

Contents

Level 1 – Basic Skills

1 Exponents	6
2 Scientific Notation	10
3 Prime Factorization	14
4 Squares and Square Roots	18
5 Fractions	22
6 Decimals	26
7 Percents	30
8 Proportions	34
9 Integers	38
10 Circumferences of Circles	42
11 Congruence and Similarity	46
12 Pythagorean Relationship	50
13 Algebraic Expressions	54
14 Data Analysis	58
15 Graphs	62

Level 2 – Further Your Understanding

1 Rational Numbers	68
2 Fractions, Decimals, and Percents	72
3 Ratios, Rates, and Proportions	76
4 Areas of Circles	80
5 Cylinders	84
6 Volume and Surface Area	88
7 2-D and 3-D Geometry	92
8 Lines, Angles, and Triangles	96
9 Cartesian Coordinate Plane	100
10 Linear Patterns	104

11	Linear Equations	108
12	Graphs	112
13	Theoretical and Experimental Probabilities	116

Level 3 – Applications

1	Powers and Roots	122
2	Fractions	126
3	Decimals	130
4	Percents	134
5	Ratios, Rates, and Proportions	138
6	Integers	142
7	Circles	146
8	Volume and Surface Area	150
9	Angles	154
10	Angles in Parallel Lines	158
11	Pythagorean Relationship	162
12	Coordinates and Transformations	166
13	Patterning	170
14	Linear Equations	174
15	Graphs	178
16	Probability	182

Handy Reference	185
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QR Code	187
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Answers	191
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Assessment Tests 1 and 2	217
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Assessment Test Answers	231
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11 Linear Equations

- solving linear equations

Read This

When solving an algebraic equation, the goal is to isolate the variable. Follow the steps below to solve an equation.

- 1 Combine the like terms.
- 2 Move all the constant terms to one side of the equation and leave the variable on the other side.
- 3 Multiply or divide to make the variable have a coefficient of 1.



Example Solve the equation.

$$\begin{aligned}6x - 5 &= 13 \\6x - 5 + 5 &= 13 + 5 \quad \leftarrow \text{Add 5 on both sides.} \\6x &= 18 \\6x \div 6 &= 18 \div 6 \quad \leftarrow \text{Divide both sides by 6.} \\x &= 3\end{aligned}$$

$2x + 2 = 12$

$2x + 2 - \square = 12 - \square$

$2x = \square$

$2x \div \square = \square \div \square$

$x = \square$

Solve the equations.

① $2x + 5 = 11$

② $\frac{n}{5} - 1 = 4$

③ $3y + 2 = 8$

④ $\frac{4}{9}k = 8$

⑤ $3 + \frac{m}{4} = 9$

⑥ $12 = 2 + \frac{a}{3}$

⑦ $6x + 7x = 52$

⑧ $6 - k = k + 2$

⑨ $3y = 32 - 5y$

Check each correct equation. Then solve it and check your answer.

- ⑩ The difference of 10 and the product of 5 and n is 20.

(A) $10 + 5n = 20$

(B) $5n - 10 = 20$

Check



To check your answer, substitute the answer into the equation. If the left side of the equation equals the right side, then the answer is correct.

e.g. $3a + 1 = 7$. Is $a = 2$ correct?

$$\text{left side} = 3a + 1$$

$$= 3(2) + 1$$

$$= 7 \longleftarrow \text{equal to the right side}$$

So, $a = 2$ is correct.

- ⑪ Multiplying m by 9 and subtracting the product by 10 gives 8.

(A) $(9 - m) \times 10 = 8$

(B) $9m - 10 = 8$

Check

- ⑫ x divided by 6 and then increased by 4 is 7.

(A) $x \div 6 + 4 = 7$

(B) $x \div 6 + 7 = 4$

Check

- ⑬ Three quarters of y minus 5 is 4.

(A) $\frac{3}{4}(y - 5) = 4$

(B) $\frac{3}{4}y - 5 = 4$

Check

- ⑭ Two fifths of q plus 2 is equal to 8.

(A) $\frac{2}{5}q + 2 = 8$

(B) $(q + 2) \times \frac{2}{5} = 8$

Check

Read what each child says and set up a corresponding equation. Then solve it and check your answer using substitution.

15



5 less than y is 29.

Check

16



9 subtracted from z is -4.

Check

17



p multiplied by -0.4 is 9.

Check

18



The sum of q and -5 is 27.

Check

Simplify the equations and solve them. Then check your answers using substitution.

19 $9y + 5 = y + 37$

Check

20 $4p + 5 + 8p = 11p$

Check

21 $i + 6 + 4i = 18 + 8$

Check

Solve the equations and write the letters to find out what Jason says.

② $7c + 8 = 35 - 2c$

$c =$

③ $4y + 8 = 29 - 5y$

$y =$

④ $0.6e + 0.7 = 0.4e$

$e =$

⑤ $\frac{1}{4}t + \frac{1}{5}t - 4 = 5$

$t =$

⑥ $3 - s = 6s + 24$

$s =$

⑦ $5 - 2a - 0.5a = -4$

$a =$

⑧ $0.3b - 0.8 = 0.2b - 1.9$

$b =$

⑨ $\frac{2}{3}m - \frac{1}{2}m + 4 = 7$

$m =$

⑩ $1.4h + 0.8 = 8 - 0.2h$

$h =$

⑪ $i - 67 + 3.2i = -4$

$i =$

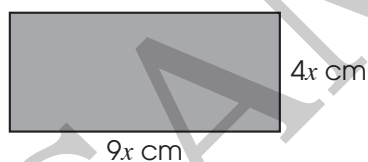
⑫

I like 18 $3\frac{3}{5}$ 20 $4\frac{1}{2}$ $-3\frac{1}{2}$ 18 $3\frac{3}{5}$ 20 15 3 -3



Solve the problems using equations.

⑬

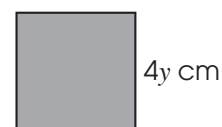


What is the value of x if the perimeter of the rectangle is

a. 234 cm?

b. 65 cm?

⑭



What is the value of y if the area of the square is

a. 64 cm^2 ?

b. 256 cm^2 ?