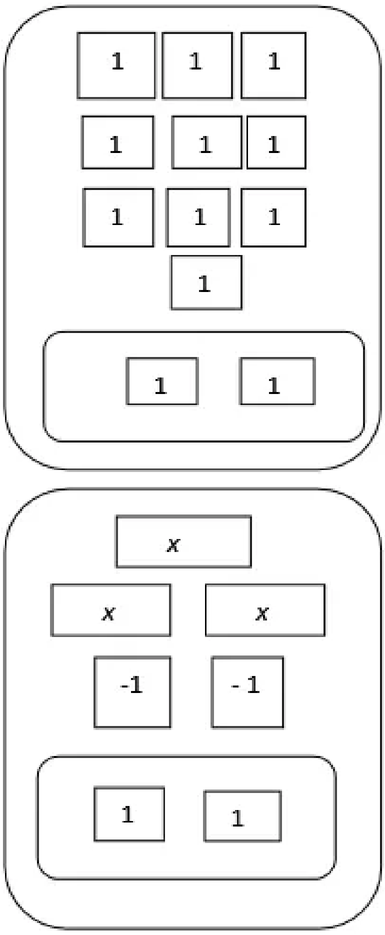
$3x - 2 = 10$

Place 3 *x* tiles and 2 negative 1 tiles on side of the mat. Place 10 positive 1 tiles on the other side of the mat.

Step 2 : Isolate the *x* term.



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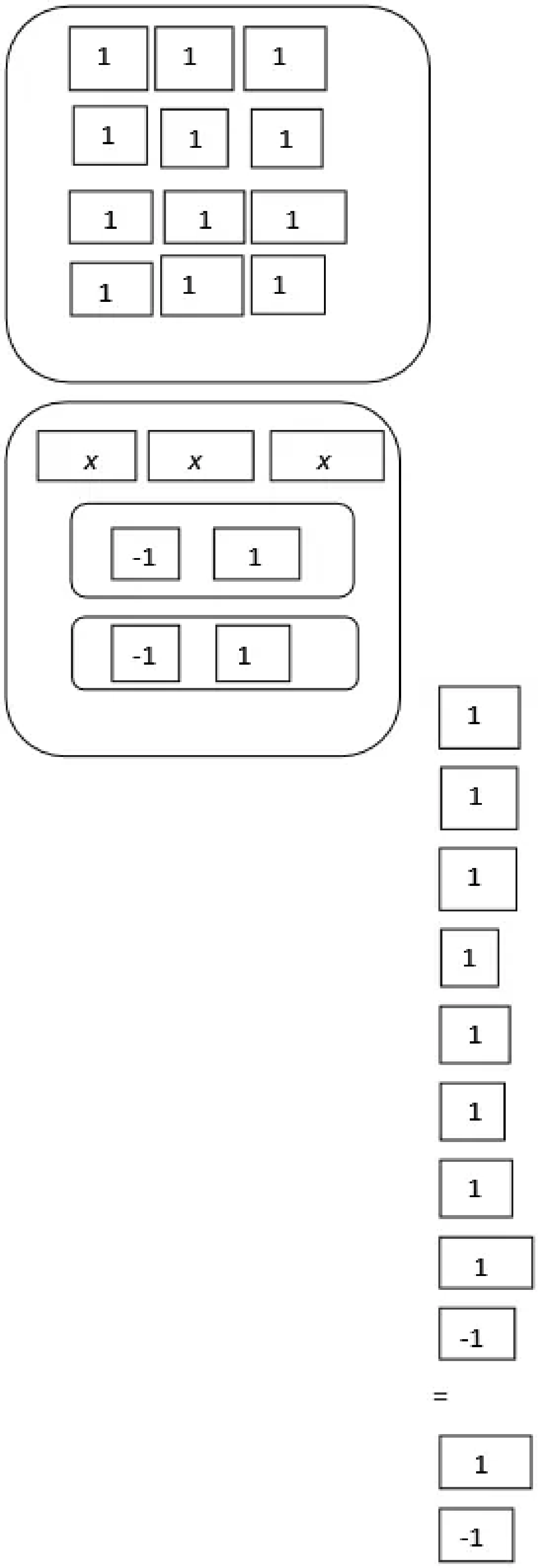
$3x - 2 + 2 = 10 + 2$

Since there are 2 negative 1 tiles with the *x* tiles, add 2 positive 1 tiles to each side to form zero pairs.

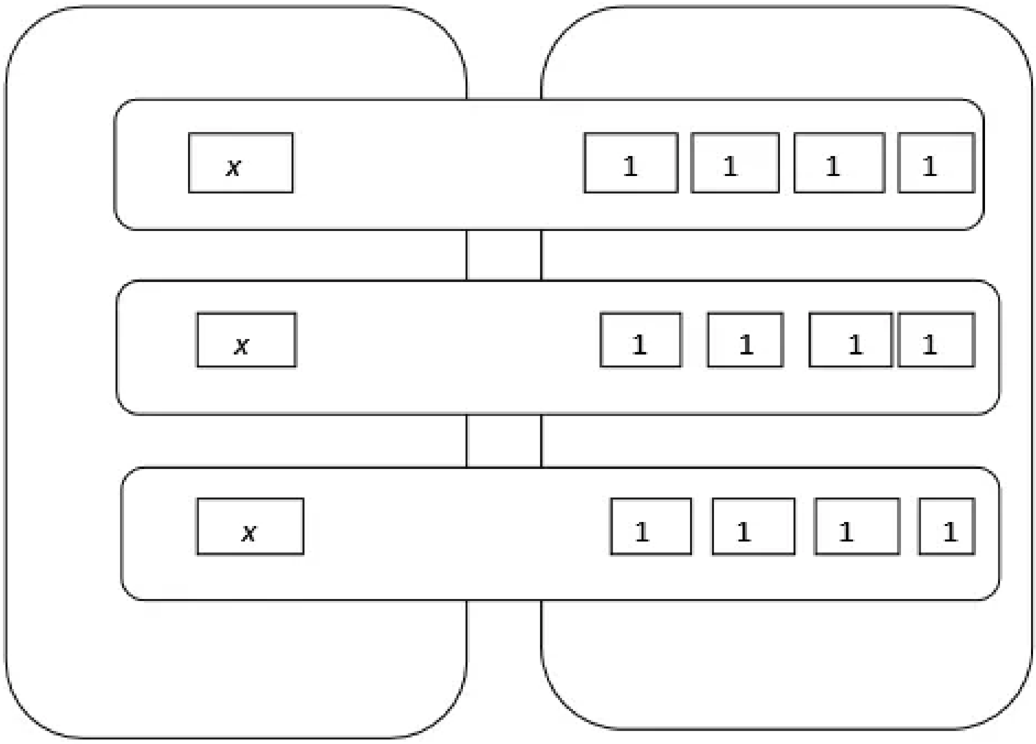
Step 3 : Remove zero pairs.



$3x = 12$

Group the tiles to form zero pairs and remove the zero pairs.

Step 4: Group the tiles.



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$$\frac{3x}{3} = \frac{12}{3}$$

Separate the tiles into 3 equal groups to match the 3 *x* tiles. Each *x* tile is paired with 4 positive 1 tiles. Thus, $x = 4$

Consider the equation $8n = -72$

Method 1:

$8n = -72$	original equation
$8n(8) = -72(8)$	multiply by 8 on each side
$n = -576$	simplify

Method 2:

$8n = -72$	original equation
$\frac{8n}{8} = \frac{-72}{8}$	divide by 8 on each side
$n = -9$	simplify

Answer 3PQ.

Since in method 1, while calculating, $64n$ is interpreted as, n and the value of *n* is -576.

Therefore, the second method is correct.

Solving an equation involves various operations like addition, subtraction, multiplication and division. Consider the equation,

$d + 18 = -27$ ......(1)

Equation(1) is solved in following steps:

$d + 18 = -27$	original equation
$d + 18 - 18 = -27 - 18$	subtract 18 from each side
$d = -45$	simplify

Check the result $d = -45$.

$$\begin{aligned} d + 18 &= -27 && \text{original equation} \\ -45 + 18 &= -27 && \text{substitute } -45 \text{ for } d \\ -27 &= -14 && \text{the solution is } -45 \end{aligned}$$

Therefore, the final answer is $d = -45$

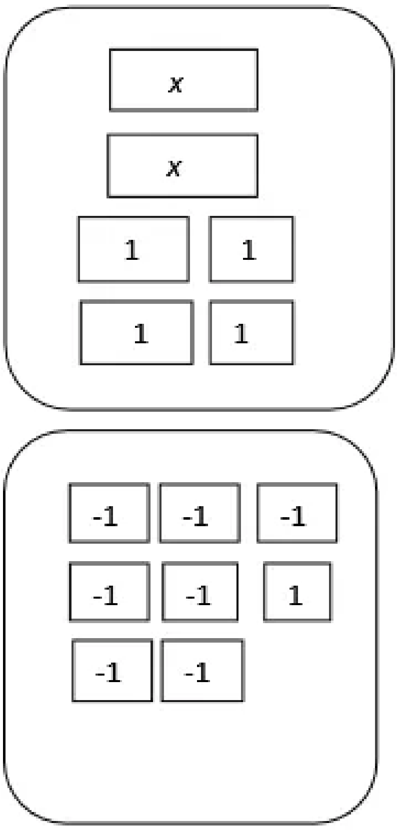
Answer 4AA.

Solving an equation involves operations like addition, subtraction, multiplication and division. Consider the expression,

$2x + 4 = -8$ ......(1)

Equation(1) is solved in the following ways.

Step 1: Model the equation.



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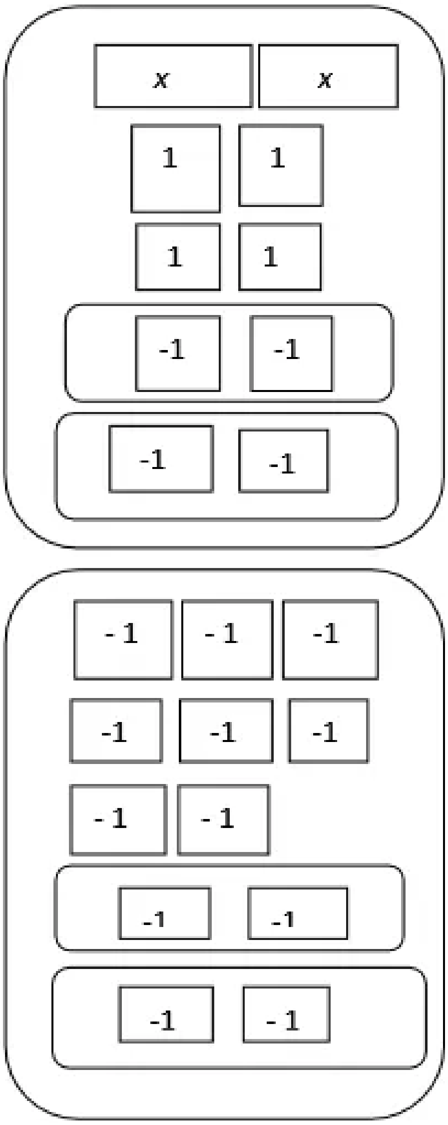
$2x+4=-8$

Place 2 *x* tiles and 4 positive 1 tiles on side of the mat. Place 8 negative 1 tiles on the other side of the mat.

Step 2 : Isolate the *x* term.



Answer 4CU.

For any numbers *a*, *b* and *c* if $a=b,$ then $ac=bc$.

Consider the equation,

$-2g=-84$ ....(1)

Multiply equation(1) by $\left(-\frac{1}{2}\right)$ on both sides. Therefore, equation(1) becomes

$$(-2g)\cdot\left(-\frac{1}{2}\right)=(-84)\cdot\left(-\frac{1}{2}\right)$$

$$g=42$$

CHECK

$$\begin{aligned} -2g &= -84 \quad \text{original equation} \\ -2(42) &= -84 \quad \text{substitute 42 for } g \\ -84 &= -84 \quad \text{the solution is 42} \end{aligned}$$

Hence the final answer is $g = 42$.

Answer 4PQ.

Solving an equation involves various operations like addition, subtraction, multiplication and division. Consider the equation,

$m - 77 = -61$ ......(1)

Equation(1) is solved in following steps:

$$\begin{aligned} m - 77 &= -61 && \text{original equation} \\ m - 77 + 77 &= -61 + 77 && \text{add 77 to each side} \\ m &= 16 && \text{simplify} \end{aligned}$$

Check the result $m = 16$.

$$\begin{aligned} m - 77 &= -61 \quad \text{original equation} \\ 16 - 77 &= -61 \quad \text{substitute 16 for } m \\ -61 &= -61 \quad \text{the solution is 16} \end{aligned}$$

Therefore, the final answer is $m = 16$

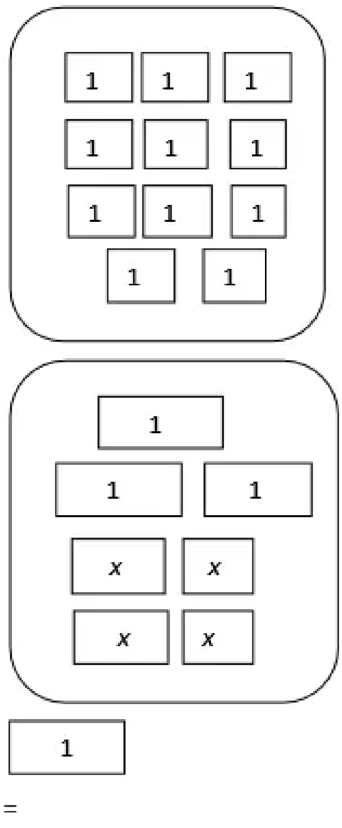
Answer 5AA.

Solving an equation involves operations like addition, subtraction, multiplication and division. Consider the expression,

$4x + 3 = 11$ ......(1)

Equation(1) is solved in the following ways.

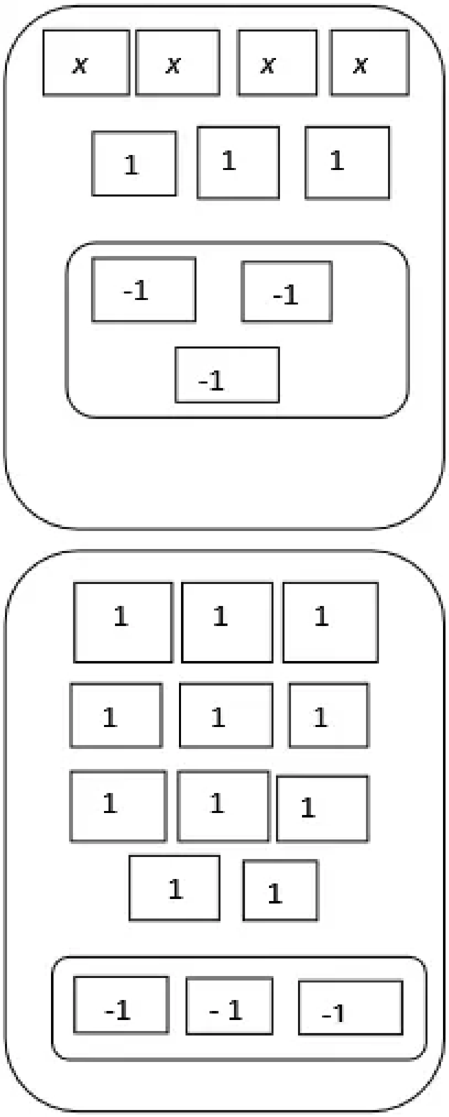
Step 1: Model the equation.



$3+4x=11$

Place 4 *x* tiles and 3 positive 1 tiles on side of the mat. Place 11 positive 1 tiles on the other side of the mat.

Step 2 : Isolate the *x* term.



x

x

1

=

1

1

1

-1

-1

-1

-1

$$4x + 3 - 3 = 11 - 3$$

Since there are 3 positive 1 tiles with the *x* tiles, add 3 negative 1 tiles to each side to form zero pairs.

Answer 5CU.

For any numbers *a*, *b* and *c* if $a = b$,then $ac = bc$.

Consider the equation,

$$\frac{t}{7} = -5 \quad \text{......(1)}$$

Multiply equation(1) by 7 on both sides. Therefore, equation(1) becomes

$$\frac{t}{7} \cdot 7 = (-5) \cdot 7$$
$$t = -35$$

CHECK

$$\frac{t}{7} = -5 \quad \text{original equation}$$
$$\frac{-35}{7} = -5 \quad \text{substitute } -35 \text{ for } t$$
$$-5 = -5$$

Hence the final answer is $t = -35$.

Answer 5PQ.

Solving an equation involves various operations like addition, subtraction, multiplication and division. Consider the equation,

$$-12 + a = -36 \quad \text{......(1)}$$

Equation(1) is solved in following steps:

$$\begin{aligned} -12 + a &= -36 && \text{original equation} \\ -12 + a + 12 &= -36 + 12 && \text{add 12 to each side} \\ a &= -24 && \text{simplify} \end{aligned}$$

Check the result $a = -24$.

$$\begin{aligned} -12 + a &= -36 && \text{original equation} \\ -12 - 24 &= -36 && \text{substitute } -24 \text{ for } a \\ -36 &= -36 && \text{the solution is } -24 \end{aligned}$$

Therefore, the final answer is $a = -24$

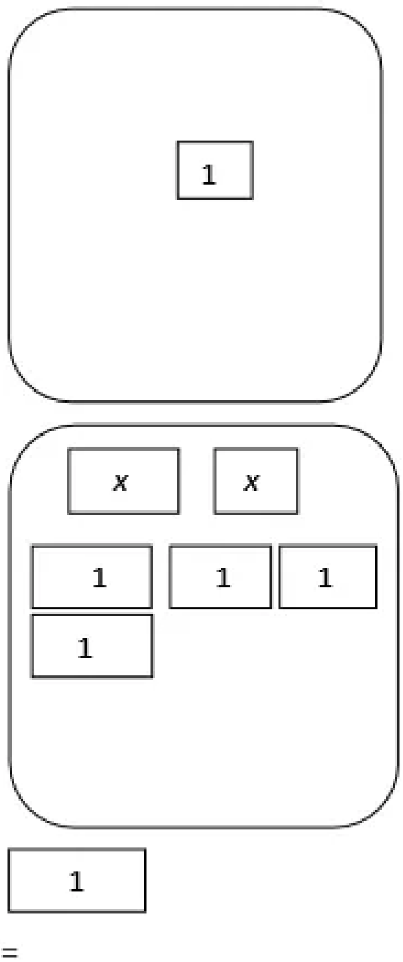
Answer 6AA.

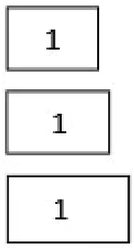
Solving an equation involves operations like addition, subtraction, multiplication and division. Consider the expression,

$$2x + 7 = 1 \quad \text{......(1)}$$

Equation(1) is solved in the following ways.

Step 1: Model the equation.

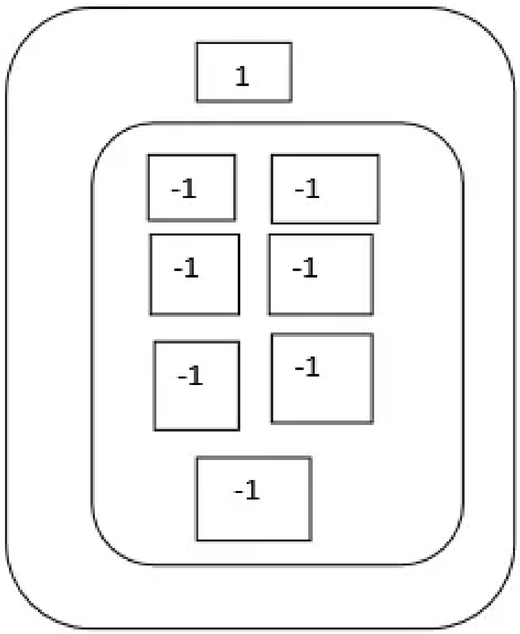


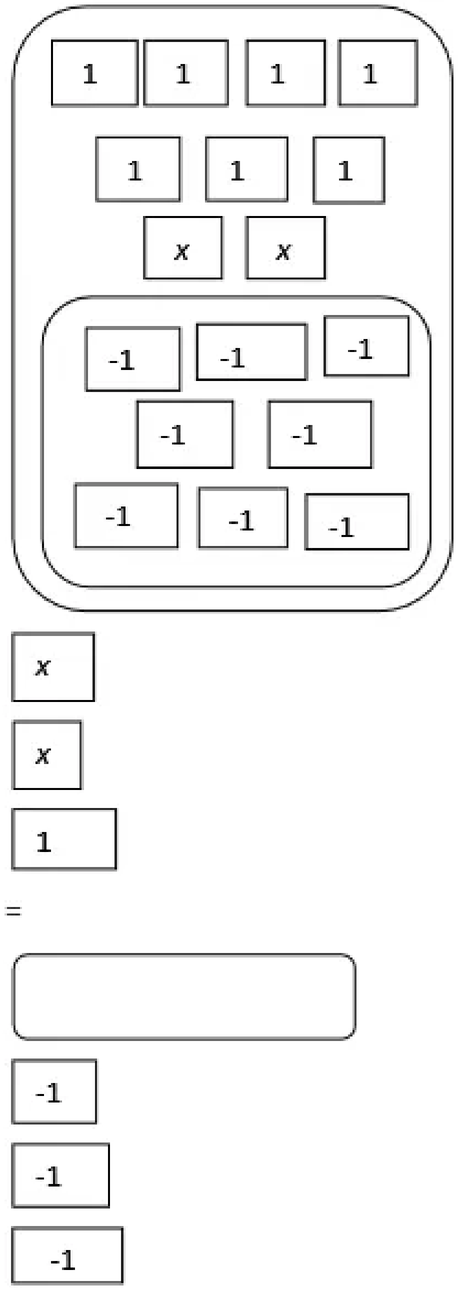


$2x + 7 = 1$

Place 2 *x* tiles and 7 positive 1 tiles on side of the mat. Place 1 positive 1 tiles on the other side of the mat.

Step 2 : Isolate the *x* term.

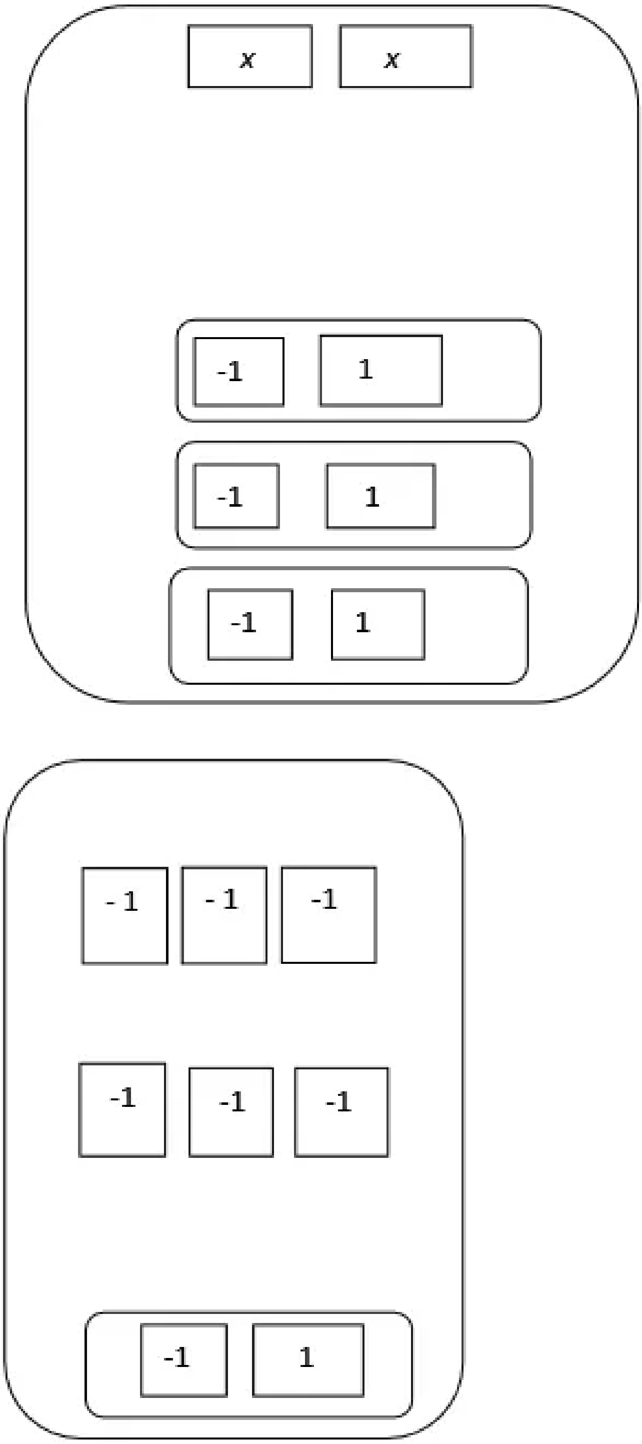


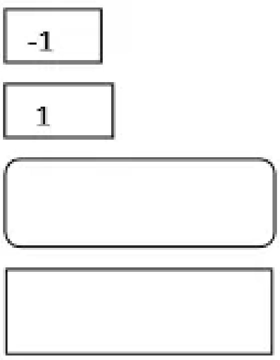


$$2x+7-7=1-7$$

Since there are 7 positive 1 tiles with the *x* tiles, add 7s negative 1 tiles to each side to form zero pairs.

Step 3 : Remove zero pairs.





1

-1

1

1

1

1

-1

1

-1

1

1

1

1

-1

=

- 1

1

-1

$2x = -6$

Group the tiles to form zero pairs and remove the zero pairs.

Step 4: Group the tiles.

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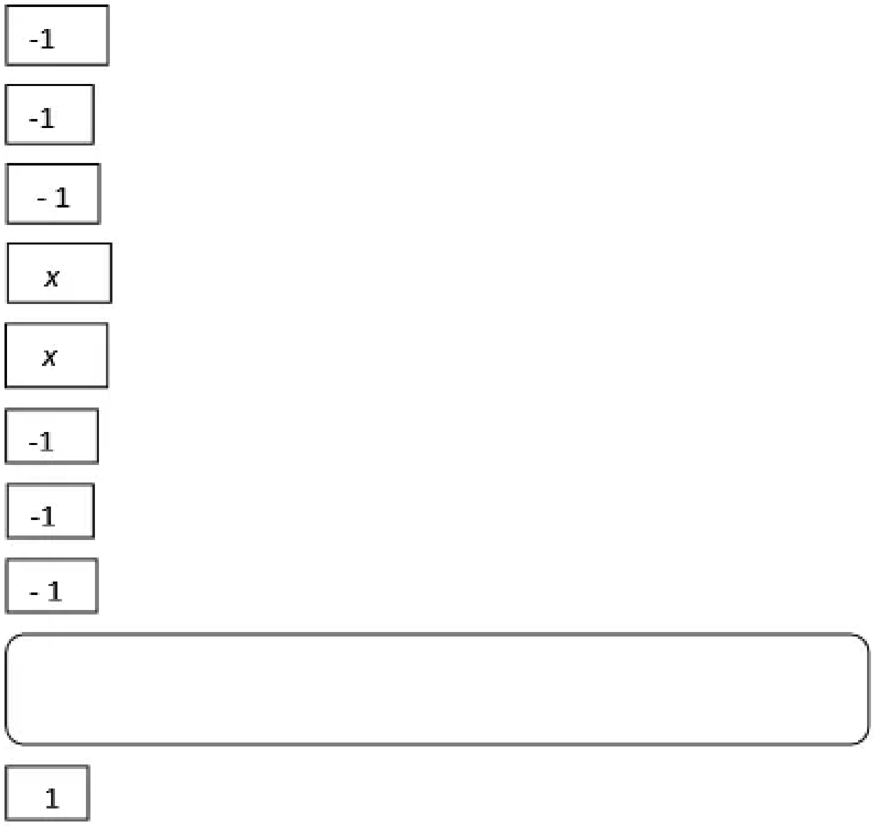


$$\frac{2x}{2}=\frac{-6}{2}$$

Separate the tiles into 2 equal groups to match the 4 *x* tiles. Each *x* tile is paired with 3 negative 1 tiles. Thus, $x=-3$

Answer 6CU.

For any numbers *a*, *b* and *c* ,if $a=b$,then $ac=bc$.

Consider the equation

$$\frac{a}{36}=\frac{4}{9} \quad ......(1)$$

Multiply equation(1) by 36 on both sides. Then equation(1) becomes

$$\frac{a}{36}\cdot 36=\frac{4}{9}.36$$
$$a=\frac{144}{9}$$
$$a=16$$

CHECK

$$\frac{a}{36}=\frac{4}{9} \quad \text{original equation}$$
$$\frac{16}{36}=\frac{4}{9} \quad \text{substitute 16 for } a$$
$$\frac{4}{9}=\frac{4}{9} \quad \text{on simplification}$$

Hence the final answer is $a=16$.

Answer 6PQ.

Solving an equation involves various operations like addition, subtraction, multiplication and division. Consider the equation,

$t-(-16)=9$ ......(1)

Equation(1) is solved in following steps:

$$\begin{aligned} t-(-16)&=9 && \text{original equation} \\ t+16&=9 && \text{simplify} \\ t+16-16&=9-16 && \text{subtract } 16 \text{ from each side} \\ t&=-7 && \text{simplify} \end{aligned}$$

Check the result $t=-7$.

$$\begin{aligned} t-(-16)&=9 && \text{original equation} \\ t+16&=9 && \text{simplify} \\ -7+16&=9 && \text{substitute } -7 \text{ for } t \\ 9&=9 && \text{the solution is } -7 \end{aligned}$$

Therefore, the final answer is $t=-7$

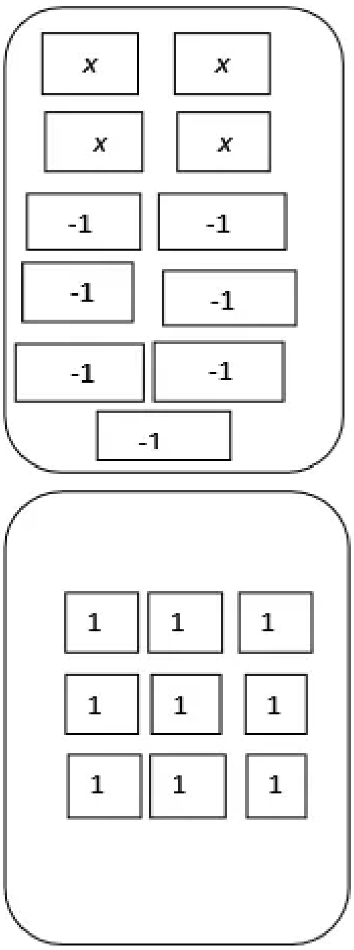
Answer 7AA.

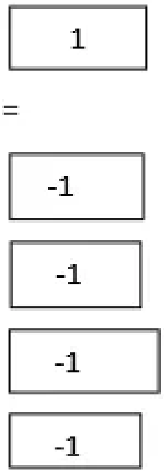
Solving an equation involves operations like addition, subtraction, multiplication and division. Consider the expression,

$4x-7=9$ ......(1)

Equation(1) is solved in the following ways.

Step 1: Model the equation.

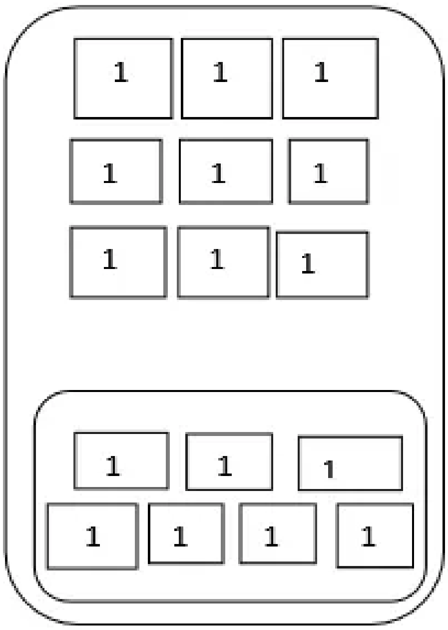


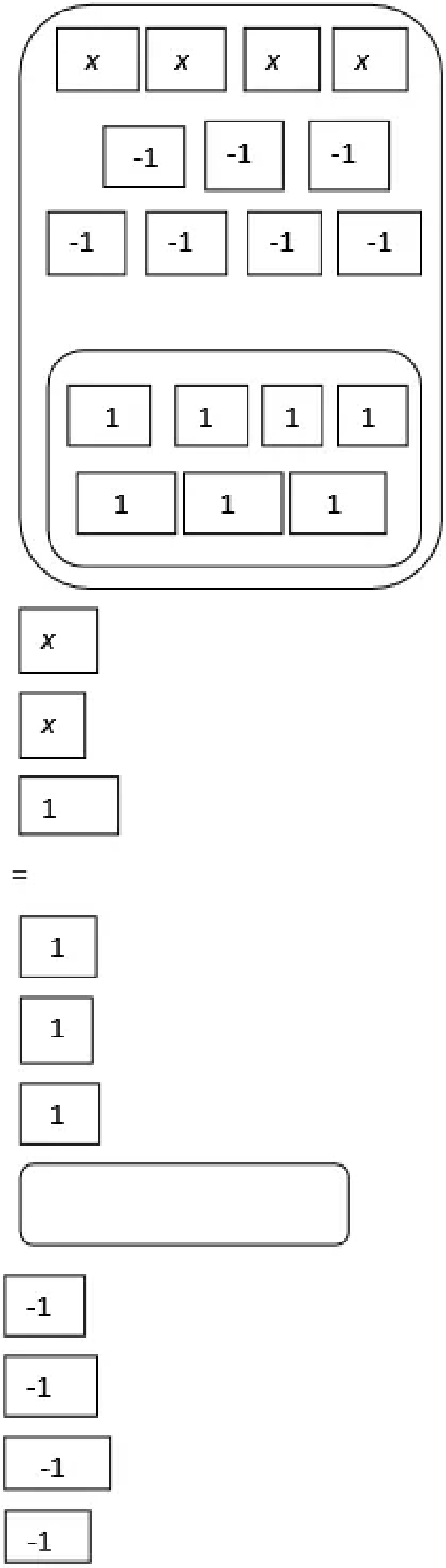


$4x - 7 = 9$

Place 4 *x* tiles and 7 negative 1 tiles on side of the mat. Place 9 positive 1 tiles on the other side of the mat.

Step 2 : Isolate the *x* term.

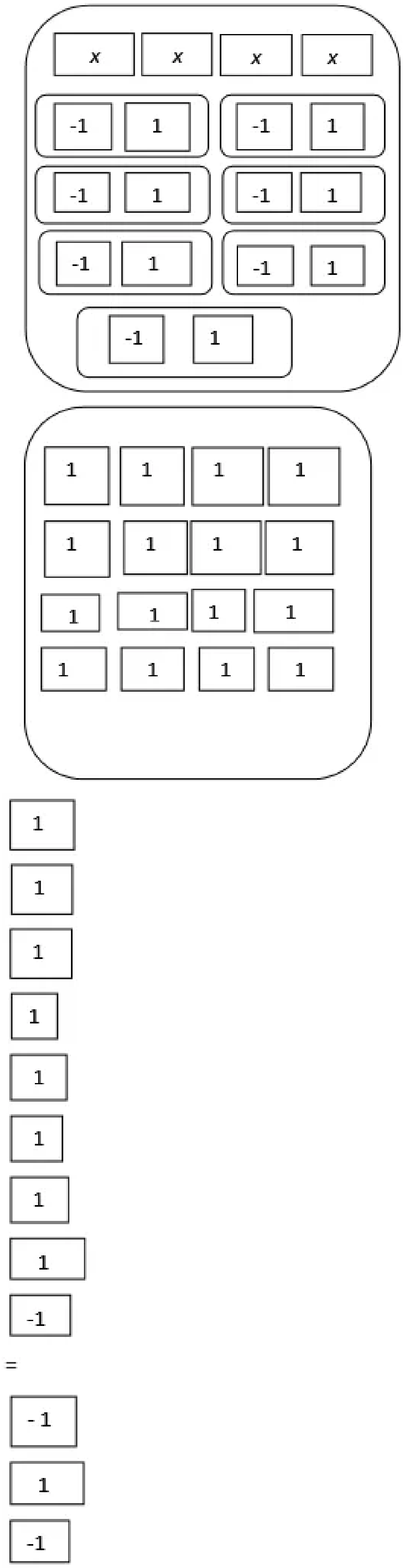




$4x-7+7=9+7$

Since there are 7 negative 1 tiles with the *x* tiles, add 7positive 1 tiles to each side to form zero pairs.

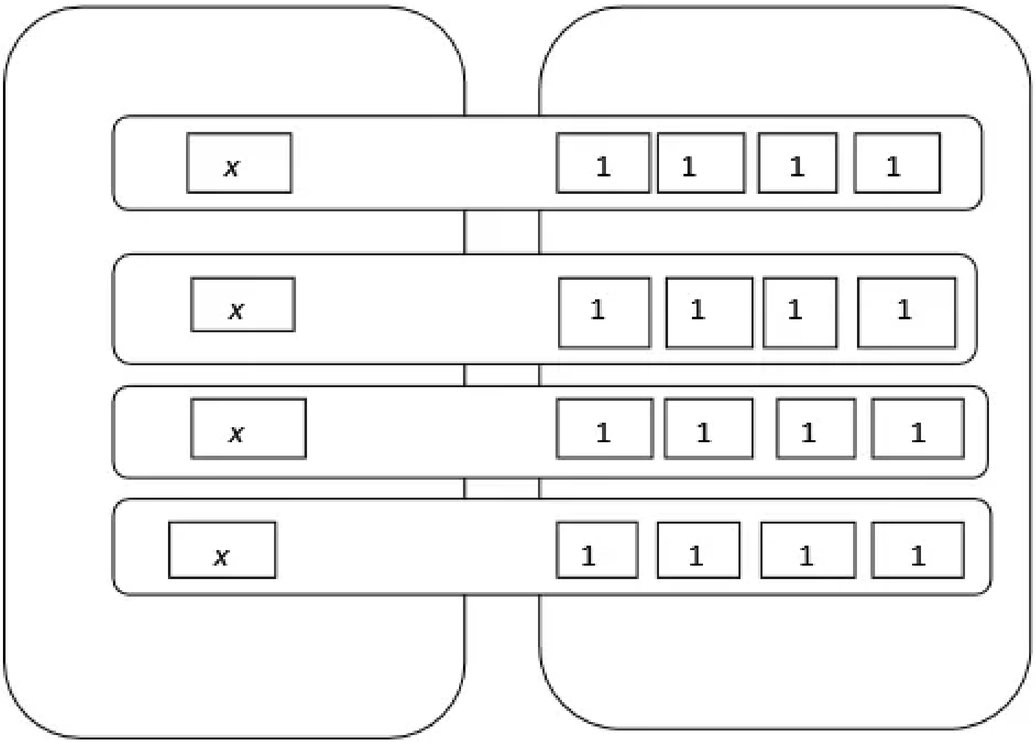
Step 3 : Remove zero pairs.



$4x = 16$

Group the tiles to form zero pairs and remove the zero pairs.

Step 4: Group the tiles.



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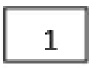


$$\frac{4x}{4} = \frac{16}{4}$$

Separate the tiles into 4 equal groups to match the 4 *x* tiles. Each *x* tile is paired with 4 positive 1 tiles. Thus, $x = 4$

Answer 7CU.

For any numbers *a*, *b* and *c* ,if $a = b$,then $ac = bc$.

Consider the equation

$$\frac{4}{5}k = \frac{8}{9} \quad ....(1)$$

Multiply equation(1) by $\frac{5}{4}$ on both sides. Then equation(1) becomes

$$\frac{5}{4} \cdot \frac{4}{5}k = \frac{5}{4} \cdot \frac{8}{9}$$

$$k = \frac{10}{9}$$

CHECK

$\frac{4}{5}k = \frac{8}{9}$ original equation

$\frac{4}{5} \cdot \frac{10}{9} = \frac{8}{9}$ substitute $\frac{10}{9}$ for k

$\frac{8}{9} = \frac{4}{9}$ on simplification

Hence the final answer is $k = \frac{10}{9}$.

Answer 7PQ.

For any numbers *a*, *b* and *c* with if $a = b$ then

$ac = bc$ ......(1)

Consider the equation,

$\frac{2}{3}p = 18$ ....(2)

Apply equation(1) to equation(2).That is, multiply equation(2) by 3.

Therefore, equation(2) becomes

$$\frac{2}{3}p \cdot 3 = 18 \cdot 3 \quad \text{multiply by 3 on both sides}$$

$$2p = 54 \quad \text{simplify}$$

$$\frac{2p}{2} = \frac{54}{2} \quad \text{divide by 2 on each side}$$

$$p = 27 \quad \text{simplify}$$

Hence the value of $p = 27$ .Check this result.

CHECK

$$\frac{2}{3}p = 18 \quad \text{original equation}$$

$$\frac{2}{3} \cdot 27 = 18 \quad \text{substitute 27 for } p$$

$$\frac{54}{3} = 18 \quad \text{simplify}$$

$$18 = 18 \quad \text{the solution is 27}$$

Therefore the final answer is $p = 27$

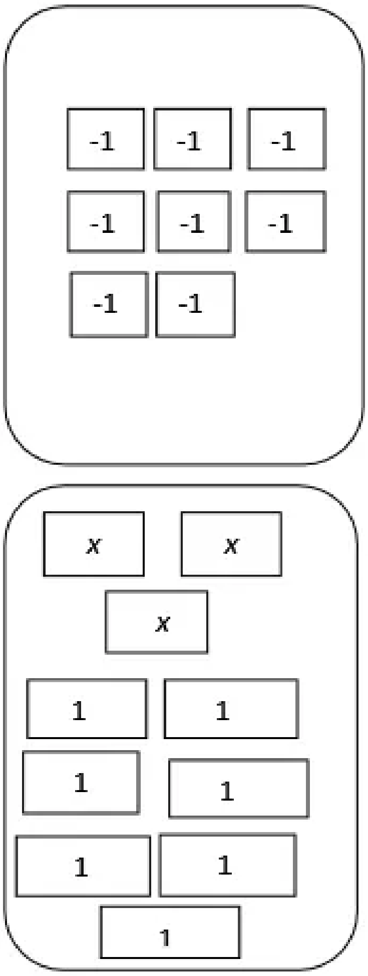
Answer 8AA.

Solving an equation involves operations like addition, subtraction, multiplication and division.
Consider the expression,

$3x + 7 = -8$ ......(1)

Equation(1) is solved in the following ways.

Step 1: Model the equation.



1

=

-1

-1

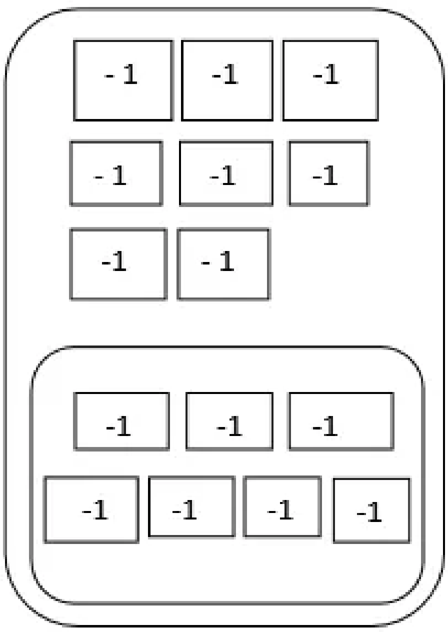
-1

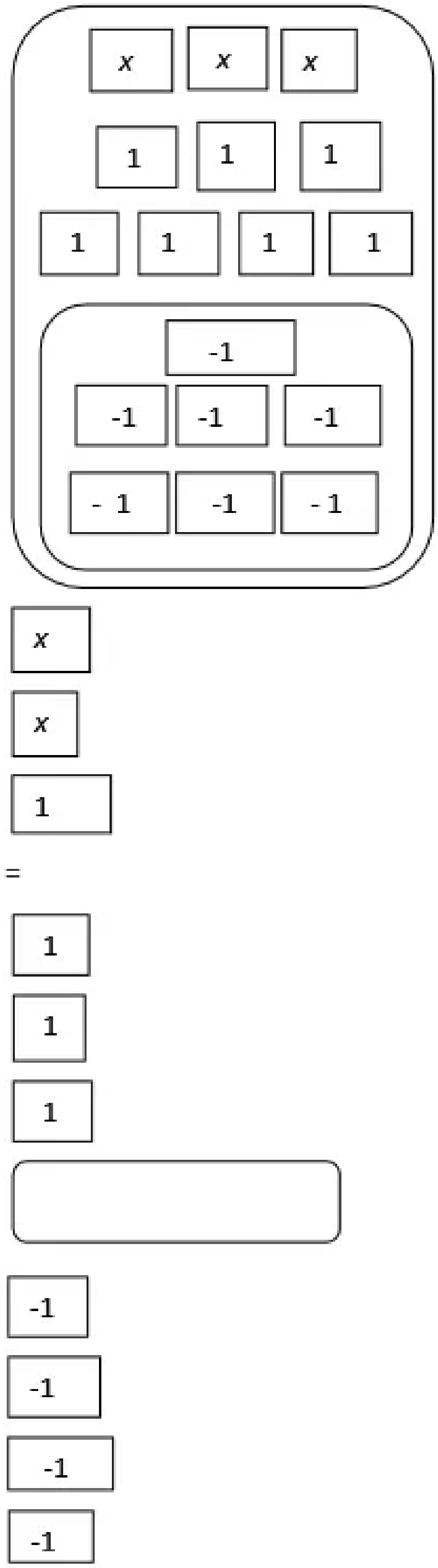
-1

$3x+7=-8$

Place 3 *x* tiles and 7 positive 1 tiles on side of the mat. Place 8 negative 1 tiles on the other side of the mat.

Step 2 : Isolate the *x* term.

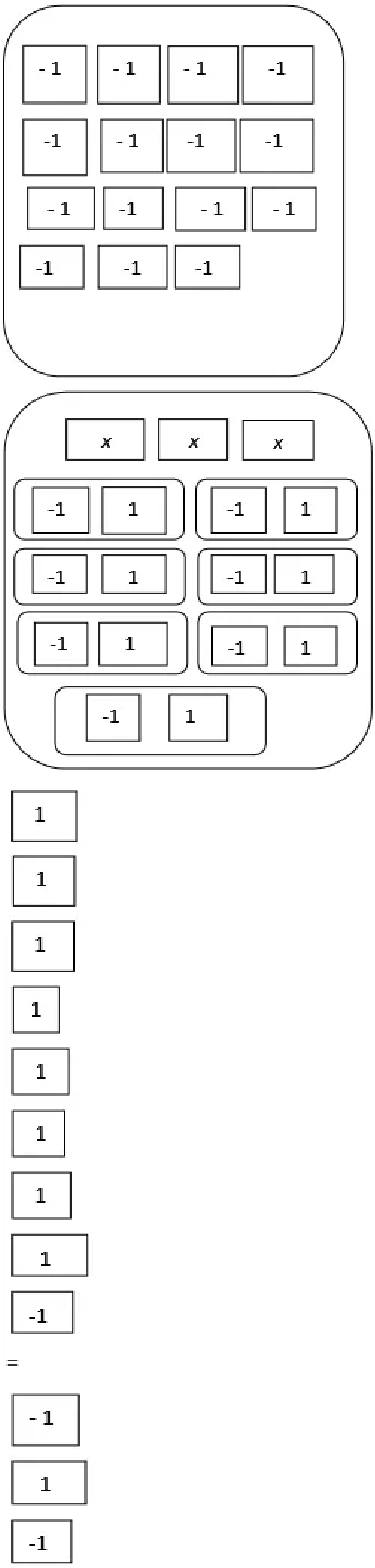




$3x + 7 - 7 = -8 - 7$

Since there are 7 positive 1 tiles with the *x* tiles, add 7 negative 1 tiles to each side to form zero pairs.

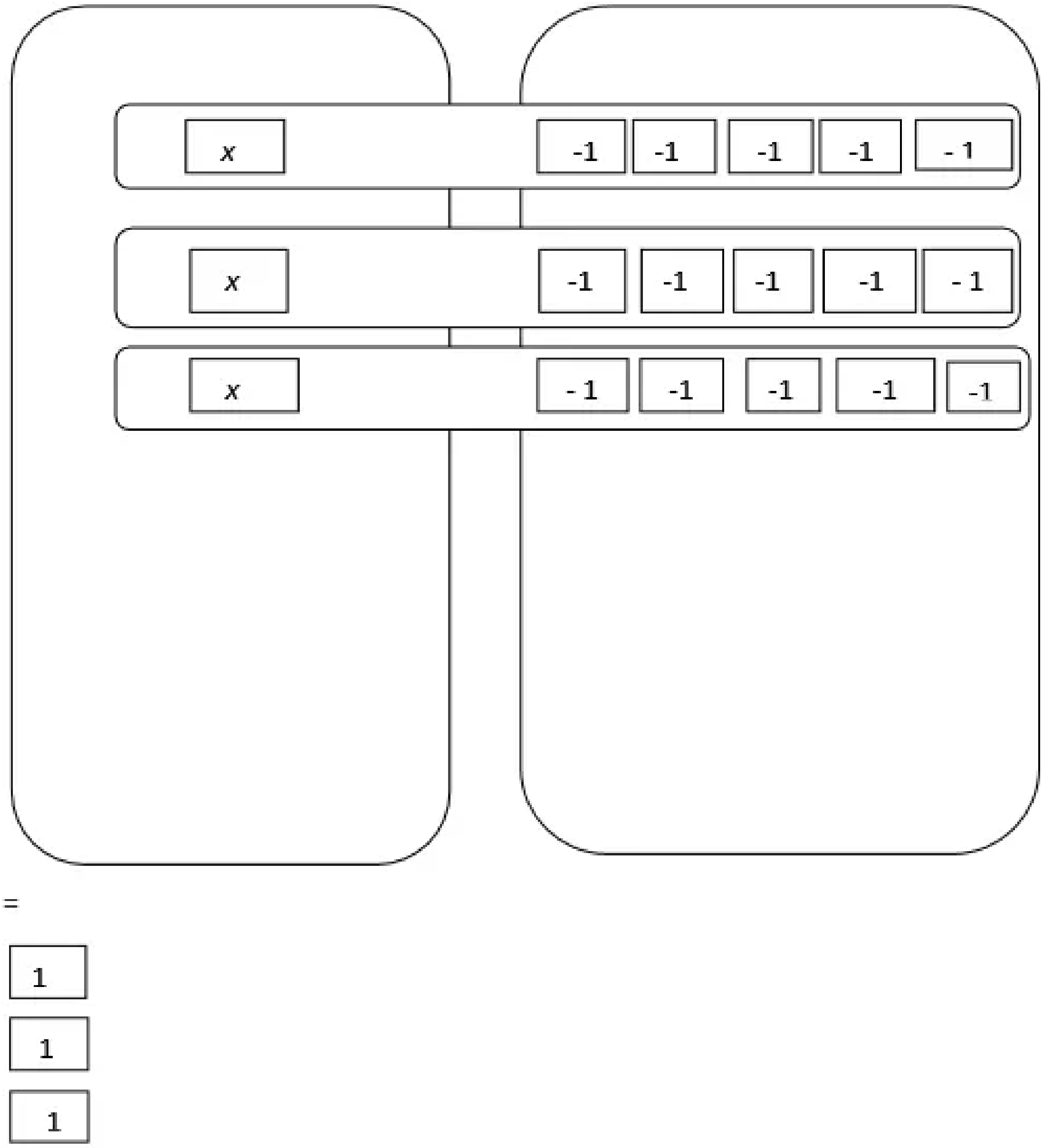
Step 3 : Remove zero pairs.



$3x = -15$

Group the tiles to form zero pairs and remove the zero pairs.

Step 4: Group the tiles.



Answer 8CU.

For any numbers *a*, *b* and *c* ,if $a = b$,then $ac = bc$.

Consider the equation

$3.15 = 1.5\text{y}$ ......(1)

Multiply equation(1) by $\frac{1}{1.5}$ on both sides. Then equation(1) becomes

$$\frac{1}{1.5}\cdot(3.15) = \frac{1}{1.15}\cdot(1.15y)$$
$$\left(\frac{3.15}{1.5}\right) = y$$
$$2.1 = y$$

CHECK

$3.15{=}1.5\text{y}$	original equation
$3.15{=}1.5(2.1)$	substitute 2.1 for y
$3.15{=}3.15$	on multiplication

Hence the final answer is $y = 2.1$.

Answer 8PQ.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$$\frac{a}{c} = \frac{b}{c} \quad \text{......(1)}$$

Consider the equation,

$$-17y = 391 \quad \text{.......(2)}$$

Since $-17 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\frac{-17y}{-17} = \frac{391}{-17} \quad \text{divide by } -17 \text{ on both sides}$$

$$y = -23 \quad \text{simplify}$$

Hence the value of $y = -23$ .Check this result

CHECK

$$-17y = 391 \quad \text{original equation}$$

$$-17(-23) = 391 \quad \text{substitute } -23 \text{ for } y$$

$$391 = 391 \quad \text{the solution is } -23$$

Therefore the final answer is $y = -23$

Answer 9AA.

Solving an equation involves operations like addition, subtraction, multiplication and division. Consider the equation,

$$7x - 12 = -61 \quad \text{......(1)}$$

Equation(1) can be solved as,

$$7x - 12 + 12 = -61 + 12 \quad \text{add 12 to each side}$$

$$7x = -49$$

$$\frac{7x}{7} = -\frac{49}{7} \quad \text{divide by 7 on each side}$$

$$x = -7$$

Thus, we get $x = -7$.

CHECK

$$7x - 12 = -61 \quad \text{original equation}$$

$$7(-7) - 12 = -61 \quad \text{substitute } -7 \text{ for } x$$

$$-49 - 12 = -61$$

$$-61 = -61 \quad \text{the solution is } -7$$

Therefore, the required answer is $x = -7$.

Answer 9CU.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

For any numbers *a*, *b* and *c* if $a = b$,then

$ac = bc$ ......(2)

Consider the equation,

$\left(3\frac{1}{4}\right)p = 2\frac{1}{2}$ ......(3)

Equation(3) can be expressed as,

$\frac{13}{4}p = \frac{5}{2}$ Rewrite each mixed number as an improper fraction ......(4)

Apply equation(2) to equation(4). That is, multiply equation (4) by 4 on both sides .

Therefore, equation(4) becomes,

$$4 \cdot \frac{13}{4}p = 4 \cdot \frac{5}{2}$$
$$13p = \frac{20}{2} \quad \text{simplify}$$
$$13p = 10 \quad \text{simplify}$$

Consider the equation,

$13p = 10$ ......(5)

Since $13 \neq 0$,apply equation(1) to equation(5).That is, divide equation(5) by 13 on both sides .Hence equation(5) becomes,

$$\frac{13}{13}p = \frac{10}{13}$$
$$p = \frac{10}{13} \quad \text{simplify}$$

Thus, we get $p = \frac{10}{13}$ .Check the value of *p* is correct or not.

CHECK

$$\left(3\frac{1}{4}\right)p = 2\frac{1}{2} \quad \text{originalequation}$$
$$\frac{13}{4}p = \frac{5}{2} \quad \text{rewrite each mixed number as an improper fraction}$$
$$\frac{13}{4} \cdot \frac{10}{13} = \frac{5}{2} \quad \text{substitute } \frac{10}{13} \text{ for } p$$
$$\frac{130}{52} = \frac{5}{2}$$
$$\frac{5}{2} = \frac{5}{2} \quad \text{simplify}$$

Therefore, the value of $p=\frac{10}{13}$.

Answer 9PQ.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a=b$ then

$\frac{a}{c}=\frac{b}{c}$ ......(1)

Consider the equation,

$5x=-45$ ....(2)

Since $5 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\frac{5x}{5}=\frac{-45}{5} \quad \text{divide by 5 on both sides}$$
$$x=-9 \quad \text{simplify}$$

Hence the value of $x=-9$ .Check this result

CHECK

$$5x=-45 \quad \text{original equation}$$
$$5(-9)=-45 \quad \text{substitute } -9 \text{ for } x$$
$$-45=-45 \quad \text{the solution is } -9$$

Therefore the final answer is $x=-9$

Answer 10CU.

For any numbers *a*, *b* and *c* with $c \neq 0$,if $a=b$, then

$\frac{a}{c}=\frac{b}{c}$ ......(1)

Consider the statement, five times a number is 120 .This statement can be expressed as,

$$\underbrace{\text{Five}}_{5}\underbrace{\text{times}}_{\times}\underbrace{\text{a number}}_{n}\underbrace{\text{is}}_{=}\underbrace{120}_{120}$$

$$5n=120 \quad \text{original equation}$$
$$\frac{5n}{5}=\frac{120}{5} \quad \text{apply equation(1) and divide each side by 5}$$
$$n=24 \quad \text{simplify}$$

Thus, we get $n=24$ .Check this result.

CHECK

$$5n=120 \quad \text{original equation}$$
$$5.24=120 \quad \text{substitute 24 for } n$$
$$120=120$$

Therefore, the value of $n=24$.

Answer 10PQ.

For any numbers *a*, *b* and *c* with if $a = b$ then

$ac = bc$ ......(1)

Consider the equation,

$-\frac{2}{5}d = -10$ ....(2)

Apply equation(1) to equation(2).That is, multiply equation(2) by 3.

Therefore, equation(2) becomes

$$-\frac{2}{5}d \cdot 5 = -10 \cdot 5 \quad \text{multiply by 5 on both sides}$$
$$-2d = -50 \quad \text{simplify}$$
$$\frac{-2d}{-2} = \frac{-50}{-2} \quad \text{divide by } -2 \text{ on each side}$$
$$d = 25 \quad \text{simplify}$$

Hence the value of $d = 25$ .Check this result.

CHECK

$$-\frac{2}{5}d = -10 \quad \text{original equation}$$
$$-\frac{2}{5} \cdot 25 = -10 \quad \text{substitute 25 for } d$$
$$-\frac{50}{5} = -10 \quad \text{simplify}$$
$$-10 = -10 \quad \text{the solution is 25}$$

Therefore the final answer is $d = 25$

Answer 11CU.

For any numbers *a*, *b* and *c* with $c \neq 0$,if $a = b$, then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

Consider the statement, two fifths of a number equals -24 .This statement can be expressed as,

$$\underbrace{\text{two fifths}}_{\frac{2}{5}}\underbrace{\text{of}}_{\times}\underbrace{\text{a number}}_{n}\underbrace{\text{is}}_{=}\underbrace{-24}_{-24}$$

$$\frac{2}{5}n = -24 \quad \text{original equation}$$
$$5.\frac{2}{5}n = 5.(-24) \quad \text{multiply each side by 5}$$
$$2n = -120 \quad \text{simplify}$$
$$\frac{2n}{2} = -\frac{120}{2} \quad \text{apply equation(1) and divide each side by 2}$$
$$n = -60 \quad \text{simplify}$$

Thus, we get $n = -60$ .Check this result.

CHECK

$$\frac{2}{5}n = -24 \quad \text{original equation}$$
$$\frac{2}{5}(-60) = -24 \quad \text{substitute } -60 \text{ for } n$$
$$-\frac{120}{5} = -24$$
$$-24 = -24$$

Therefore, the value of $n = -60$.

12CU.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

Let discharge of a river be *D*, width of the river be *w*, depth of the river be *d* and speed of the river be *S*. These notations are related as,

$$\underbrace{\text{Discharge of a river}}_{D}\underbrace{\text{is}}_{=}\underbrace{\text{width}}_{w}\underbrace{\text{times}}_{\times}\underbrace{\text{depth}}_{d}\underbrace{\text{times}}_{\times}\underbrace{\text{speedofriver}}_{S}$$

$D = wdS \quad$ original equation

Thus, we get $D = wdS$ ......(2)

Substitute $w = 533\ m, S = 0.6\ m/s, D = 3198\ m^3/s$ in equation(2).Therefore, equation(2) becomes

$$D = wdS \quad \text{original equation}$$
$$3198 = (533)d(0.6) \quad \text{substitute the values}$$
$$3198 = 319.8d \quad \text{simplify}$$
$$\frac{3198}{319.8} = \frac{319.8}{319.8}d \quad \text{divide by 319.8 one each side}$$
$$10\ m = d \quad \text{simplify}$$

Thus, we get $d = 10\ m$.

Hence, average depth of the river is 10 meters

Answer 13PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

Consider the equation,

$-5r = 55$ ....(2)

Since $-5 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\frac{-5r}{-5}=\frac{55}{-5} \quad \text{divide by } -5 \text{ on both sides}$$
$$r=-11 \quad \text{simplify}$$

Hence the value of $r=-11$ .Check this result.

CHECK

$$-5r=55 \quad \text{original equation}$$
$$-5(-11)=55 \quad \text{substitute } -11 \text{ for } r$$
$$55=55 \quad \text{the solution is } -11$$

Therefore the final answer is $r=-11$

Answer 14PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a=b$ then

$\frac{a}{c}=\frac{b}{c}$ ......(1)

Consider the equation,

$8d=48$ ....(2)

Since $8 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\frac{8d}{8}=\frac{48}{8} \quad \text{divide by 8 on both sides}$$
$$d=6 \quad \text{simplify}$$

Hence the value of $d=6$.

CHECK

$$8d=48 \quad \text{original equation}$$
$$8(6)=48 \quad \text{substitute 6 for } d$$
$$48=48 \quad \text{the solution is 6}$$

Therefore the final answer is $d=6$

Answer 15PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a=b$ then

$\frac{a}{c}=\frac{b}{c}$ ......(1)

Consider the equation,

$-910=-26a$ ....(2)

Since $-26 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\frac{-910}{-26} = \frac{-26a}{-26} \quad \text{divide by } -26 \text{ on both sides}$$
$$35 = a \quad \text{simplify}$$

Hence the value of $a = 35$.

CHECK

$$-910 = -26a \quad \text{original equation}$$
$$-910 = -26(35) \quad \text{substitute 35 for } a$$
$$-910 = -910 \quad \text{the solution is 35}$$

Therefore the final answer is $a = 35$

Answer 16PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

Consider the equation,

$-1634 = 86s$ ....(2)

Since $86 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\frac{-1634}{86} = \frac{86s}{86} \quad \text{divide by 86 on both sides}$$
$$-19 = s \quad \text{simplify}$$

Hence the value of $s = -19$.

CHECK

$$-1634 = 86s \quad \text{original equation}$$
$$-1634 = 86(-19) \quad \text{substitute } -19 \text{ for } s$$
$$-1634 = -1634 \quad \text{the solution is } -19$$

Therefore the final answer is $s = -19$

Answer 17PA.

For any numbers *a*, *b* and *c* with if $a = b$ then

$ac = bc$ ......(1)

Consider the equation,

$\frac{b}{7} = -11$ ....(2)

Apply equation(1) to equation(2).That is, multiply equation(2) by 7.

Therefore, equation(2) becomes

$$\frac{b}{7}\cdot 7 = -11\cdot 7 \quad \text{multiply by 7 on both sides}$$

$$b = -77 \quad \text{simplify}$$

Hence the value of $b = -77$.

CHECK

$$\frac{b}{7} = -11 \quad \text{original equation}$$

$$\frac{-77}{7} = -11 \quad \text{substitute } -77 \text{ for } b$$

$$-11 = -11 \quad \text{the solution is } -77$$

Therefore the final answer is $b = -77$

Answer 18PA.

For any numbers *a*, *b* and *c* if $a = b$,then

$ac = bc$ ......(1)

Consider the equation

$-\frac{v}{5} = -45$ ......(2)

Apply equation(1) to equation(2).

That is, multiply equation(2) by 5 on both sides. Therefore, equation(2) becomes

$$-\frac{v}{5}\cdot 5 = -45\cdot 5$$

$$-v = -225 \quad \text{simplify}$$

$$v = 225$$

Hence we get $v = 225$

CHECK

$$-\frac{v}{5} = -45 \quad \text{original equation}$$

$$-\frac{225}{5} = -45 \quad \text{substitute 225 for } v$$

$$-45 = -45$$

Therefore, the final answer is $v = 225$

Answer 19PA.

For any numbers *a*, *b* and *c* if $a = b$,then

$ac = bc$ ......(1)

Consider the equation

$\frac{2}{3}n = 14$ ......(2)

Apply equation(1) to equation(2).

That is, multiply equation(2) by 3 on both sides. Therefore, equation(2) becomes

$$\frac{2}{3}n \cdot 3 = 14 \cdot 3$$

$$2n = 42 \quad \text{simplify}$$

$$n = 21 \quad \text{simplify}$$

Hence we get $n = 21$

CHECK

$$\frac{2}{3}n = 14 \quad \text{original equation}$$

$$\frac{2}{3} \cdot 21 = 14 \quad \text{substitute 21 for n}$$

$$\frac{42}{3} = 14 \quad \text{simplify}$$

$$14 = 14$$

Therefore, the final answer is $n = 21$

Answer 20PA.

For any numbers *a*, *b* and *c* if $a = b$,then

$ac = bc$ ......(1)

Consider the equation

$\frac{2}{5}g = -14$ ......(2)

Apply equation(1) to equation(2).

That is, multiply equation(2) by 5 on both sides. Therefore, equation(2) becomes

$$\frac{2}{5}g \cdot 5 = -14 \cdot 5$$

$$2g = -70 \quad \text{simplify}$$

$$g = -35 \quad \text{simplify}$$

Hence we get $g = -35$

CHECK

$$\frac{2}{5}g=-14 \quad \text{original equation}$$

$$\frac{2}{5}(-35)=-14 \quad \text{substitute -35 for } g$$

$$\frac{-70}{5}=-14 \quad \text{simplify}$$

$$-14=-14$$

Therefore, the final answer is $g=-35$

Answer 21PA.

For any numbers *a*, *b* and *c* if $a=b$,then

$ac=bc$ ......(1)

Consider the equation

$\frac{g}{24}=\frac{5}{12}$ ......(2)

Apply equation(1) to equation(2).

That is, multiply equation(2) by 24 on both sides. Therefore, equation(2) becomes

$$\frac{g}{24}.24=\frac{5}{12}\cdot 24$$

$$g=\frac{120}{12} \quad \text{simplify}$$

$$g=10 \quad \text{simplify}$$

Hence we get $g=10$

CHECK

$$\frac{g}{24}=\frac{5}{12} \quad \text{original equation}$$

$$\frac{10}{24}=\frac{5}{12} \quad \text{substitute 10 for } g$$

$$\frac{5}{12}=\frac{5}{12} \quad \text{simplify}$$

Therefore, the final answer is $g=10$

Answer 22PA.

For any numbers *a*, *b* and *c* if $a=b$,then

$ac=bc$ ......(1)

Consider the equation

$\frac{z}{45}=\frac{2}{5}$ ......(2)

Apply equation(1) to equation(2).

That is, multiply equation(2) by 45 on both sides. Therefore, equation(2) becomes

$$\frac{z}{45}.45 = \frac{2}{5} \cdot 45$$

$$z = \frac{90}{5} \quad \text{simplify}$$

$$z = 18 \quad \text{simplify}$$

Hence we get $z = 10$

CHECK

$$\frac{z}{45} = \frac{2}{5} \quad \text{original equation}$$

$$\frac{18}{45} = \frac{2}{5} \quad \text{substitute 18 for } z$$

$$\frac{2}{5} = \frac{2}{5} \quad \text{simplify}$$

Therefore, the final answer is $z = 18$

Answer 23PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$$\frac{a}{c} = \frac{b}{c} \quad ......(1)$$

Consider the equation,

$$1.9f = -11.78 \quad ....(2)$$

Since $1.9 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\frac{1.9}{1.9}f = -\frac{11.78}{1.9} \quad \text{divide by 1.9 on both sides}$$

$$f = -6.2 \quad \text{simplify}$$

Hence the value of $f = -6.2$.

CHECK

$$1.9f = -11.78 \quad \text{original equation}$$

$$1.9(-6.2) = -11.78 \quad \text{substitute } -6.2 \text{ for } f$$

$$-11.78 = -11.78 \quad \text{the solution is } -6.2$$

Therefore the final answer is $f = -6.2$

Answer 24PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$\frac{a}{c} = \frac{b}{c}$ ....(1)s

Consider the equation,

$0.49k = 6.272$ ....(2)

Since $0.49 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\begin{aligned} \frac{0.49}{0.49}k &= \frac{6.272}{0.49} && \text{divide by 0.49 on both sides} \\ k &= 12.8 && \text{simplify} \end{aligned}$$

Hence the value of $k = 12.8$.

CHECK

$$\begin{aligned} 0.49k &= 6.272 && \text{original equation} \\ 0.49(12.8) &= 6.272 && \text{substitute 12.8 for } k \\ 6.272 &= 6.272 && \text{the solution is 12.8} \end{aligned}$$

Therefore the final answer is $k = 12.8$

Answer 25PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$\frac{a}{c} = \frac{b}{c}$ ....(1)

Consider the equation,

$-2.8m = 9.8$ ....(2)

Since $-2.8 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\begin{aligned} \frac{-2.8}{-2.8}m &= \frac{9.8}{-2.8} && \text{divide by } -2.8 \text{ on both sides} \\ m &= -3.5 && \text{simplify} \end{aligned}$$

Hence the value of $m = -3.5$.

CHECK

$$\begin{aligned} -2.8m &= 9.8 && \text{original equation} \\ -2.8(-3.5) &= 9.8 && \text{substitute } -3.5 \text{ for } m \\ 9.8 &= 9.8 && \text{the solution is } -3.5 \end{aligned}$$

Therefore the final answer is $m = -3.5$

Answer 26PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$$\frac{a}{c} = \frac{b}{c} \quad ......(1)$$

Consider the equation,

$$-5.73q = 97.41 \quad ....(2)$$

Since $-5.73 \neq 0$,apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\frac{-5.73}{-5.73}q = \frac{97.41}{-5.73} \quad \text{divide by } -5.73 \text{ on both sides}$$

$$q = -17 \quad \text{simplify}$$

Hence the value of $q = -17$.

CHECK

$$-5.73q = 97.41 \quad \text{original equation}$$

$$-5.73(-17) = 97.41 \quad \text{substitute } -17 \text{ for } q$$

$$97.41 = 97.41 \quad \text{the solution is } -17$$

Therefore the final answer is $q = -17$

Answer 27PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$$\frac{a}{c} = \frac{b}{c} \quad ......(1)$$

For any numbers *a*, *b* and *c* if $a = b$,then

$$ac = bc \quad ......(2)$$

Consider the equation,

$$\left(-2\frac{3}{5}\right)t = -22 \quad ......(3)$$

Equation(3) can be rewritten as,

$$-\frac{13}{5}t = -22 \quad \text{rewrite mixed number as an improper fraction} \quad ......(4)$$

Apply equation(2) to equation(4). That is,

$$\left(-\frac{13}{5}t\right)5 = -22 \cdot 5 \quad \text{multiply equation(4) by 5 on both sides}$$

$$-\frac{65}{5}t = -110$$

$$13t = 110 \quad \text{simplify}$$

Hence equation(4) is reduced to the form

$13t = 110$ ......(5)

Since $13 \neq 0$,apply equation(1) to equation(5).Therefore, equation(5) becomes

$$13t = 110 \quad \text{original equation}$$
$$\frac{13}{13}t = \frac{110}{13} \quad \text{divide by 13 on both sides}$$
$$t = \frac{110}{13} \quad \text{simplify}$$

CHECK

$$-\frac{13}{5}t = -22 \quad \text{original equation}$$
$$-\frac{13}{5}\left(\frac{110}{13}\right) = -22 \quad \text{substitute } \frac{110}{13} \text{ for t}$$
$$-22 = -22 \quad \text{simplify}$$

Therefore, the final answer is, $t = \frac{110}{13}$

Answer 28PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

For any numbers *a*, *b* and *c* if $a = b$,then

$ac = bc$ ......(2)

Consider the equation,

$\left(3\frac{2}{3}\right)x = -5\frac{1}{2}$ ......(3)

Equation(3) can be expressed as,

$\frac{11}{3}x = -\frac{11}{2}$ Rewrite each mixed number as an improper fraction ......(4)

Consider the equation,

$\frac{11}{3}x = -\frac{11}{2}$ ......(5)

Since $11 \neq 0$,apply equation(1) to equation(5).That is,

divide equation(5) by 11 on both sides .Hence equation(5) becomes,

$$\frac{1}{11}\cdot\frac{11}{3}x = -\frac{1}{11}\cdot\frac{11}{2}$$
$$\frac{x}{3} = -\frac{1}{2} \quad \text{simplify}$$

Consider the equation,

$$\frac{x}{3}=-\frac{1}{2} \quad ......(6)$$

Apply equation(2) to equation(6). That is, multiply equation(6) by 3 on both sides . Hence equation(6) becomes

$$\frac{x}{3}\cdot 3=-\frac{1}{2}\cdot 3$$

$$x=-\frac{3}{2} \quad \text{simplify}$$

Thus, we get $x=-\frac{3}{2}$

CHECK

$$\left(3\frac{2}{3}\right)x=-5\frac{1}{2} \quad \text{original equation}$$

$$\frac{11}{3}x=-\frac{11}{2} \quad \text{rewrite each mixed number as an improper fraction}$$

$$\frac{11}{3}\cdot\left(-\frac{3}{2}\right)=-\frac{11}{2} \quad \text{substitute } -\frac{3}{2} \text{ for } x$$

$$-\frac{33}{6}=-\frac{11}{2}$$

$$-\frac{11}{2}=-\frac{11}{2} \quad \text{simplify}$$

Therefore, the value of $x=-\frac{3}{2}$.

Answer 29PA.

For any numbers *a*, *b* and *c* with $c\neq 0$ if $a=b$ then

$$\frac{a}{c}=\frac{b}{c} \quad ......(1)$$

Consider the equation,

$$-5h=-3\frac{2}{3} \quad ....(2)$$

Equation(2) can be expressed as,

$$-5h=-\frac{11}{3} \quad \text{rewrite mixed number as an improper fraction} \quad ......(3)$$

Since $-5\neq 0$ apply equation(1) to equation(3).That is,

$$\frac{-5}{-5}h = -\frac{11}{3\cdot(-5)} \quad \text{divide by } -5 \text{ on both sides}$$

$$h = \frac{11}{15} \quad \text{simplify}$$

CHECK

$$-5h = -\frac{11}{3} \quad \text{original equation}$$

$$-5\left(\frac{11}{15}\right) = -\frac{11}{3} \quad \text{substitute } \frac{11}{15} \text{ for } h$$

$$-\frac{55}{15} = -\frac{11}{3}$$

$$-\frac{11}{3} = -\frac{11}{3} \quad \text{simplify}$$

Therefore the final answer is $h = \frac{11}{15}$

Answer 30PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$$\frac{a}{c} = \frac{b}{c} \quad \text{......(1)}$$

Consider the equation,

$$3p = 4\frac{1}{5} \quad \text{.......(2)}$$

Equation(2) can be expressed as, $3p = \frac{21}{5}$ rewrite mixed number as an improper fraction

......(3)

Since $3 \neq 0$ apply equation(1) to equation(3).That is,

$$\frac{3}{3}p = \frac{21}{5\cdot(3)} \quad \text{divide by 3 on both sides}$$

$$p = \frac{21}{15} \quad \text{simplify}$$

$$p = \frac{7}{5} \quad \text{simplify}$$

Check the result $p = \frac{7}{5}$

CHECK

$$3p = \frac{21}{5} \quad \text{original equation}$$

$$3\left(\frac{7}{5}\right) = \frac{21}{5} \quad \text{substitute } \frac{7}{5} \text{ for } p$$

$$\frac{21}{5} = \frac{21}{5} \quad \text{simplify}$$

Therefore the final answer is $p = \frac{7}{5}$

Answer 31PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ and if, $a = b$,then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

Consider the equation,

$4m = 10$ ......(2)

Since $4 \neq 0$,apply equation(1) to equation(2). That is, divide equation(2) by 4 on each side. Therefore, equation(2) becomes

$$\frac{4m}{4} = \frac{10}{4} \quad \text{divide by 4 on each side}$$
$$m = \frac{5}{2} \quad \text{simplify}$$

Thus, we get $m = \frac{5}{2}$.

Use the value of *m* and calculate the value of 12*m*.Therefore, we have

$$12m = 12 \cdot \frac{5}{2} \quad \text{substitute } \frac{5}{2} \text{ for } m$$
$$12m = \frac{60}{2}$$
$$12m = 30$$

Thus, we get $12m = 30$ .Check this result.

CHECK

$$4m = 10 \quad \text{original equation}$$
$$4m \cdot 3 = 10 \cdot 3 \quad \text{multiply by 3 on each side}$$
$$12m = 30 \quad \text{simplify}$$

Therefore, the value of $12m = 30$.

Answer 32PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ and if, $a = b$,then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

Consider the equation,

$15b = 55$ ......(2)

Since $15 \neq 0$,apply equation(1) to equation(2). That is, divide equation(2) by 15 on each side. Therefore, equation(2) becomes

$$\frac{15b}{15} = \frac{55}{15} \quad \text{divide by 15 on each side}$$
$$b = \frac{11}{3} \quad \text{simplify}$$

Thus, we get $b = \frac{11}{3}$.

Use the value of *b* and calculate the value of 3*b*.Therefore, we have

$$3b = 3 \cdot \frac{11}{3} \quad \text{substitute } \frac{11}{3} \text{ for } b$$
$$3b = \frac{33}{3}$$
$$3b = 11$$

Thus, we get $3b = 11$ .Check this result.

CHECK

$$15b = 55 \quad \text{original equation}$$
$$\frac{15b}{5} = \frac{55}{5} \quad \text{divide by 5 on each side}$$
$$3b = 11 \quad \text{simplify}$$

Therefore, the value of $3b = 11$.

Answer 33PA.

For any numbers *a*, *b* and *c* with $c \neq 0$,if $a = b$, then

$$\frac{a}{c} = \frac{b}{c} \quad ......(1)$$

Consider the statement, $\text{seven times a number equals } -84$ .This statement can be expressed as,

$$\underbrace{\text{Seven}}_{7}\ \underbrace{\text{times}}_{\times}\ \underbrace{\text{a number}}_{n}\ \underbrace{\text{equals}}_{=}\ \underbrace{-84}_{-84}$$

$$7n = -84 \quad \text{original equation}$$
$$\frac{7n}{7} = -\frac{84}{7} \quad \text{apply equation(1) and divide each side by 7}$$
$$n = -12 \quad \text{simplify}$$

Thus, we get $n=-12$ .Check this result.

CHECK

$$\begin{aligned} 7n &= -84 \quad \text{original equation} \\ 7(-12) &= -84 \quad \text{substitute } -12 \text{ for } n \\ -84 &= -84 \end{aligned}$$

Therefore, the value of $n=-12$.

Answer 34PA.

For any numbers *a*, *b* and *c* with $c \neq 0$,if $a=b$, then

$\frac{a}{c}=\frac{b}{c}$ ......(1)

Consider the statement, $\text{negative nine times a number is } -117$ .This statement can be expressed as,

$$\underbrace{\text{Negative nine}}_{-9}\ \underbrace{\text{times}}_{\times}\ \underbrace{\text{a number}}_{n}\ \underbrace{\text{is}}_{=}\ \underbrace{-117}_{-117}$$

$$-9n=-117 \quad \text{original equation}$$

Thus, we get the equation as,

$-9n=-117$ ......(2)

Since $-9 \neq 0$, apply equation(1) to equation(2).Therefore, equation(2) becomes

$$\begin{aligned} \frac{-9n}{-9} &= \frac{-117}{-9} \quad \text{divide each side by } -9 \text{ on both sides} \\ n &= 13 \quad \text{simplify} \end{aligned}$$

Hence the required number is $n=13$.

Answer 35PA.

For any numbers *a*, *b* and *c* if $a=b$, then

$ac=bc$ ......(1)

Consider the statement, $\text{one fifth of a number is } 12$ .This statement can be expressed as,

$$\underbrace{\text{One fifth of a number}}_{\frac{1}{5}n}\ \underbrace{\text{is}}_{=}\ \underbrace{12}_{12}$$

$$\frac{1}{5}n=12 \quad \text{original equation}$$

Thus, we get the equation as,

$$\frac{1}{5}n = 12 \quad ......(2)$$

Apply equation(1) to equation(2).That is, multiply each side of the equation by 5. Therefore, equation(2) becomes

$$\frac{n}{5}\cdot 5 = 12\cdot 5 \quad \text{multiply each side by 5 on both sides}$$
$$n = 60 \quad \text{simplify}$$

Hence the required number is $n = 60$.

Answer 36PA.

For any numbers *a*, *b* and *c* if $a = b$, then

$$ac = bc \quad ......(1)$$

Consider the statement, Negative three eighths times a number equals 12 .This statement can be expressed as,

$$\underbrace{\text{Negative three eighths}}_{-\frac{3}{8}}\ \underbrace{\text{times}}_{\times}\ \underbrace{\text{a number}}_{n}\ \underbrace{\text{equals}}_{=}\ \underbrace{12}_{12}$$

S

$$-\frac{3}{8}n = 12 \quad \text{original equation}$$

Thus, we get the equation as,

$$-\frac{3}{8}n = 12 \quad ......(2)$$

Apply equation(1) to equation(2).That is, multiply each side of the equation by 8. Therefore, equation(2) becomes

$$-\frac{3n}{8}\cdot 8 = 12\cdot 8 \quad \text{multiply each side by 8 on both sides}$$
$$-3n = 96 \quad \text{simplify}$$
$$\frac{-3n}{-3} = \frac{96}{-3} \quad \text{divide each side by } -3 \text{ on both sides}$$
$$n = -32 \quad \text{simplify}$$

Hence the required number is $n = -32$.

Answer 37PA.

For any numbers *a*, *b* and *c* if $a = b$, then

$ac = bc$ ......(1)

Consider the statement, two and half times a number equals one and one fifth .This statement can be expressed as,

$$\underbrace{\text{Two and half}}_{2\frac{1}{2}}\ \underbrace{\text{times}}_{\times}\ \underbrace{\text{a number}}_{n}\ \underbrace{\text{equals}}_{=}\ \underbrace{\text{oneandonefifth}}_{1\frac{1}{5}}$$

$$2\frac{1}{2}n = 1\frac{1}{5} \quad \text{original equation}$$

$$\frac{5}{2}n = \frac{6}{5} \quad \text{rewrite each mixed number as an improper fraction}$$

Thus, we get the equation as,

$\frac{5}{2}n = \frac{6}{5}$ ......(2)

Apply equation(1) to equation(2).That is, multiply each side of the equation by 2. Therefore, equation(2) becomes

$$\frac{5n}{2}\cdot 2 = \frac{6}{5}\cdot 2 \quad \text{multiply each side by 2 on both sides}$$

$$5n = \frac{12}{5} \quad \text{simplify}$$

$$\frac{5n}{5} = \frac{12}{5(5)} \quad \text{divide each side by 5 on both sides}$$

$$n = \frac{12}{25} \quad \text{simplify}$$

Hence the required number is $n = \frac{12}{25}$.

Answer 38PA.

For any numbers *a*, *b* and *c* if $a = b$, then

$ac = bc$ ......(1)

Consider the statement, One and one third times a number is -4.82 .This statement can be expressed as,

$$\underbrace{\text{one and one third}}_{1\frac{1}{3}}\ \underbrace{\text{times}}_{\times}\ \underbrace{\text{a number}}_{n}\ \underbrace{\text{is}}_{=}\ \underbrace{-4.82}_{-4.82}$$

$$1\frac{1}{3}n = -4.82 \quad \text{original equation}$$

$$\frac{4}{3}n = -4.82 \quad \text{rewrite mixed number as an improper fraction}$$

Thus, we get the equation as,

$$\frac{4}{3}n = -4.82 \text{ ......(2)}$$

Apply equation(1) to equation(2).That is, multiply each side of the equation by 3. Therefore, equation(2) becomes

$$\begin{aligned} \frac{4n}{3}\cdot 3 &= (-4.82)\cdot 3 && \text{multiply each side by 3 on both sides} \\ 4n &= -14.46 && \text{simplify} \\ \frac{4n}{4} &= -\frac{14.46}{4} && \text{divide each side by 5 on both sides} \\ n &= -3.615 && \text{simplify} \end{aligned}$$

Hence the required number is $n = -3.615$.

Answer 39PA.

Let the total number of people =*p*

The number of left-handed people =*l*

One-seventh of the people are left-handed. This statement can be represented in equation form as,

$$\underbrace{\text{One-seventh of people}}_{\frac{1}{7}p}\ \underbrace{\text{are}}_{=}\ \underbrace{\text{left-handed}}_{l}$$

$$\frac{1}{7}p = l \qquad \text{original equation}$$

Therefore, multiplication equation relating the number of left-handed people *l* and the total number of people *p* is $\boxed{l = \frac{1}{7}p}$

Answer 40PA.

Let the total number of people =*p* and the number of left-handed people =*l*

Consider one-seventh of the people are left-handed.

This statement can be represented in equation form as,

$$\underbrace{\text{One-seventh of people}}_{\frac{1}{7}p}\ \underbrace{\text{are}}_{=}\ \underbrace{\text{left-handed}}_{l}$$

$$\frac{1}{7}p = l \qquad \text{original equation}$$

Find the number of left-handed people in a group of 350 people:

$$\frac{1}{7}p = l \qquad \text{original equation}$$

$$\frac{1}{7}(350) = l \qquad \text{substitute 350 for } p$$

$$50 = l \qquad \text{simplify}$$

Therefore, the number of left-handed people in a group of 350 people is $\boxed{50}$

Answer 41PA.

Consider the number of left-handed people in the group 65.

Find the number of people in the group:

Let the total number of people $= p$

The number of left-handed people $= l$

One-seventh of the people are left-handed. This statement can be represented in equation form as,

$$\underbrace{\text{One-seventh of people}}_{\frac{1}{7}p}\ \underbrace{\text{are}}_{=}\ \underbrace{\text{left-handed}}_{l}$$

$$\frac{1}{7}p = l \qquad \text{original equation}$$

Therefore, multiplication equation relating the number of left-handed people l and the total number of people p is $\boxed{l = \frac{1}{7}p}$

Here $l = 65$

Now calculate the value of p:

$$\frac{1}{7}p = l \qquad \text{original equation}$$

$$\frac{1}{7}p = 65 \qquad \text{substitute 65 for } l$$

$$\frac{p}{7} \cdot 7 = 65 \cdot 7 \qquad \text{multiply by 7 on each side}$$

$$p = 455$$

Hence, the number of people in that group is $p = \boxed{455}$

Answer 42PA.

Consider the doughnut weighed 1.5 tons and circumference 50 feet.

Find the diameter of the doughnut:

For a doughnut of diameter *d*, it's circumference *C* is given by, $C = \pi d$.

$C = \pi d$ Original equation

$50 = \frac{22}{7}d$ Substitute 50 for C and $\frac{22}{7}$ for π

$50 \cdot 7 = \left(\frac{22d}{7}\right) \cdot 7$ Multiply by 7 on each side.

$350 = 22d$

$\frac{350}{22} = \frac{22d}{22}$ Divide by 22 on each side

$15.\overline{90} \approx d$ Simplify

Therefore, the diameter of the doughnut is $d = \boxed{15.9 \text{ feet}}$ approximately.

Answer 43PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

For a two-seam fastball , let *d* be the distance from the pitcher's mound to home plate. Let *t* be the time taken and *r* be the speed of the ball . Then these are related by the relation,

$rt = d$ ......(2)

Now, $d = 60.5$ and $r = 126$

$\underbrace{\text{How long does it take a ball to go from mound to home plate}}_{t}$

Equation(2) becomes,

$rt = d$ original equation

$126 \cdot t = 60.5$ substitute 126 for r and 60.5 for d

$\frac{126t}{126} = \frac{60.5}{126}$ divide by 126 on each side

$t = 0.48\overline{015873}$

Therefore, the time taken by two-seam fastball to go the home plate is

$0.48\overline{015873} = 48.\overline{015873} \times 10^{-2}$.

Answer 44PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$$\frac{a}{c} = \frac{b}{c} \text{ ......(1)}$$

For a four-seam fastball , let *d* be the distance from the pitcher's mound to home plate. Let *t* be the time taken and *r* be the speed of the ball . Then these are related by the relation,

$$rt = d \text{ ......(2)}$$

Now, $d = 60.5$ and $r = 132$

$$\underbrace{\text{How long does it take a ball to go from mound to home plate}}_{t}$$

Equation(2) becomes,

$$\begin{aligned} rt &= d && \text{original equation} \\ 132t &= 60.5 && \text{substitute 132 for } r \text{ and 60.5 for } d \\ \frac{132t}{132} &= \frac{60.5}{132} && \text{divide by 132 on each side} \\ t &= 0.458\bar{3} \end{aligned}$$

Therefore, the time taken by four-seam fastball to go the home plate is $0.458\bar{3} = 458.\bar{3} \times 10^{-3}$.

Answer 45PA.

For any numbers *a*, *b* and *c* with $c \neq 0$ if $a = b$ then

$$\frac{a}{c} = \frac{b}{c} \text{ ......(1)}$$

For a four-seam fastball , let *d* be the distance from the pitcher's mound to home plate. Let *t* be the time taken and *r* be the speed of the ball . Then these are related by the relation,

$$rt = d \text{ ......(2)}$$

Now, $d = 60.5$ and $r = 132$

$$\underbrace{\text{How long does it take a ball to go from mound to home plate}}_{t}$$

Equation(2) becomes,

$$\begin{aligned} rt &= d && \text{original equation} \\ 132t &= 60.5 && \text{substitute 132 for } r \text{ and 60.5 for } d \\ \frac{132t}{132} &= \frac{60.5}{132} && \text{divide by 132 on each side} \\ t &= 0.458\bar{3} \end{aligned}$$

Therefore, the time taken by four-seam fastball to go the home plate is $0.458\bar{3} = 458.\bar{3} \times 10^{-3}$

For a two-seam fastball , let *d'* be the distance from the pitcher's mound to home plate. Let *t'* be the time taken and *r'* be the speed of the ball . Then these are related by the relation,

$$r't' = d' \text{ ......(2)}$$

Now, $d = 60.5$ and $r = 126$

$$\underbrace{\text{How long does it take a ball to go from mound to home plate}}_{t'}$$

Equation(2) becomes,

$$r't' = d' \quad \text{original equation}$$
$$126 \cdot t' = 60.5 \quad \text{substitute 126 for } r' \text{ and 60.5 for } d'$$
$$\frac{126t'}{126} = \frac{60.5}{126} \quad \text{divide by 126 on each side}$$
$$t' = 0.48\overline{015873}$$

Therefore, the time taken by two-seam fastball to go the home plate is

$$0.48\overline{015873} = 48.\overline{015873} \times 10^{-2}.$$

$$\underbrace{\text{How much does it take for a two-seamfastball to reach than a fourseam fastball}}_{t'-t}$$

$$t' - t \quad \text{original equation}$$
$$t' - t = 0.48\overline{015873} - 0.458\overline{3} \quad \text{substitute } 0.48\overline{015873} \text{ for } t' \text{ and } 0.458\overline{3} \text{ for } t$$
$$= 0.02182539\overline{6}$$

Therefore, the final answer is $0.02182539\overline{6}$.

Answer 46PA.

Each gram of water is a combination of hydrogen and oxygen.

In 477 grams of water, for every 8 grams of oxygen there is 1 gram of hydrogen.

The number of grams of hydrogen in water is denoted by x.

Let the number of grams of oxygen in water $= y$

Number of 8 grams of oxygen = $\frac{y}{8}$

The relation between x and y is:

$$\underbrace{\text{number of grams of hydrogen}}_{x}\ \underbrace{\text{is}}_{=}\ \underbrace{\text{number of 8 grams of oxygen}}_{\frac{y}{8}}$$

$$x = \frac{y}{8} \quad \text{Original equation}$$
$$x \cdot 8 = \frac{y}{8} \cdot 8 \quad \text{Multiply by 8 on each side}$$
$$8x = y$$

Therefore, the required expression to represent the number of grams of oxygen is $y = 8x$

Answer 47PA.

Each gram of water is a combination of hydrogen and oxygen.

In 477 grams of water, for every 8 grams of oxygen there is 1 gram of hydrogen.

The number of grams of hydrogen in water is denoted by x.

Let the number of grams of oxygen in water $= y$

Thus, $x + y = 477$

Number of 8 grams of oxygen = $\frac{y}{8}$

The relation between x and y is:

$$\underbrace{\text{number of grams of hydrogen}}_{x}\ \underbrace{\text{is}}_{=}\ \underbrace{\text{number of 8 grams of oxygen}}_{\frac{y}{8}}$$

$$\begin{aligned} x &= \frac{y}{8} && \text{Original equation} \\ x \cdot 8 &= \frac{y}{8} \cdot 8 && \text{Multiply by 8 on each side} \\ 8x &= y \end{aligned}$$

Substitute $y = 8x$ in $x + y = 477$, it becomes $x + 8x = 477$

Therefore, the required expression to represent 477 grams of water is $\boxed{477 = x + 8x}$

Answer 48PA.

Each gram of water is a combination of hydrogen and oxygen.

In 477 grams of water, for every 8 grams of oxygen there is 1 gram of hydrogen.

The number of grams of hydrogen in water is denoted by x.

Let the number of grams of oxygen in water $= y$

Thus, $x + y = 477$

Number of 8 grams of oxygen = $\frac{y}{8}$

The relation between x and y is:

$$\underbrace{\text{number of grams of hydrogen}}_{x}\ \underbrace{\text{is}}_{=}\ \underbrace{\text{number of 8 grams of oxygen}}_{\frac{y}{8}}$$

$$\begin{aligned} x &= \frac{y}{8} && \text{Original equation} \\ x \cdot 8 &= \frac{y}{8} \cdot 8 && \text{Multiply by 8 on each side} \\ 8x &= y \end{aligned}$$

Substitute $y = 8x$ in $x + y = 477$, it becomes $x + 8x = 477$

$$\begin{aligned} 477 &= x + 8x && \text{original equation} \\ 477 &= 9x \\ \frac{477}{9} &= \frac{9x}{9} && \text{divide by 9 on each side} \\ 53 &= x && \text{simplify} \end{aligned}$$

Therefore, the number of grams of hydrogen in water is $\boxed{53}$

Answer 49PA.

Each gram of water is a combination of hydrogen and oxygen.

In 477 grams of water, for every 8 grams of oxygen there is 1 gram of hydrogen.

The number of grams of hydrogen in water is denoted by *x*.

Let the number of grams of oxygen in water =*y*

Thus, $x + y = 477$

Number of 8 grams of oxygen = $\frac{y}{8}$

The relation between *x* and *y* is:

$$\underbrace{\text{number of grams of hydrogen}}_{x}\underbrace{\text{is}}_{=}\underbrace{\text{number of 8 grams of oxygen}}_{\frac{y}{8}}$$

$$x = \frac{y}{8} \quad \text{Original equation}$$

$$x \cdot 8 = \frac{y}{8} \cdot 8 \quad \text{Multiply by 8 on each side}$$

$$8x = y$$

Substitute $y = 8x$ in $x + y = 477$, it becomes $x + 8x = 477$

$$477 = x + 8x \quad \text{original equation}$$

$$477 = 9x$$

$$\frac{477}{9} = \frac{9x}{9} \quad \text{divide by 9 on each side}$$

$$53 = x \quad \text{simplify}$$

Substitute $x = 53$ in $y = 8x$ to find the number of grams of hydrogen in water.

$$y = 8x \quad \text{original equation}$$

$$y = 8 \cdot 53 \quad \text{substitute 53 for } x$$

$$y = 424$$

Therefore, $\text{the number of grams of hydrogen in water is } \boxed{424}$

Answer 50PA.

For any numbers *a*, *b* and *c* if $a = b$ then $ac = bc$. In particular for $c \neq 0$,we also have,

$\frac{a}{c} = \frac{b}{c}$ .Consider the equation,

$6y - 7 = 4$ ......(1)

Simplify left-hand side of equation(1) to the form,

$18y - 21$ ......(2)

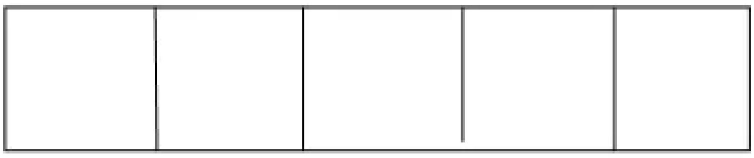
Therefore, equation(1) becomes

$$\begin{aligned}
6y-7&=4 && \text{original equation}\\
6y-7+7&=4+7 && \text{add 7 to each side}\\
6y&=11 && \text{simplify}\\
6y\cdot 3&=11.3 && \text{multiply by 3 on each side}\\
18y&=33 && \text{simplify}\\
18y-21&=33-21 && \text{subtract 21 from each side}\\
18y-21&=12 && \text{simplify}
\end{aligned}$$

Therefore, the value of $18y-21=12$.

Answer 52PA.

For a rectangle of length *l* and breadth *b* ,the perimeter *P*, is $P=2(l+b)$ .Area of a square of side *a* is a^2 .The rectangle is divided into 5 identical squares. Let the measure of each side of square be *n*. The graphical representation is:



$$\underbrace{\text{Perimeter of the rectangle}}_{2(l+b)}\ \underbrace{is}_{=}\ \underbrace{\text{48 inches}}_{48}$$

$$2(l+b)=48 \quad \text{original equation}$$

Thus, we get $2(l+b)=48$ ......(1)

Each square is of measure *n*. Consider the first square. We observe that $n=b$ .From the figure, we observe that length of the rectangle is sum of the sides of 5 squares. That is

$$\begin{aligned}
l&=n+n+n+n+n\\
l&=5n && \text{simplify}
\end{aligned}$$

Therefore, equation(1)becomes

$$\begin{aligned}
2(l+b)&=48 && \text{original equation}\\
2l+2b&=48\\
2(5n)+2n&=48 && \text{substitute } n \text{ for } b \text{ and } 5n \text{ for } l\\
10n+2n&=48\\
12n&=48\\
\frac{12n}{12}&=\frac{48}{12} && \text{divide by 12 on each side}\\
n&=4
\end{aligned}$$

Therefore, each square is of size 4 inches. Hence,

$$\text{Area of the square} = 4 \cdot 4 \\ = 16$$

Therefore, required area is 16 inches

Answer 53PA.

For any numbers *a*, *b* and *c* if $a = b$,and $c \neq 0$ then

$\frac{a}{c} = \frac{b}{c}$ ......(1)

Consider the equation, $4t = 20$ ......(2)

Simplify equation(2).

Therefore, equation(2) becomes

$$4t = 20 \quad \text{original equation}$$
$$\frac{4t}{4} = \frac{20}{4} \quad \text{divide by 4 on each side}$$
$$t = 5$$

Hence, the value of $t = 5$ .Therefore, the values of

$$-2t = -2(5) \quad \text{substitute 5 for } t$$
$$= -10$$
$$2t = 2(5) \quad \text{substitute 5 for } t$$
$$= 10$$
$$-8t = -8(5) \quad \text{substitute 5 for } t$$
$$= -40$$

Hence, $-2t = -10, 2t = 10, -8t = -40$ .Therefore, $4t = 20$ is equivalent to $\textit{option } \text{A } -2t = -10$.

Answer 54MYS.

Solving an equation involves various operations like addition, subtraction, multiplication and division. Consider the equation,

$m + 14 = 81$ ......(1)

Equation(1) is solved in following steps:

$$m + 14 = 81 \quad \text{original equation}$$
$$m + 14 - 14 = 81 - 14 \quad \text{subtract 14 from each side}$$
$$m = 67 \quad \text{simplify}$$

Thus, we get $m = 67$.

Check the result $m=67$.

CHECK

$$\begin{aligned} m+14&=81 && \text{original equation} \\ 67+14&=81 && \text{substitute 67 for } m \\ 81&=81 && \text{the solution is 67} \end{aligned}$$

Therefore, the final answer is $m=67$

Answer 55MYS.

Solving an equation involves various operations like addition, subtraction, multiplication and division. Consider the equation,

$d-27=-14$ ......(1)

Equation(1) is solved in following steps:

$$\begin{aligned} d-27&=-14 && \text{original equation} \\ d-27+27&=-14+27 && \text{add 27 to each side} \\ d&=13 && \text{simplify} \end{aligned}$$

Thus, we get $d=13$.

Check the result $d=13$.

CHECK

$$\begin{aligned} d-27&=-14 && \text{original equation} \\ 13-27&=-14 && \text{substitute 13 for } d \\ -14&=-14 && \text{the solution is 13} \end{aligned}$$

Therefore, the final answer is $d=13$

Answer 56MYS.

Solving an equation involves various operations like addition, subtraction, multiplication and division. Consider the equation,

$17-(-w)=-55$ ......(1)

Equation(1) is solved in following steps:

$$\begin{aligned} 17-(-w)&=-55 && \text{original equation} \\ 17+w&=-55 && \text{simplify} \\ 17+w-17&=-55-17 && \text{subtract 17 from each side} \\ w&=-72 && \text{simplify} \end{aligned}$$

Thus, we get $w=-72$

Check the result $w=-72$.

CHECK

$$\begin{aligned} 17-(-w)&=-55 && \text{original equation}\\ 17+w&=-55 && \text{simplify}\\ 17-72&=-55 && \text{substitute } -72 \text{ for } w\\ -55&=-55 && \text{the solution is } -72 \end{aligned}$$

Therefore, the final answer is $w=-72$

Answer 57MYS.

Consider the statement,

Ten times a number a is equal to 5 times the sum of b and c ......(1)

This statement can be expressed in equation form as follows:

$$\underbrace{\text{Ten}}_{10}\ \underbrace{\text{times}}_{\times}\ \underbrace{\text{a number } a}_{a}\ \underbrace{\text{is equal to}}_{=}\ \underbrace{5}_{5}\ \underbrace{\text{times}}_{\times}\ \underbrace{\text{the sum of } b \text{ and } c}_{b+c}$$

$10\cdot a=5(b+c)$ equation form

Therefore, the required equation is, $10\cdot a=5(b+c)$.

Answer 58MYS.

The objective is to find the product of -5 and 12.

As the signs of two numbers are different, so their product is negative.

That is,

$$(-5)(12)=-60$$

Therefore, the product of (-5) and 12 is $\boxed{-60}$.

Answer 59MYS.

The objective is to find the product of -2.93 and -0.003.

As the signs of two numbers are same, so their product is positive.

That is,

$$\begin{aligned}(-2.93)(-0.003)&=(2.93)(0.003)\\ &=0.00879\end{aligned}$$

Therefore, the product of -2.93 and -0.003 is $\boxed{0.00879}$.

Answer 60MYS.

The objective is to find the product of $(-4)(0)(-2)(-3)$.

Any number multiplied with zero is zero.

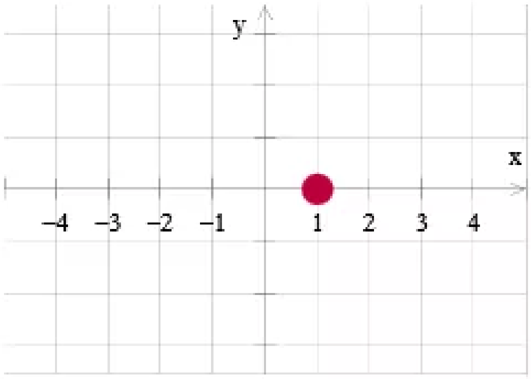
That is,

$$(-4)(0)(-2)(-3)=0$$

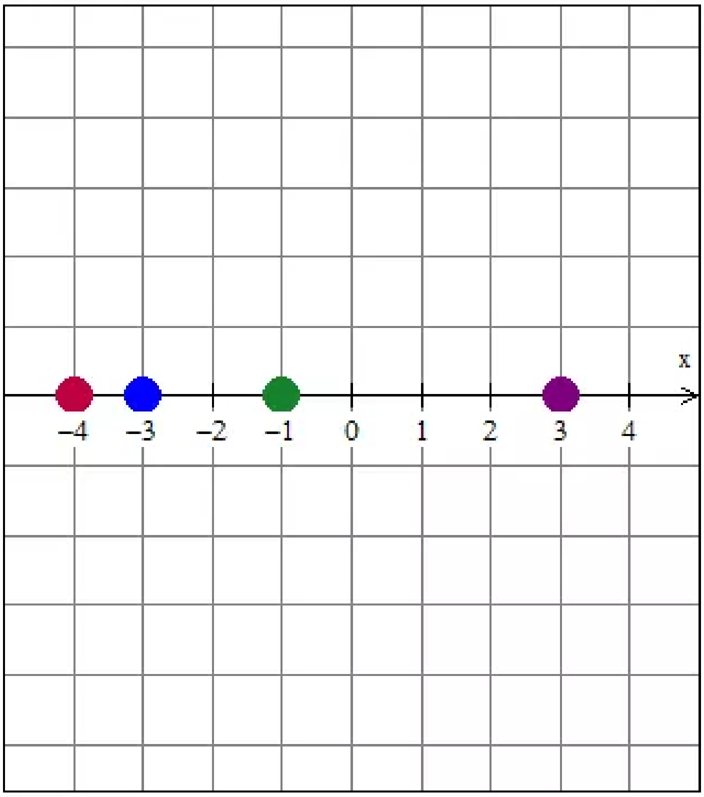
Therefore, the product of $(-4)(0)(-2)(-3)$ is $\boxed{0}$.

Answer 61MYS.

The graph of $x = 1$ is



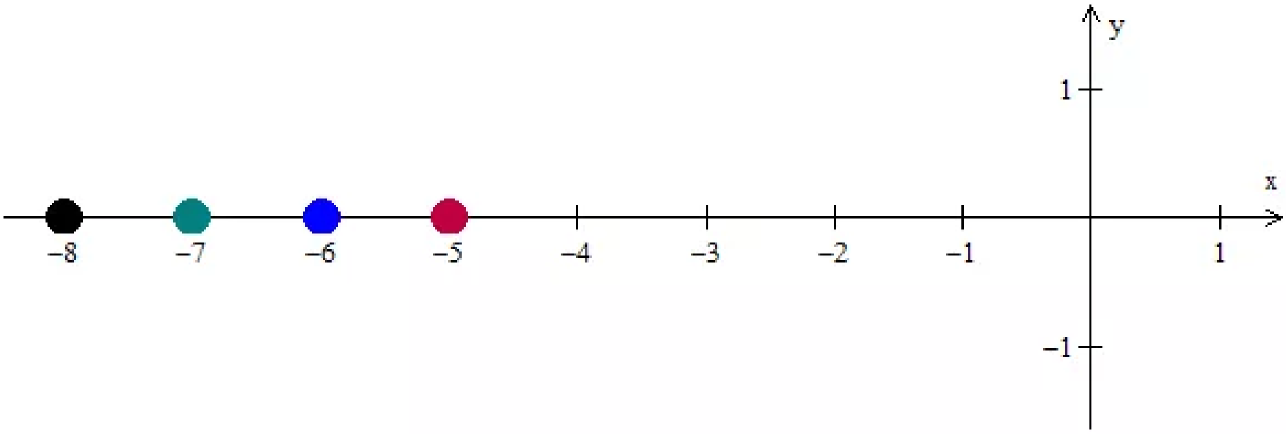
Consider the set of numbers $\{-4, -3, -1, 3\}$ .The graphical representation of these numbers is:



Answer 63MYS.

The integers are $\{\ldots -3, -2, -1, 0, 1, 2, 3, \ldots.\}$ .The

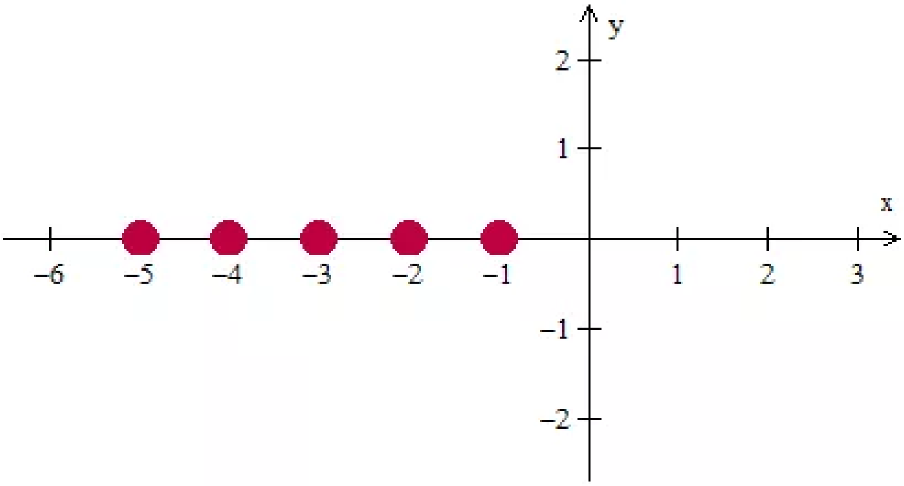
integers less than -4 are $\{-5, -6, -7, -8, -9, \ldots\}$ .The graphical representation of these numbers is:



Answer 64MYS.

The integers are $\{... -3, -2, -1, 0, 1, 2, 3, ...\}$ .The

integers less than 0 and greater than -6 are $\{-1, -2, -3, -4, -5\}$ .The graphical representation of these numbers is:



Answer 65MYS.

Let *u*, *v* and *w* be real numbers, variables or algebraic expressions.

PROPERTY	ALGEBRAIC EXPRESSION
Commutative	$u+v=v+u$
Associative	$(u+v)w=u(v+w)$
Identity	$u+0=u$
Inverse	$u+(-u)=0$
Distributive property under addition	$u(v+w)=uv+uw$ $(u+v)w=uw+vw$

Consider the expression,

$67+3=3+67$ ......(1)

Compare equation(1) with the above table. Therefore, it is of the form

$u+v=v+u$

Hence, we conclude that equation(1) represent commutative property under addition

Answer 66MYS.

Let *u*, *v* and *w* be real numbers, variables or algebraic expressions.

PROPERTY	ALGEBRAIC EXPRESSION
Commutative	$uv = vu$
Associative	$(uv)w = u(vw)$
Identity	$u.1 = u$
Inverse	$u.\frac{1}{u} = 1, u \neq 0$
Distributive property under addition	$u(v+w) = uv + uw$ $(u+v)w = uw + vw$

Consider the expression,

$(5 \cdot m) \cdot n = 5 \cdot (m \cdot n)$ ......(1)

Compare equation(1) with the above table. Therefore, we conclude that equation(1) represent the $\text{associative property under multiplication}$ of variables 5,*m* and *n* .

Answer 67MYS.

The objective is to find the value of $2 \times 8 + 9.$

Use the order of operations to find the value.

First find the product of 2×8 and then add the resultant to 9.

$$\begin{aligned} 2 \times 8 + 9 &= 16 + 9 \\ &= 25 \end{aligned}$$

Therefore, the value of $2 \times 8 + 9$ is $\boxed{25}$.

Answer 68MYS.

The objective is to find the value of $24 \div 3 - 8.$

Use the order of operations to find the value.

First do the division $24 \div 3$ and then subtract 8 from the resultant.

$$\begin{aligned} 24 \div 3 - 8 &= 8 - 8 \\ &= 0 \end{aligned}$$

Therefore, the value of $24 \div 3 - 8$ is $\boxed{0}$.

Answer 69MYS.

The objective is to find the value of $\frac{3}{8}(17+7)$.

Use the order of operations to find the value.

Simplify the expression inside the parenthesis.

$$\begin{aligned}\frac{3}{8}(17+7) &= \frac{3}{8}(24) && \text{Add 17 and 7}\\ &= \frac{72}{8} && \text{Multiply 24 by } \frac{3}{8}\\ &= 9 && \text{Divide 72 by 8}\end{aligned}$$

Therefore, the value of $\frac{3}{8}(17+7)$ is $\boxed{9}$.

Answer 70MYS.

The objective is to find the value of $\frac{15-9}{26+12}$.

Use the order of operations to find the value.

Simplify the expressions in the numerator and denominator.

$$\begin{aligned}\frac{15-9}{26+12} &= \frac{6}{38}\\ &= 0.158 && \text{simplify}\end{aligned}$$

Therefore, the value of $\frac{15-9}{26+12}$ is $\boxed{0.158}$.