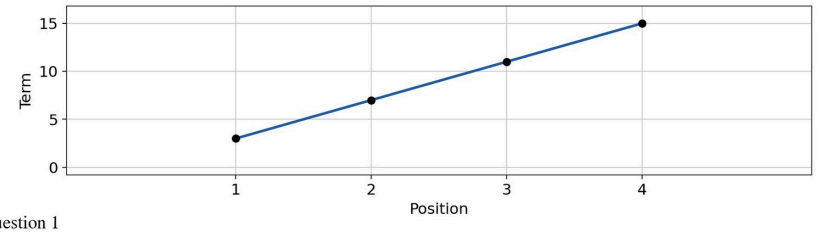
ALBERTA MATH 20-2 · UNIT 1 · 25 QUESTIONS

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**



Question 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

- **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**

Question 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 15 th figure is

A) 43 B) 45

C) 46 D) 48

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. What is the most direct way to show that her claim is false?**

- **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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