Reasoning and Problem Solving
Step 7: One-Step Equations

National Curriculum Objectives:

Mathematics Year 6: (6A1) Express missing number problems algebraically

Differentiation:

Questions 1, 4 and 7 (Reasoning)
Developing Explain whether a statement is correct. Using all four operations and whole numbers.
Expected Explain whether a statement is correct. Using all four operations, whole numbers, with some decimals and fractions.
Greater Depth Explain whether a statement is correct. Using all four operations, whole numbers, fractions, decimal and negative numbers.

Questions 2, 5 and 8 (Reasoning)
Developing Explain whether a representation matches a given equation. Using all four operations and whole numbers.
Expected Explain whether a representation matches a given equation. Using all four operations, whole numbers, with some decimals and fractions.
Greater Depth Explain whether a representation matches a given equation. Using all four operations, whole numbers, fractions, decimal and negative numbers.

Questions 3, 6 and 9 (Problem Solving)
Developing Find three different equations that will balance the scale. Using all four operations and whole numbers.
Expected Find three different equations that will balance the scale. Using all four operations, whole numbers, with some decimals and fractions.
Greater Depth Find three different equations that will balance the scale. Using all four operations, whole numbers, fractions, decimal and negative numbers.

More Year 6 Algebra resources.

Did you like this resource? Don't forget to review it on our website.

One-Step Equations

1a. Jonah is solving the equation $2n = 20$.

Jonah says,

$n = 18$ because $2 + 18 = 20$.

Is he correct? Explain your answer.

D R

One-Step Equations

1b. Amy-Jo is solving the equation $2c = 6$.

Amy-Jo says,

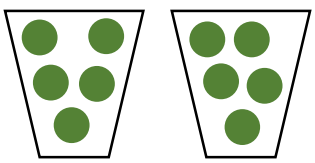
$c = 8$ because $2 - 8 = 6$.

Is she correct? Explain your answer.

D R

2a. Greta has created a representation to help her solve the following equation:

$2n = 10$

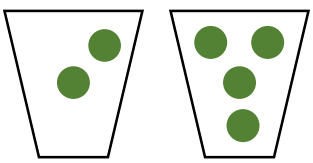


Is Greta correct? Convince me.

D R

2b. Brayson has created a representation to help him solve the following equation:

$12 = 2n$

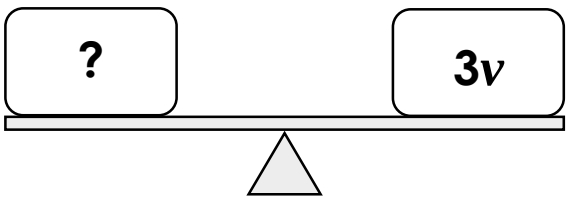


Is Brayson correct? Convince me.

D R

3a. Create three different equations that will balance the scale when $v = 6$.

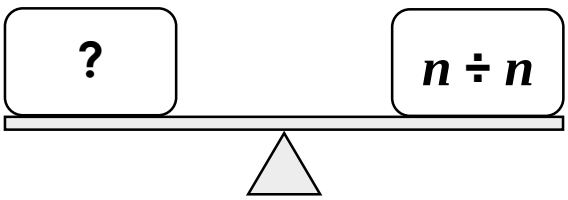
Each equation must include a different operation.



D PS

3b. Create three different equations that will balance the scale when $n = 4$.

Each equation must include a different operation.



D PS

One-Step Equations

4a. Euan is solving the equation $c + 9 = 36$.

Euan says,

$c = 45$ because $36 + 9 = 45$.

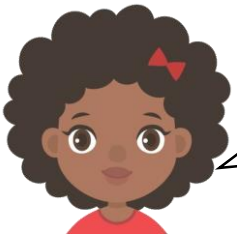
Is he correct? Explain your answer.

E R

One-Step Equations

4b. Maisy is solving the equation $3f = 30$.

Maisy says,



$f = 90$ because $3 \times 30 = 90$.

Is she correct? Explain your answer.

E R

5a. Aurora has created a representation to help her solve the following equation:

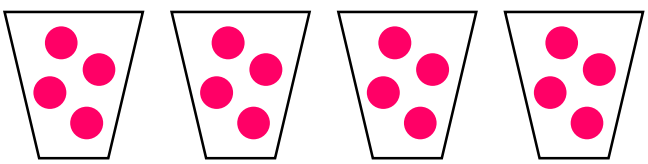
$3b = 15$

Is Aurora correct? Convince me.

E R

5b. Jack has created a representation to help him solve the following equation:

$3n = 12$

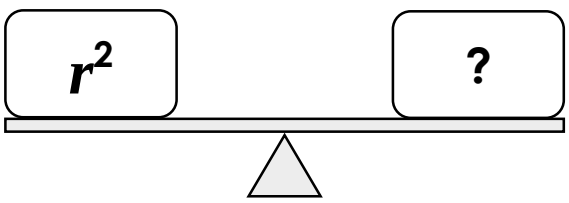


Is Jack correct? Convince me.

E R

6a. Create three different equations that will balance the scale when $r = 8$.

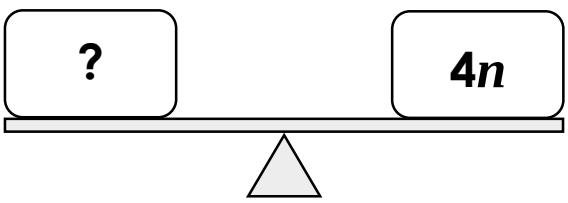
At least one equation must include a decimal number or fraction.



E PS

6b. Create three different equations that will balance the scale when $n = 0.5$.

At least one equation must include a decimal number or fraction.

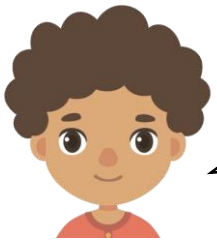


E PS

One-Step Equations

7a. Graham is solving the equation $d^2 = 1$.

Graham says,



$d = 0.5$ because $0.5 + 0.5 = 1$.

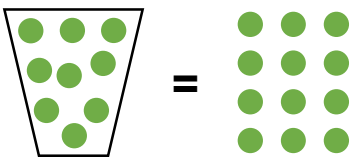
Is he correct? Explain your answer.

GD

R

8a. Amina has created a representation to help her solve the following equation:

$b + 3 = 12$



Is Amina correct? Convince me.

GD

R

9a. Create three different equations that will balance the scale when $d = 7$.

Each equation must include a decimal number or fraction.

$d^2 + 5$?

GD

PS

One-Step Equations

7b. Nell is solving the equation $b - 7 = -4$.

Nell says,

$b = 11$ because $11 - 7 = 4$.

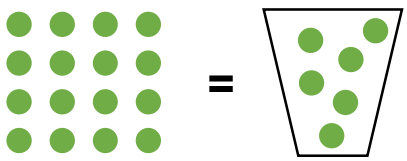
Is she correct? Explain your answer.

GD

R

8b. Brynn has created a representation to help him solve the following equation:

$16 = x + 10$



Is Brynn correct? Convince me.

GD

R

9b. Create three different equations that will balance the scale when $c = -5$.

Each equation must include a decimal number or fraction.

? $c + 6$

GD

PS

Reasoning and Problem Solving One-Step Equations

Developing

1a. Jonah is incorrect because $2n$ means $2 \times n = 20$, so $n = 10$.

2a. Yes; $n = 5$ so both cups should contain 5 counters.

3a. Various answers, for example:
$3v = 3 \times 6$; $9 + 9 = 3v$; $3v = 19 - 1$

Expected

4a. Euan is incorrect because $c = 27$, not 45; he needs to subtract 9 from 36 to balance the equation, not add it.

5a. No; $b = 5$, so each of the three cups should contain 5 counters each.

6a. Various answers, for example:
$60 + 4 = r^2$; $r^2 = 70.5 - 6.5$; $16 \times 4 = r^2$

Greater Depth

7a. Graham is incorrect because d^2 means $d \times d = 1$, so $d = 1$; he needs to multiply d, not add it.

8a. No; although Amina has correctly shown that $b = 9$, she has forgotten to add 3 counters to it (as shown in the equation) to create a total of 12.

9a. Various answers, for example:
$27.5 \times 2 - 1 = d^2 + 5$; $d^2 + 5 = 50.5 + 3.5$; $60 \frac{1}{2} - 6 \frac{1}{2} = d^2 + 5$

Reasoning and Problem Solving One-Step Equations

Developing

1b. Amy-Jo is incorrect because $2c$ means $2 \times c = 6$, so $c = 3$.

2b. No; $n = 6$ so both cups should contain 6 counters.

3b. Various answers, for example:
$n = 1 \times 1$; $2 - 1 = n$; $n = 0 + 1$

Expected

4b. Maisy is incorrect because $f = 10$, not 90; this is because $30 \div 3 = 10$, which would balance the equation.

5b. No; Jack has shown 4×4, which would total 16. He needs to show three cups which contain 4 counters each, which would show 3×4.

6b. Various answers, for example:
$4n = 1 \times 2$; $0.75 + 1.25 = 4n$; $4n = 4 \frac{1}{2} - 2 \frac{1}{2}$

Greater Depth

7b. Nell is incorrect because $b = 3$, not 11; this is because she needs to add 7 to -4 to balance the equation, not subtract 7 from 11.

8b. No; although Brynn has correctly identified that $x = 6$, he has forgotten to add 10 counters to it (as shown in the equation) to create a total of 16.

9b. Various answers, for example:
$1 = 9.5 - 8.5$; $-1.5 + 2.5 = 1$; $\frac{1}{2} \times 2 = 1$