SOLVING EQUATIONS

A WHAT IS AN EQUATION?

A.1 MATH ESCAPE ROOM: LEVEL 1

MCQ 1: For this Math escape room, the code is:

$$\bigcirc + 5 = 9$$

Which code do you enter?

- ☐ $\bigcirc = 2$
- ☐ $\bigcirc = 4$
- ☐ $\bigcirc = 5$
- ☐ $\bigcirc = 9$

MCQ 2: For this Math escape room, the code is:

$$\triangle + 10 = 1 + 2 \times 6$$

Which code do you enter?

- ☐ $\triangle = 3$
- ☐ $\triangle = 5$
- ☐ $\triangle = 8$
- ☐ $\triangle = 10$

MCQ 3: For this Math escape room, the code is:

$$\square + 5 = 2 \times 4 + 1$$

Which code do you enter?

- ☐ $\square = 6$
- ☐ $\square = 8$
- ☐ $\square = 5$
- ☐ $\square = 4$

MCQ 4: For this Math escape room, the code is:

$$\bigcirc - 4 = 3 \times 2 - 1$$

Which code do you enter?

- ☐ $\bigcirc = 7$
- ☐ $\bigcirc = 6$
- ☐ $\bigcirc = 5$
- ☐ $\bigcirc = 9$

A.2 MATH ESCAPE ROOM: LEVEL 2

MCQ 5: For this Math escape room, the code is:

$$2 \times \bigcirc - 2 = \bigcirc + 10$$

Which code do you enter?

- ☐ $\bigcirc = 8$
- ☐ $\bigcirc = 10$
- ☐ $\bigcirc = 12$
- ☐ $\bigcirc = 14$

MCQ 6: For this Math escape room, the code is:

$$3x + 7 = x + 19$$

Which code do you enter?

- ☐ $x = 2$
- ☐ $x = 4$
- ☐ $x = 6$
- ☐ $x = 8$

MCQ 7: For this Math escape room, the code is:

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

Which code do you enter?

- ☐ $x = 6$
- ☐ $x = 8$
- ☐ $x = 10$
- ☐ $x = 12$

MCQ 8: For this Math escape room, the code is:

$$x \times (x - 2) = 24$$

Which code do you enter?

- ☐ $x = 6$
- ☐ $x = 7$
- ☐ $x = 8$
- ☐ $x = 9$

A.3 MATH ESCAPE ROOM: LEVEL 3

MCQ 9: For this Math escape room, the code is:

$$x^2 - 4 = 0$$

Which code do you enter?

- ☐ $x = 2$
- ☐ $x = 3$
- ☐ $x = -2$
- ☐ $x = -3$

MCQ 10: For this Math escape room, the code is:

$$x^2 - 2x + 1 = 0$$

Which code do you enter?

- ☐ $x = 0$
- ☐ $x = 1$
- ☐ $x = 2$
- ☐ $x = 3$

MCQ 11: For this Math escape room, the code is:

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

Which code do you enter?

- ☐ $x = 2$
- ☐ $x = 3$
- ☐ $x = 4$
- ☐ $x = 5$

B SOLVING BY INSPECTION AND TRIAL-AND-ERROR

B.1 FINDING A SOLUTION: LEVEL 1

Ex 12: Consider the equation $2x + 3 = 11$.
Use the trial-and-error method to find a solution (try $x = 2, 3, \ldots$).

$$x = \square$$

Ex 13: Consider the equation $3x - 5 = 10$.
Use the trial-and-error method to find a solution (try $x = 4, 5, \ldots$).

$$x = \square$$

Ex 14: Consider the equation $x(x - 1) = 6$.
Use the trial-and-error method to find a solution (try $x = 2, 3, \ldots$).

$$x = \square$$

Ex 15: Consider the equation $2x - 3 = 5x - 9$.
Use the trial-and-error method to find a solution (try $x = 0, 1, \ldots$).

$$x = \square$$

B.2 FINDING A SOLUTION: LEVEL 2

Ex 16: Consider the equation $x^2 - 2x + 1 = 0$.
Use the trial-and-error method to find a solution (try $x = 0, 1, \ldots$).

$$x = \square$$

Ex 17: Consider the equation $x^2 - 9 = 0$.
Use the trial-and-error method to find a solution (try $x = 2, 3, \ldots$).

$$x = \square$$

Ex 18: Consider the equation $\frac{x+2}{x-2} = 2$.
Use the trial-and-error method to find a solution (try $x = 6, 3, 4$).

$$x = \square$$

C THE PRINCIPLE OF BALANCE

C.1 SOLVING EQUATIONS BY ADDING OR SUBTRACTING

Ex 19: Solve for x:

$$x + 10 = 80$$

$$x = \square$$

Ex 20: Solve for x:

$$x + 20 = 36$$

$$x = \square$$

Ex 21: Solve for x:

$$x + 1 = 100$$

$$x = \square$$

Ex 22: Solve for x:

$$x + 0.5 = 3$$

$$x = \square$$

Ex 23: Solve for x:

$$x - 10 = -20$$

$$x = \square$$

Ex 24: Solve for x:

$$x - 5 = -2$$

$$x = \square$$

C.2 SOLVING EQUATIONS BY MULTIPLYING OR DIVIDING

Ex 25: Solve for x:

$$2x = 16$$

$$x = \square$$

Ex 26: Solve for x:

$$2x = 30$$

$$x = \square$$

Ex 27: Solve for x:

$$3x = 27$$

$$x = \square$$

Ex 28: Solve for x:

$$\frac{x}{4} = 5$$

$$x = \square$$

Ex 29: Solve for x:

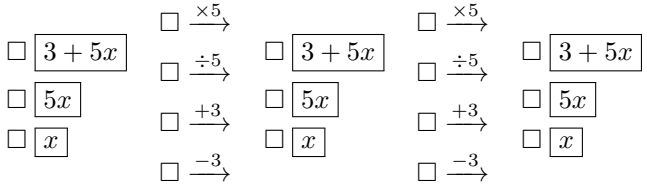
$$\frac{x}{3} = \frac{1}{2}$$

$$x = \square$$

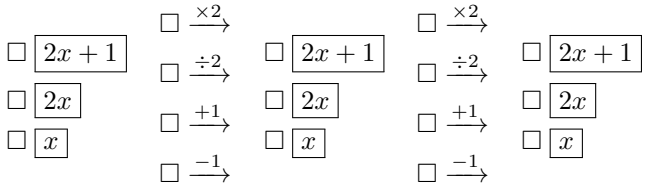
D SOLVING BY REVERSING OPERATIONS

D.1 DOING EXPRESSIONS

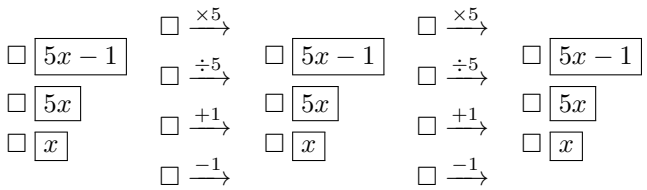
Ex 30: Build the expression $3 + 5x$



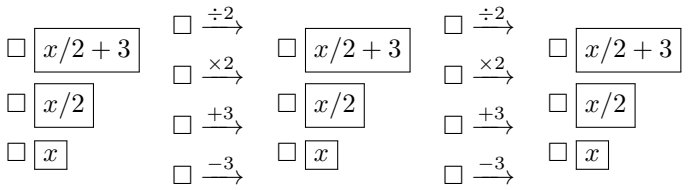
Ex 31: Build the expression $2x + 1$



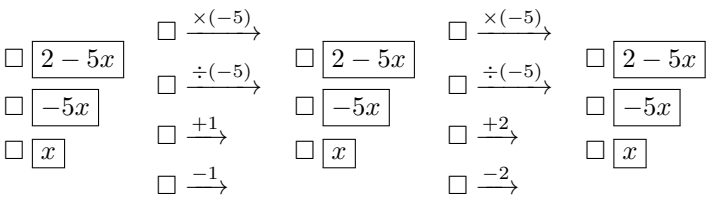
Ex 32: Build the expression $5x - 1$



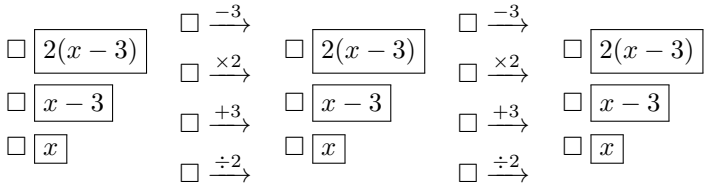
Ex 33: Build the expression $\frac{x}{2} + 3$



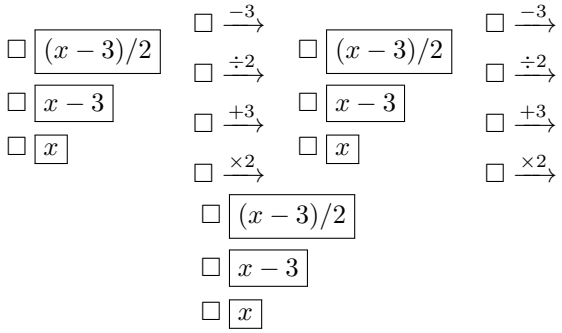
Ex 34: Build the expression $2 - 5x$



Ex 35: Do the expression $2(x - 3)$

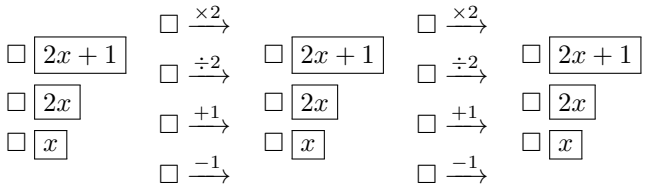


Ex 36: Build the expression $\frac{x - 3}{2}$

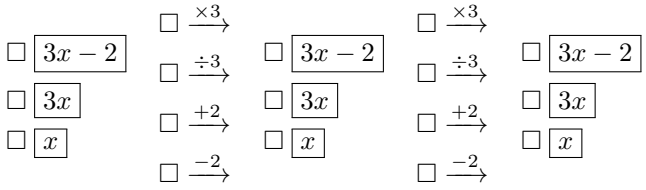


D.2 UNDOING EXPRESSIONS

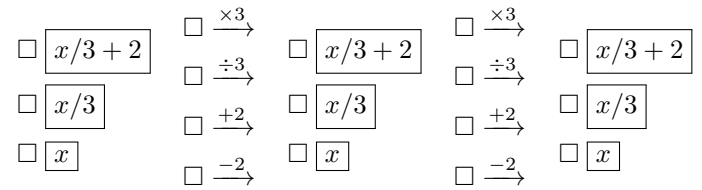
Ex 37: Undo the expression $2x + 1$



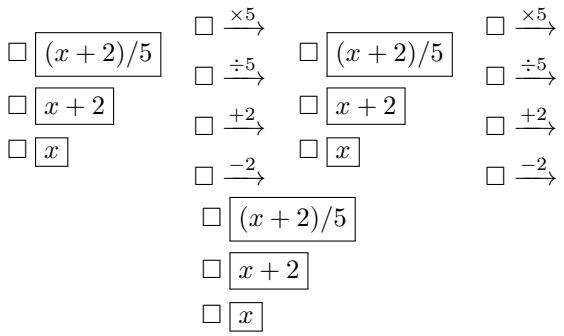
Ex 38: Undo the expression $3x - 2$



Ex 39: Undo the expression $\frac{x}{3} + 2$



Ex 40: Undo the expression $\dfrac{x+2}{5}$



D.3 SOLVING LINEAR EQUATIONS: LEVEL 1

Ex 41: Solve for x:

$$2x + 1 = 7$$

$x =$ ☐

Ex 42: Solve for x:

$$2x - 4 = 5$$

$x =$ ☐

Ex 43: Solve for x:

$$4x - 7 = 9$$

$x =$ ☐

Ex 44: Solve for x:

$$3x + 10 = 4$$

$x =$ ☐

D.4 SOLVING LINEAR EQUATIONS: LEVEL 2

Ex 45: Solve for x:

$$\frac{x - 17}{3} = 10$$

$x =$ ☐

Ex 46: Solve for x:

$$\frac{x - 2}{6} = \frac{2}{3}$$

$x =$ ☐

Ex 47: Solve for x:

$$4(x + 2) = 40$$

$x =$ ☐

Ex 48: Solve for x:

$$\frac{2x + 5}{4} = 3$$

$x =$ ☐

E SOLVING PRODUCT OF LINEAR FACTORS

E.1 SOLVING EQUATIONS USING THE NULL FACTOR LAW: LEVEL 1

Ex 49: Solve for x:

$$x(x + 1) = 0$$

Give your answers in increasing order:

The set of solutions is {☐, ☐}.

Ex 50: Solve for x:

$$(x + 2)(x - 1) = 0$$

Give your answers in increasing order:

The set of solutions is {☐, ☐}.

Ex 51: Solve for x:

$$(x + 6)(x - 3) = 0$$

Give your answers in increasing order:

The set of solutions is {☐, ☐}.

Ex 52: Solve for x:

$$(x - 1)(x - 2) = 0$$

Give your answers in increasing order:

The set of solutions is {☐, ☐}.

E.2 SOLVING EQUATIONS USING THE NULL FACTOR LAW: LEVEL 2

Ex 53: Solve for x:

$$(2x + 6)(x + 2) = 0$$

Give your answers in increasing order:

The set of solutions is {☐, ☐}.

Ex 54: Solve for x:

$$(x + 2)(2x - 1) = 0$$

Give your answers in increasing order:

The set of solutions is {☐, ☐}.

Ex 55: Solve for x:

$$\left(\frac{x}{2} - 1\right)(2x + 2) = 0$$

Give your answers in increasing order:

The set of solutions is {☐, ☐}.

Ex 56: Solve for x:

$$x(x - 1)(x - 2) = 0$$

Give your answers in increasing order:

The set of solutions is {☐, ☐, ☐}.

F SOLVING BASIC QUADRATIC EQUATIONS

F.1 SOLVING QUADRATIC EQUATIONS IN THE FORM $x^2 = k$

Ex 57: Solve for x:

$$x^2 = 9$$

Give your answers in increasing order:

The set of solutions is $\{\square, \square\}$.

Ex 58: Solve for x:

$$x^2 = 25$$

Give your answers in increasing order:

The set of solutions is $\{\square, \square\}$.

Ex 59: Solve for x:

$$x^2 = 10$$

Give your answers in increasing order:

The set of solutions is $\{\square, \square\}$.

Ex 60: Solve for x:

$$x^2 - 3 = 0$$

Give your answers in increasing order:

The set of solutions is $\{\square, \square\}$.