# 2.9 Sequences, Patterns and Formulae: 1-hour Pack

ISEB CE 13+ Mathematics · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** The nth term of a sequence is 9n + 4. What is the 30th term?

- ☐ A) 266
- ☐ B) 390
- ☐ C) 283
- ☐ D) 274
- ☐ E) 306

---

**2** Here are the first 4 terms of a sequence: 5, 8, 11, 14. What is the nth term?

- ☐ A) 3n - 2
- ☐ B) 2n + 3
- ☐ C) 3n + 2
- ☐ D) n + 5
- ☐ E) 3n + 5

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**3** The nth term of a sequence is 9n - 4. What is the 27th term?

- ☐ A) 239
- ☐ B) 207
- ☐ C) 32
- ☐ D) 247
- ☐ E) 248

---

**4** Here are the first 5 terms of a sequence: -3, 0, 3, 6, 9. What is the nth term?

- ☐ A) 3n - 3
- ☐ B) 3n - 9
- ☐ C) 3n + 6
- ☐ D) 3n - 6
- ☐ E) n - 3


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**5** Here are the first 4 terms of a sequence: -3, 0, 3, 6. What is the nth term?

- [ ] A) 4n - 6
- [ ] B) 3n - 3
- [ ] C) -3n - 6
- [ ] D) n - 3
- [ ] E) 3n - 6

---

**6** The nth term of a sequence is 7n - 8. Which of these numbers is a term in the sequence?

- [ ] A) 104
- [ ] B) 105
- [ ] C) 101
- [ ] D) 106
- [ ] E) 107

---

**7** Here are the first 4 terms of a sequence: 4, 12, 20, 28. What is the nth term?

- [ ] A) 9n - 4
- [ ] B) -8n - 4
- [ ] C) -4n + 8
- [ ] D) 8n + 4
- [ ] E) 8n - 4

---

**8** The nth term of a sequence is 7n + 3. What is the 50th term?

- [ ] A) 360
- [ ] B) 353
- [ ] C) 347
- [ ] D) 500
- [ ] E) 60

---

**9** Here are the first 4 terms of a sequence: 3, 8, 13, 18. What is the nth term?

- [ ] A) 5n - 7
- [ ] B) -5n - 2
- [ ] C) 5n - 2
- [ ] D) -2n + 5
- [ ] E) 5n + 3


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**10** The nth term of a sequence is 6n - 8. Which of these numbers is a term in the sequence?

- [ ] A) 133
- [ ] B) 129
- [ ] C) 132
- [ ] D) 130
- [ ] E) 127

---

**11** The nth term of a sequence is 9n + 4. What is the 11th term?

- [ ] A) 143
- [ ] B) 112
- [ ] C) 135
- [ ] D) 103
- [ ] E) 95

---

**12** Here are the first 4 terms of a sequence: 6, 10, 14, 18. What is the nth term?

- [ ] A) 4n + 2
- [ ] B) 5n + 2
- [ ] C) -4n + 2
- [ ] D) 4n - 2
- [ ] E) 4n + 6

---

**13** The nth term of a sequence is 4n + 8. What is the 14th term?

- [ ] A) 48
- [ ] B) 168
- [ ] C) 64
- [ ] D) 26
- [ ] E) 88

---

**14** Here are the first 4 terms of a sequence: 0, 7, 14, 21. What is the nth term?

- [ ] A) 7n + 7
- [ ] B) 8n - 7
- [ ] C) 7n - 14
- [ ] D) 7n
- [ ] E) 7n - 7


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**15** The nth term of a sequence is 8n + 7. What is the 52nd term?

- [ ] A) 431
- [ ] B) 67
- [ ] C) 780
- [ ] D) 423
- [ ] E) 2912

---

**16** Here are the first 4 terms of a sequence: 2, 10, 18, 26. What is the nth term?

- [ ] A) -6n + 8
- [ ] B) 8n - 6
- [ ] C) -8n - 6
- [ ] D) 8n - 14
- [ ] E) 8n + 2

---

**17** Here are the first 5 terms of a sequence: -1, 7, 15, 23, 31. What is the nth term?

- [ ] A) -9n + 8
- [ ] B) 8n - 17
- [ ] C) 8n - 9
- [ ] D) 9n - 9
- [ ] E) n - 1

---

**18** The nth term of a sequence is 5n - 8. What is the 35th term?

- [ ] A) 135
- [ ] B) 32
- [ ] C) -1400
- [ ] D) 183
- [ ] E) 167

---

**19** Here are the first 4 terms of a sequence: -4, -1, 2, 5. What is the nth term?

- [ ] A) -3n - 7
- [ ] B) 3n + 7
- [ ] C) -7n + 3
- [ ] D) 3n - 7
- [ ] E) 3n - 4


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**20** The nth term of a sequence is 6n + 8. What is the 30th term?

- [ ] A) 172
- [ ] B) 194
- [ ] C) 420
- [ ] D) 44
- [ ] E) 188

---

**21** Here are the first 5 terms of a sequence: 12, 18, 24, 30, 36. What is the nth term?

- [ ] A) n + 12
- [ ] B) -6n + 6
- [ ] C) 6n + 6
- [ ] D) 6n
- [ ] E) 6n + 12

---

**22** The nth term of a sequence is 5n - 7. What is the 55th term?

- [ ] A) 282
- [ ] B) 268
- [ ] C) 240
- [ ] D) -1925
- [ ] E) 53

---

**23** Here are the first 4 terms of a sequence: 1, 10, 19, 28. What is the nth term?

- [ ] A) 9n - 8
- [ ] B) 9n + 1
- [ ] C) 9n - 17
- [ ] D) -9n - 8
- [ ] E) -8n + 9


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**24** The nth term of a sequence is $n^2 - n + 1$.

**(a)** Find the 1st term and the 5th term of the sequence. **(2)**

**(b)** A student says, 'I think 150 is a term in this sequence.' Show that the student is wrong. **(2)**

---

**25** The nth term of a sequence is 8n + 10. Which of these numbers is a term in the sequence?

- ☐ A) 252
- ☐ B) 247
- ☐ C) 250
- ☐ D) 248
- ☐ E) 251

---

**26** Here are the first 4 terms of a sequence: 12, 19, 26, 33. What is the nth term?

- ☐ A) -7n + 5
- ☐ B) 7n + 5
- ☐ C) 7n - 5
- ☐ D) 8n + 5
- ☐ E) n + 12

---

**27** The nth term of a sequence is 6n - 5. What is the 59th term?

- ☐ A) 60
- ☐ B) 355
- ☐ C) 359
- ☐ D) -1770
- ☐ E) 349


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**28** Here are the first 4 terms of a sequence: -4, -1, 2, 5. What is the nth term?

- [ ] A) -3n - 7
- [ ] B) -7n + 3
- [ ] C) 3n - 4
- [ ] D) 3n - 7
- [ ] E) n - 4

---

**29** The nth term of a sequence is 6n + 4. What is the 27th term?

- [ ] A) 166
- [ ] B) 37
- [ ] C) 648
- [ ] D) 270
- [ ] E) 186

---

**30** Here are the first 5 terms of a sequence: 1, 7, 13, 19, 25. What is the nth term?

- [ ] A) 6n + 1
- [ ] B) 6n + 5
- [ ] C) n + 1
- [ ] D) 7n - 5
- [ ] E) 6n - 5

---

**31** The nth term of a sequence is 9n - 7. What is the 58th term?

- [ ] A) -3654
- [ ] B) 529
- [ ] C) 524
- [ ] D) 515
- [ ] E) 459

---

**32** The nth term of a sequence is 2n + 6. What is the 60th term?

- [ ] A) 128
- [ ] B) 126
- [ ] C) 114
- [ ] D) 68
- [ ] E) 720


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**33** Here are the first 5 terms of a sequence: -1, -6, -11, -16, -21. What is the nth term?

- [ ] A) -5n - 1
- [ ] B) -4n + 4
- [ ] C) -5n + 4
- [ ] D) -5n - 4
- [ ] E) -5n + 9

---

**34** The nth term of a sequence is 9n - 2. What is the 57th term?

- [ ] A) 495
- [ ] B) 515
- [ ] C) 64
- [ ] D) 399
- [ ] E) 511

---

**35** Here are the first 4 terms of a sequence: 19, 28, 37, 46. What is the nth term?

- [ ] A) -9n + 10
- [ ] B) 10n + 9
- [ ] C) 9n + 10
- [ ] D) 9n - 10
- [ ] E) 9n + 19

---

**36** The nth term of a sequence is 8n + 11. What is the 47th term?

- [ ] A) 66
- [ ] B) 4136
- [ ] C) 464
- [ ] D) 387
- [ ] E) 365

---

**37** Here are the first 5 terms of a sequence: 8, 17, 26, 35, 44. What is the nth term?

- [ ] A) -n + 9
- [ ] B) 9n - 1
- [ ] C) n + 8
- [ ] D) 10n - 1
- [ ] E) 9n + 8


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**38** Here are the first 4 terms of a sequence: 0, 5, 10, 15. What is the nth term?

- [ ] A) n
- [ ] B) 5n
- [ ] C) 5n + 5
- [ ] D) -5n - 5
- [ ] E) 5n - 5

---

**39** The nth term of a sequence is 9n - 2. What is the 18th term?

- [ ] A) 164
- [ ] B) -324
- [ ] C) 160
- [ ] D) 126
- [ ] E) 169

---

**40** Here are the first 4 terms of a sequence: 20, 29, 38, 47. What is the nth term?

- [ ] A) 9n - 11
- [ ] B) 9n + 11
- [ ] C) -9n + 11
- [ ] D) 11n + 9
- [ ] E) 10n + 11

---

**41** The nth term of a sequence is 7n + 1. What is the 26th term?

- [ ] A) 183
- [ ] B) 189
- [ ] C) 182
- [ ] D) 208
- [ ] E) 181

---

**42** Here are the first 5 terms of a sequence: 17, 26, 35, 44, 53. What is the nth term?

- [ ] A) 10n + 8
- [ ] B) 9n - 8
- [ ] C) 9n + 17
- [ ] D) 9n + 8
- [ ] E) -9n + 8


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**43** The nth term of a sequence is 8n + 10. What is the 13th term?

- [ ] A) 94
- [ ] B) 184
- [ ] C) 234
- [ ] D) 114
- [ ] E) 31

---

**44** The nth term of a sequence is 2n + 7. What is the 41st term?

- [ ] A) 96
- [ ] B) 91
- [ ] C) 369
- [ ] D) 50
- [ ] E) 89

---

**45** Here are the first 4 terms of a sequence: -3, 1, 5, 9. What is the nth term?

- [ ] A) 5n - 7
- [ ] B) 4n - 7
- [ ] C) 4n + 7
- [ ] D) -7n + 4
- [ ] E) 4n - 3

---

**46** The nth term of a sequence is 5n - 3. What is the 17th term?

- [ ] A) 34
- [ ] B) 70
- [ ] C) 82
- [ ] D) 88
- [ ] E) 19

---

**47** Here are the first 5 terms of a sequence: -5, -1, 3, 7, 11. What is the nth term?

- [ ] A) 4n - 5
- [ ] B) n - 5
- [ ] C) 4n - 9
- [ ] D) 4n + 9
- [ ] E) 4n - 13


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**48** The nth term of a sequence is 4n + 10. What is the 36th term?

- [ ] A) 1440
- [ ] B) 154
- [ ] C) 504
- [ ] D) 50
- [ ] E) 158

---

**49** Here are the first 4 terms of a sequence: 10, 15, 20, 25. What is the nth term?

- [ ] A) 5n + 5
- [ ] B) n + 10
- [ ] C) 5n
- [ ] D) 6n + 5
- [ ] E) 5n + 10

---

**50** The nth term of a sequence is 5n - 2. What is the 15th term?

- [ ] A) 45
- [ ] B) 77
- [ ] C) -150
- [ ] D) 65
- [ ] E) 73

---

**51** Here are the first 4 terms of a sequence: 14, 21, 28, 35. What is the nth term?

- [ ] A) 7n + 14
- [ ] B) 7n
- [ ] C) 7n - 7
- [ ] D) 7n + 7
- [ ] E) -7n + 7

---

**52** The nth term of a sequence is 4n + 10. What is the 31st term?

- [ ] A) 45
- [ ] B) 434
- [ ] C) 114
- [ ] D) 138
- [ ] E) 134


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**53** Here are the first 4 terms of a sequence: 18, 25, 32, 39. What is the nth term?

- ☐ A) 11n + 7
- ☐ B) -7n + 11
- ☐ C) 7n + 4
- ☐ D) 7n + 11
- ☐ E) 7n + 18

---

**54** Here are the first 5 terms of a sequence: 17, 25, 33, 41, 49. What is the nth term?

- ☐ A) 8n + 1
- ☐ B) n + 17
- ☐ C) 8n + 9
- ☐ D) 9n + 9
- ☐ E) -8n + 9


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**55** Here are the first 4 terms of a sequence: 7, 13, 19, 25. What is the nth term?

- ☐ A) 6n + 1
- ☐ B) 6n - 1
- ☐ C) n + 6
- ☐ D) -6n + 1
- ☐ E) 6n + 7

---

**56** A theatre has rows of seats. Row 1 has 8 seats, row 2 has 11 seats, row 3 has 14 seats, and so on, with each row having 3 more seats than the row before.

**(a)** Find a formula for the number of seats in row n. **(2)**

.....

**(b)** The theatre has 20 rows. Calculate the number of seats in row 20. **(2)**

.....

**(c)** The manager says, 'No row has exactly 100 seats.' Determine whether the manager is correct. **(2)**


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# Mark scheme · 2.9 Sequences, Patterns and Formulae: 1-hour Pack

## Question 1

D cao (274); 9 x 30 + 4 **B1**

**Answer: D) 274**

## Question 2

C cao (3n + 2); common difference gives the coefficient of n; then adjust **B1**

**Answer: C) 3n + 2**

## Question 3

A cao (239); 9 x 27 - 4 **B1**

**Answer: A) 239**

## Question 4

D cao (3n - 6); common difference gives the coefficient of n; then adjust **B1**

**Answer: D) 3n - 6**

## Question 5

E cao (3n - 6); common difference gives the coefficient of n; then adjust **B1**

**Answer: E) 3n - 6**

## Question 6

A cao (104); the number must be -8 more than a multiple of 7 **B1**

**Answer: A) 104**

## Question 7

E cao (8n - 4); common difference gives the coefficient of n; then adjust **B1**

**Answer: E) 8n - 4**

## Question 8

B cao (353); 7 x 50 + 3 **B1**

**Answer: B) 353**

## Question 9

C cao (5n - 2); common difference gives the coefficient of n; then adjust **B1**

**Answer: C) 5n - 2**

## Question 10

D cao (130); the number must be -8 more than a multiple of 6 **B1**

**Answer: D) 130**

## Question 11

D cao (103); 9 x 11 + 4 **B1**

**Answer: D) 103**

## Question 12

A cao (4n + 2); common difference gives the coefficient of n; then adjust **B1**

**Answer: A) 4n + 2**

## Question 13

C cao (64); 4 x 14 + 8 **B1**

**Answer: C) 64**

## Question 14

E cao (7n - 7); common difference gives the coefficient of n; then adjust **B1**

**Answer: E) 7n - 7**

## Question 15

D cao (423); 8 x 52 + 7 **B1**

**Answer: D) 423**

## Question 16

B cao (8n - 6); common difference gives the coefficient of n; then adjust **B1**

**Answer: B) 8n - 6**

## Question 17

C cao (8n - 9); common difference gives the coefficient of n; then adjust **B1**

**Answer: C) 8n - 9**

## Question 18

E cao (167); 5 x 35 - 8 **B1**

**Answer: E) 167**

## Question 19

D cao (3n - 7); common difference gives the coefficient of n; then adjust **B1**

**Answer: D) 3n - 7**

## Question 20

E cao (188); 6 x 30 + 8 **B1**

**Answer: E) 188**

## Question 21

C cao (6n + 6); common difference gives the coefficient of n; then adjust **B1**

**Answer: C) 6n + 6**

## Question 22

B cao (268); 5 x 55 - 7 **B1**

**Answer: B) 268**

## Question 23

A cao (9n - 8); common difference gives the coefficient of n; then adjust **B1**

**Answer: A) 9n - 8**

## Question 24

(a) 1st term = 1 **B1**

(a) 5th term = 21 **B1**

**(a) Answer: 1st term = 1, 5th term = 21**

(b) finds the 12th term (133) and the 13th term (157) **M1**

(b) cso: concludes 150 lies strictly between two consecutive terms, so it cannot be a term **A1**

**(b) Answer: 150 is not a term: the 12th term is 133 and the 13th term is 157, and 150 falls between them**


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## Question 25

C cao (250); the number must be 10 more than a multiple of 8 **B1**

**Answer: C) 250**

## Question 26

B cao (7n + 5); common difference gives the coefficient of n; then adjust **B1**

**Answer: B) 7n + 5**

## Question 27

E cao (349); 6 x 59 - 5 **B1**

**Answer: E) 349**

## Question 28

D cao (3n - 7); common difference gives the coefficient of n; then adjust **B1**

**Answer: D) 3n - 7**

## Question 29

A cao (166); 6 x 27 + 4 **B1**

**Answer: A) 166**

## Question 30

E cao (6n - 5); common difference gives the coefficient of n; then adjust **B1**

**Answer: E) 6n - 5**

## Question 31

D cao (515); 9 x 58 - 7 **B1**

**Answer: D) 515**

## Question 32

B cao (126); 2 x 60 + 6 **B1**

**Answer: B) 126**

## Question 33

C cao (-5n + 4); common difference gives the coefficient of n; then adjust **B1**

**Answer: C) -5n + 4**

## Question 34

E cao (511); 9 x 57 - 2 **B1**

**Answer: E) 511**

## Question 35

C cao (9n + 10); common difference gives the coefficient of n; then adjust **B1**

**Answer: C) 9n + 10**

## Question 36

D cao (387); 8 x 47 + 11 **B1**

**Answer: D) 387**

## Question 37

B cao (9n - 1); common difference gives the coefficient of n; then adjust **B1**

**Answer: B) 9n - 1**

## Question 38

E cao (5n - 5); common difference gives the coefficient of n; then adjust **B1**

**Answer: E) 5n - 5**

## Question 39

C cao (160); 9 x 18 - 2 **B1**

**Answer: C) 160**

## Question 40

B cao (9n + 11); common difference gives the coefficient of n; then adjust **B1**

**Answer: B) 9n + 11**

## Question 41

A cao (183); 7 x 26 + 1 **B1**

**Answer: A) 183**

## Question 42

D cao (9n + 8); common difference gives the coefficient of n; then adjust **B1**

**Answer: D) 9n + 8**

## Question 43

D cao (114); 8 x 13 + 10 **B1**

**Answer: D) 114**

## Question 44

E cao (89); 2 x 41 + 7 **B1**

**Answer: E) 89**

## Question 45

B cao (4n - 7); common difference gives the coefficient of n; then adjust **B1**

**Answer: B) 4n - 7**

## Question 46

C cao (82); 5 x 17 - 3 **B1**

**Answer: C) 82**

## Question 47

C cao (4n - 9); common difference gives the coefficient of n; then adjust **B1**

**Answer: C) 4n - 9**

## Question 48

B cao (154); 4 x 36 + 10 **B1**

**Answer: B) 154**

## Question 49

A cao (5n + 5); common difference gives the coefficient of n; then adjust **B1**

**Answer: A) 5n + 5**

## Question 50

E cao (73); 5 x 15 - 2 **B1**

**Answer: E) 73**


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## Question 51

D cao (7n + 7); common difference gives the coefficient of n; then adjust **B1**

**Answer: D) 7n + 7**

## Question 52

E cao (134); 4 x 31 + 10 **B1**

**Answer: E) 134**

## Question 53

D cao (7n + 11); common difference gives the coefficient of n; then adjust **B1**

**Answer: D) 7n + 11**

## Question 54

C cao (8n + 9); common difference gives the coefficient of n; then adjust **B1**

**Answer: C) 8n + 9**

## Question 55

A cao (6n + 1); common difference gives the coefficient of n; then adjust **B1**

**Answer: A) 6n + 1**

## Question 56

(a) common difference = 3 **M1**

(a) seats = 3n + 5 (oe) **A1**

**(a) Answer: 3n + 5**

(b) substitutes n = 20 into 3n + 5 **M1**

(b) 65 (cao) **A1**

**(b) Answer: 65**

(c) sets 3n + 5 = 100 and solves to n = 31.67 (or 31 and 2/3, oe) **M1**

(c) concludes the manager is correct, since n is not a whole number **A1**

**(c) Answer: The manager is correct: n = 31.67 (recurring), which is not a whole number**


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