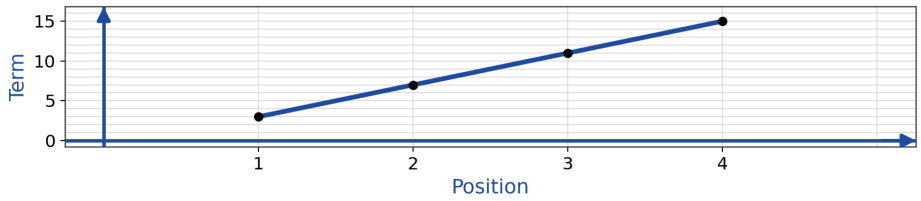
NUNAVUT MATH 20-2 · UNIT 1 · 25 QUESTIONS

Inductive and Deductive Reasoning — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **The graph shows the first four terms of a pattern, plotted against position. A conjecture for the next term is**



- **A** 18
- **B** 19
- **C** 20
- **D** 23

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2 **A counterexample is best described as**

A an example that proves a conjecture is true in every case

B a statement that has been proven using deductive reasoning

C a specific example that shows a conjecture is false

D a conclusion reached by observing a pattern

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3 **Sofia conjectures that all prime numbers are odd. Which number is a counterexample to her conjecture?**

A 7

B 2

C 9

D 13

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4 **Reaching a general conclusion based on observations of a pattern is an example of**

A deductive reasoning

B a proof

C inductive reasoning

D a counterexample

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5 **The terms of a pattern are 1, 4, 9, 16, 25, …, where each term is the square of its position. Following the same pattern, the 8th term is _____ Record your answer as a whole number.**

ANSWER _____

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6 **Every rectangle has diagonals that are equal in length. ABCD is a rectangle. Which conclusion follows by deductive reasoning?**

A The diagonals of ABCD are equal in length.

B ABCD must be a square.

C Every quadrilateral has diagonals that are equal in length.

D The diagonals of ABCD are perpendicular.

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7 **Liam wore his lucky socks when he wrote a test and earned a high mark. He concludes that wearing the socks causes him to earn high marks. Liam's conclusion is based on**

A a valid deductive proof

B inductive reasoning from a single observation

C a counterexample

D a mathematical definition

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8 The first five terms of a pattern are 2, 6, 12, 20, 30, … The next term is

- A 36
- B 40
- C 42
- D 44

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9 Points are placed around a circle and every pair of points is joined by a segment. For 2, 3, 4 and 5 points, the numbers of segments are 1, 3, 6 and 10. Following the same pattern, the number of segments for 8 points is _____ Record your answer as a whole number.

ANSWER _____

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10 **Which number is a counterexample to the conjecture: every multiple of 3 is also a multiple of 6?**

- **A** 12
- **B** 9
- **C** 18
- **D** 24

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11 **Which of the following is a valid deductive proof that the sum of two odd integers is always even?**

- **A** 3 + 5 = 8, 7 + 1 = 8 and 9 + 13 = 22 are all even, so the sum of two odd integers is always even.
- **B** Odd integers end in 1, 3, 5, 7 or 9, and adding two of these digits can produce an even number.
- **C** The sum of two even integers is even, so the sum of two odd integers must be even as well.
- **D** Let the integers be 2m + 1 and 2n + 1. Their sum is 2(m + n + 1), which is a multiple of 2, so the sum is even.

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12 **A matchstick pattern uses 4 sticks for the first figure, 7 sticks for the second figure and 10 sticks for the third figure. If the pattern continues, the number of sticks in the 15th figure is**

- A 43
- B 45
- C 46
- D 48

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13 **A pattern for the sums of odd numbers is 1 = 1, 1 + 3 = 4, 1 + 3 + 5 = 9 and 1 + 3 + 5 + 7 = 16. Following the same pattern, the sum of the first 12 odd numbers is _____ Record your answer as a whole number.**

ANSWER _____

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14 **Consider the argument: If a quadrilateral is a square, then it has four equal sides. Quadrilateral P has four equal sides, so P must be a square. The flaw in this argument is that**

- **A** the conclusion does not follow, because a rhombus that is not a square also has four equal sides
- **B** the first statement is false, because squares do not have four equal sides
- **C** four equal sides is not a property of any quadrilateral
- **D** there is no flaw, because the argument uses deductive reasoning correctly

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15 **Which of the following statements is false?**

- **A** The sum of two even integers is always even.
- **B** The product of two odd integers is always odd.
- **C** The product of an even integer and an odd integer is always even.
- **D** The sum of an even integer and an odd integer is always even.

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16 **The triangular numbers are 1, 3, 6, 10, 15, …, formed by adding consecutive counting numbers. Following the same pattern, the 11th triangular number is _____ Record your answer as a whole number.**

ANSWER _____

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17 **Which number is a counterexample to the conjecture: every multiple of 5 ends in the digit 5?**

A 15

B 30

C 45

D 55

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18 **All students enrolled in Math 20-2 at a certain school write a common final exam. Jordan is enrolled in Math 20-2 at that school. Which conclusion follows by deductive reasoning?**

A Jordan writes a common final exam.

B Jordan will earn the highest mark on the exam.

C Jordan finds the exam easy.

D Jordan is enrolled in every course at the school.

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19 **The numbers of diagonals in polygons with 4, 5, 6 and 7 sides are 2, 5, 9 and 14. Following the same pattern, the number of diagonals in a polygon with 9 sides is _____ Record your answer as a whole number.**

ANSWER _____

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20 **The terms of a sequence are 1, 1, 2, 3, 5, 8, … Which conjecture best describes the pattern?**

- **A** Each term is the sum of the two terms immediately before it.
- **B** Every term is an odd number.
- **C** Each term is twice the term before it.
- **D** The terms increase by the same amount each time.

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21 **Alyssa claims that every multiple of 4 is also a multiple of 8. The most direct way to show that her claim is false is to**

- **A** test the first 100 multiples of 4
- **B** write a general algebraic proof
- **C** check several multiples of 4 to see whether they work
- **D** give one multiple of 4, such as 12, that is not a multiple of 8

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22 **Sums of consecutive counting numbers follow the pattern 1 = 1, 1 + 2 = 3, 1 + 2 + 3 = 6 and 1 + 2 + 3 + 4 = 10. Following the same pattern, the sum 1 + 2 + 3 + … + 30 is _____ Record your answer as a whole number.**

ANSWER _____

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23 **Every time Noah has used a particular calculator app, it has produced the correct answer. Noah concludes that the app will always produce correct answers. This conclusion**

A is reached by inductive reasoning, so it is not guaranteed to be true

B is proven by deductive reasoning

C is a counterexample to the app being reliable

D follows from the definition of a calculator

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24 **Four runners, Ana, Ben, Cara and Dan, finish a race in different positions. Ana finished ahead of Ben. Cara finished behind Dan but ahead of Ana. The runner who finished first is**

A Ana

B Ben

C Cara

D Dan

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25 **A pattern begins 3, 6, 11, 18, 27, …, where 3, 5, 7, 9, … are added in turn. Following the same pattern, the 9th term is _____ Record your answer as a whole number.**

ANSWER _____

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ANSWER KEY

1. B
2. C
3. B
4. C
5. 64
6. A
7. B
8. C
9. 28
10. B
11. D
12. C
13. 144
14. A
15. D
16. 66
17. B
18. A
19. 27
20. A
21. D
22. 465
23. A
24. D
25. 83

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