Year 8 Sequences, Functions and Graphs – Mixed Practice

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Answers and worked solutions · 30 questions

A. Mixed practice (mixed order)

1. **gradient −2, y-intercept 1**

Compare with y = mx + c: m = −2, c = 1

2. **−3, −5, −7, −9**

n = 1: −3; n = 2: −5

n = 3: −7; n = 4: −9

3. **2n + 3**

Difference 2, so the rule starts 2n

When n = 1, 2n = 2 and the first term is 5: 2n + 3

4. **gradient 3, y-intercept 1**

Compare with y = mx + c: m = 3, c = 1

5. **6**

Undo − 3: 0 + 3 = 3

Undo × 1/2: 3 × 2 = 6

6. **gradient −4, y-intercept −5**

Compare with y = mx + c: m = −4, c = −5

7. **−3n + 24**

Difference −3, so the rule starts −3n

When n = 1, −3n = −3 and the first term is 21: −3n + 24

8. **add 2/5; 2 4/5, 3 1/5**

The difference between terms is 2/5

2 2/5 + 2/5 = 2 4/5, then 3 1/5

9. **7.25, 7.5, 7.75, 8**

n = 1: 7.25; n = 2: 7.5

n = 3: 7.75; n = 4: 8

10. **add 1/4; 1 1/2, 1 3/4**

The difference between terms is 1/4

1 1/4 + 1/4 = 1 1/2, then 1 3/4

11. **y = 4x + 25**

The fixed amount is the y-intercept: c = 25

The rate is the gradient: m = 4

y = 4x + 25

12. **gradient 1, y-intercept 8**

Compare with y = mx + c: m = 1, c = 8

13. gradient 3; y = 3x – 5

Gradient = change in y ÷ change in x = 15 ÷ 5 = 3

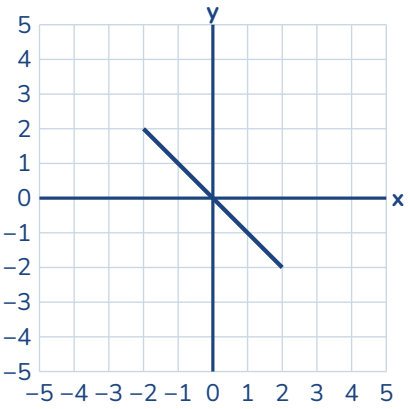
y = 3x + c; substitute (–2, –11): c = –5

y = 3x – 5

14. y = 2, 1, 0, –1, –2

Substitute each x: x = –2 → y = 2, x = –1 → y = 1, x = 0 → y = 0, x = 1 → y = –1, x = 2 → y = –2

Plot the points and join them with a ruler: a straight line



15. –5n + 20

Difference –5, so the rule starts –5n

When n = 1, –5n = –5 and the first term is 15: –5n + 20

16. 6

Undo + 6: 10 – 6 = 4

Undo × 2/3: 4 × 3/2 = 6

17. Yes. 3n + 1 = 100 gives n = 33, a whole number, so 100 is the 33rd term.

Substitute or rearrange

3n + 1 = 100 gives n = 33, a whole number, so 100 is the 33rd term.

Decide

18. –2, –4, –6, –8

n = 1: –2; n = 2: –4

n = 3: –6; n = 4: –8

19. at x = 5 (y = 25): both cost $25 for 5 hours; company A for 7 hours ($31 against $35)

3x + 10 = 5x, so 2x = 10, x = 5

For 7 hours: A = 31, B = 35

After the intersection, the line with the smaller gradient is lower

20. No. Counter-example: y = 5x has y-intercept 0 but y = x + 3 has y-intercept 3; steepness depends on m, not c.

Substitute or rearrange

Counter-example: y = 5x has y-intercept 0 but y = x + 3 has y-intercept 3; steepness depends on m, not c.

Decide

21. 2n + 7

Difference 2, so the rule starts 2n

When n = 1, 2n = 2 and the first term is 9: 2n + 7

22. **–3**

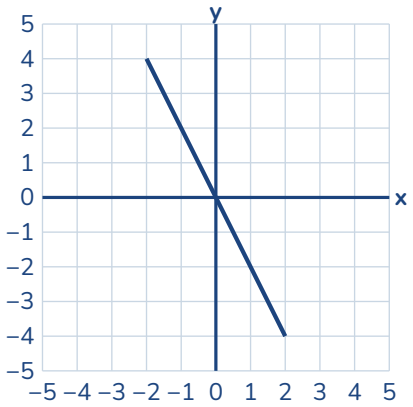
0 × 3/4 = 0

0 – 3 = –3

23. **y = 4, 2, 0, –2, –4**

Substitute each x: x = –2 → y = 4, x = –1 → y = 2, x = 0 → y = 0, x = 1 → y = –2, x = 2 → y = –4

Plot the points and join them with a ruler: a straight line



24. **The gradient is the coefficient of x: y = 2x + 1, so the gradient is 2 and the y-intercept is 1.**

Error: the gradient and intercept were swapped

Rewrite as y = 2x + 1

gradient 2, y-intercept 1

25. **add 1/6; 1 2/3, 1 5/6**

The difference between terms is 1/6

1 1/2 + 1/6 = 1 2/3, then 1 5/6

26. **10.5, 13, 15.5, 18**

n = 1: 10.5; n = 2: 13

n = 3: 15.5; n = 4: 18

27. **y = 9x + 14**

The fixed amount is the y-intercept: c = 14

The rate is the gradient: m = 9

y = 9x + 14

28. **gradient –1; y = –x**

Gradient = change in y ÷ change in x = –6 ÷ 6 = –1

y = –x + c; substitute (–3, 3): c = 0

y = –x

29. **4n + 1; 117**

Adds 4 each time: 4n

Pattern 1: 4 × 1 + 1 = 5

Pattern 29: 4 × 29 + 1 = 117

30. **gradient 3, y-intercept 4**

Compare with y = mx + c: m = 3, c = 4