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Precalculus_G11_Ch10_Test

Indicate the answer choice that best completes the statement or answers the question.

1. Which of the following statements is (are) true for all positive integers?

1) $4^n - 1$is divisible by 3.
2) $5^n - 1$is divisible by 6.

a. Both statements are true. b. None of the statements are true.
c. Only the second statement is true. d. Only the first statement is true.

2. Which of the following statements is (are) true for all positive integers?

1) $7^n - 2^n$is divisible by 5.
2) $n^2 + 2n$is divisible by 2.

a. Both statements are true. b. None of the statements are true.
c. Only the first statement is true. d. Only the second statement is true.

3. Which of the following statements is (are) true for all positive integers?

1) $n^3 + 2n$is divisible by 3.
2) $5^{2n} - 1$is divisible by 24.

a. Both statements are true. b. None of the statements are true.
c. Only the first statement is true. d. Only the second statement is true.

4. Which of the following statements is (are) true for all positive integers?

1) $1 + 3 + 5 + \ldots + n = 2n^2$
2) $1^3 + 2^3 + 3^3 + \ldots + n^3 = \frac{1}{4}n^2(n+1)^2$

a. Both statements are true. b. None of the statements are true.
c. Only the first statement is true. d. Only the second statement is true.

5. Which of the following statements is (are) true for all positive integers?

1) $2 + 2^2 + 2^3 + \ldots + 2^n = 2^{n+1} - 2$
2) $1 + 3 + 5 + \ldots + n = n^3$

a. Both statements are true. b. None of the statements are true.
c. Only the first statement is true. d. Only the second statement is true.

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6. Use Euler's formula to write $5\sqrt{2} - 5i\sqrt{2}$ in exponential form.

a. $5e^{i\frac{7\pi}{4}}$ b. $10e^{i\frac{7\pi}{4}}$
c. $10e^{i\frac{\pi}{4}}$ d. $e^{i\frac{7\pi}{4}}$

7. Find $\sum_{k=1}^{6}(6k+5)$.

a. $11 + 17 + 23 + 29 + 35; 41$ b. $11 + 17 + 23 + 29 + 35 + 41; 156$
c. $17 + 23 + 29 + 35 + 41; 11$ d. $11 + 17 + 23 + 29 + 35; 156$

8. Use Euler's formula to write $-10\sqrt{3} + 10i$ in exponential form.

a. $e^{i\frac{5\pi}{6}}$ b. $2e^{i\frac{5\pi}{6}}$
c. $20e^{i}$ d. $20e^{i\frac{5\pi}{6}}$

9. One minute after it is released, a hot-air balloon rises 120 feet. In each succeeding minute, the balloon rises only 60% as far as it rose in the previous minute. How far will the balloon rise in the fourth minute?

a. 72 ft b. 0.216 ft
c. 25.92 ft d. 121.8 ft

10. Use Euler's formula to write $9 + 9i\sqrt{3}$ in exponential form.

a. $18e^{i\frac{\pi}{3}}$ b. $9e^{i}$
c. $18e^{\frac{i}{3}}$ d. $3e^{\frac{i}{3}}$

11. What is the second part of the second step to prove that $S_n \Rightarrow 1 + 2 + 3 + \ldots + n = \frac{n(n+1)}{2}$?

a. Assume that S_n is valid for $n = k$. b. Verify that S_n is valid for $n = 1$.
c. Show that S_n is valid for $n = k$. d. Prove that S_n is valid for $n = k + 1$.

12. Find the geometric means in the following sequence.

-18, ?, ?, ?, ?, $-18{,}432$

a. $-288, -1{,}152, -4{,}608, -18{,}447$ b. $72, 288, 1{,}152, 4{,}608$
c. $-1{,}440, -2{,}160, -2{,}880, -3{,}600$ d. $-72, -288, -1{,}152, -4{,}608$

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Find the coefficient of the indicated term in each expansion.

13. $(x + 3y)^7$, x^3y^4 term

a. 210 b. 2,835
c. 17,010 d. 81

Use Pascal's triangle to expand each binomial.

14. $(2x + y)^4$

a. $x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$
b. $16x^4 + 32x^3y + 24x^2y^2 + 8xy^3 + y^4$
c. $16y^4 + 8y^3x + 4y^2x^2 + 2yx^3 + x^4$
d. $16x^4 + 8x^3y + 4x^2y^2 + 2xy^3 + y^4$

15. Use the first five terms of the exponential series of e^x and a calculator to approximate e^2. Round to the nearest hundredth.

a. $e^2 \approx 1 + 2 + \frac{4}{2} + \frac{8}{6} + \frac{16}{24} \approx 7.00$
b. $e^2 \approx 1 + 2 + \frac{8}{6} + \frac{16}{24} \approx 7.00$
c. $e^2 \approx 2 + \frac{4}{2} + \frac{8}{6} + \frac{16}{24} \approx 7.00$
d. $e^2 \approx 1 + \frac{4}{2} + \frac{8}{6} + \frac{16}{24} \approx 7.00$

16. Write an arithmetic sequence that has three arithmetic means between –25 and 71.

a. –25, –1, 24, 49, 71 b. –25, 47, 23, –1, 71
c. –25, –1, 23, 47, 71 d. –25, –9, 7, 23, 71

17. An airplane is traveling due east. After the first hour of the trip, it reaches a constant speed. The total distances traveled by the airplane after the first, second, and third hours are 465, 1105, and 1745 miles, respectively. If the airplane continues to travel at a constant velocity, calculate the total distance traveled by the airplane after the ninth hour.

a. 4185 miles b. 5585 miles
c. 5120 miles d. 6225 miles

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18. Find the sum of the given arithmetic series.

$\sum_{i=10}^{400} (30n + 11)$

a. 2,396,940 b. 2,408,951
c. 2,400,645 d. 2,287,350

19. Find the sum of the first 5 terms of the geometric series.

5 – 15 + 45 – ...

a. 304 b. 305
c. 303 d. 306

Write the expansion of each expression using sigma notation.

20. $(-6m + 6n)^5$

a. $\sum_{r=0}^{5} \binom{5}{r} (-6m)^{5-r}(6n)^r$ b. $\sum_{r}^{5} \binom{5}{r} (-6m)^{5-r}(6n)^r$

c. $\sum_{r=0}^{5} \binom{5}{r} (-6m)^{r}(6n)^{5-r}$ d. $\sum_{r=0}^{5} \binom{r}{5} (-6m)^{5-r}(6n)^r$

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