Year 9 Equations and Inequalities – Mixed Practice

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Answers and worked solutions · 30 questions

A. Mixed practice (mixed order)

1. **x = 3, y = 5**

Add the equations to eliminate y

x = 3; substitute to find y = 5

2. **x = 4**

Expand: 20x − 20 = 4x + 44

Collect x terms: 16x = 64; x = 4

3. **x = 3**

Multiply by x: x + 9 = 4x

9 = 3x, so x = 3

4. **2 < x ≤ 6**

Subtract 2 from all three parts: 6 < 3x ≤ 18

Divide all three parts by 3: 2 < x ≤ 6

5. **a = (F − 10)/m**

Undo the operations on a in reverse order

a = (F − 10)/m

6. **x = 5**

Expand: 8x + 18 = 6x + 28

Collect x terms: 2x = 10; x = 5

7. **0 ≤ t ≤ 4**

A filled circle means the value is included (≤ or ≥); an open circle means it is not (< or >)

0 ≤ t ≤ 4

8. **pen $5, notebook $4**

2p + 2n = 18 and 6p + 2n = 38

Eliminate one letter, solve, then substitute back: pen $5, notebook $4

9. **x = 5**

Subtract 5: 10/x = 2

Multiply by x: 10 = 2x, so x = 5

10. **x = 3, y = 2**

The solution is the point where the two lines cross

They cross at (3, 2)

Check: y = 2x − 4 and 2x + y = 8 are both true there

11. **C = 30ns² + 25**

The area of one slab is s² m², so n slabs cover ns² m²

Cost of slabs: 30ns²; add the delivery: C = 30ns² + 25

12. x = −2, y = 6

Match the y terms, then eliminate y

x = −2; substitute to find y = 6

13. 120/t = 60; t = 2 hours

Speed = distance ÷ time: 120/t = 60

120 = 60t; t = 2 hours

14. r = C/(2π)

Undo the operations on r in reverse order

r = C/(2π)

15. 12 + 12n ≤ 200; 15 groups

12 + 12n ≤ 200

12n ≤ 188, so n ≤ 15 2/3; Greatest whole number: 15

16. x ≥ 4

Subtract 3x: 2x + 3 ≥ 11

2x ≥ 8

x ≥ 4

17. x = 0

Multiply both sides by 2: 7x − 4 = −4

7x = 0; x = 0

18. x = 1, y = −2

The solution is the point where the two lines cross

They cross at (1, −2)

Check: y = −x − 1 and 2x + y = 0 are both true there

19. Yes. 3x + y = 7 is true; x − 2y = 7 is also true, so it is the solution.

Substitute x = 3 and y = −2 into both equations

First: 7; second: 7

A solution must make both equations true

20. x < 4

Subtract 3: 5x < 20

Divide by 5: x < 4

21. V = 9b²

Volume = area of base × height

= b² × 9 = 9b²

22. 2(2x + 2 + x − 2) = 54; x = 9, so the rectangle is 20 cm by 7 cm

2(3x) = 54

3x = 27; x = 9

23. 2(x + 3 + 4) < 50; x = 17 (a perimeter of 48 cm)

2(x + 7) < 50

x + 7 < 25, so x < 18; Largest whole number: 17

24. t > −1

A filled circle means the value is included (≤ or ≥); an open circle means it is not (< or >)

t > −1

25. Mistake: adding gives 2y, so y is not eliminated; subtract instead. Correct: x = 6, y = 2

Error: adding gives 2y, so y is not eliminated; subtract instead

2x = 12, so x = 6

y = 8 − 6 = 2

26. Yes. For example 2 < 5 but −2 > −5.

Substitute values, or rearrange

For example 2 < 5 but −2 > −5.

Decide

27. x = 5, y = −1

Match the y terms, then eliminate y

x = 5; substitute to find y = −1

28. $u = (s - 5t^2)/t$

Undo the operations on u in reverse order

$u = (s - 5t^2)/t$

29. apple 158 g, melon 1041 g

4a + 1m = 1673 and 2a + 1m = 1357

Eliminate one letter, solve, then substitute back: apple 158 g, melon 1041 g

30. x = 4

Multiply both sides by x: 12 = 3x

x = 12 ÷ 3 = 4