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**Precalculus_G11_Ch10_H.W**

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

2. 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.

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) $3^n + 3$ is divisible by 4.
2) $11^n + 15$ is divisible by 11.

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

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

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

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.

6. 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. $3e^{\frac{i}{3}}$

7. Find $\sum_{k=1}^{6}(8k+2)$.

a. $10+18+26+34+42;\ 180$
b. $18+26+34+42+50;\ 10$
c. $10+18+26+34+42;\ 50$
d. $10+18+26+34+42+50;\ 180$

8. Find the geometric means in the following sequence.

–25, _?_, _?_, _?_, _?_, –2,500,000

a. –2,500, –25,000, –250,000, –2,500,015
b. 250, 2,500, 25,000, 250,000
c. –5,000, –7,500, –10,000, –12,500
d. –250, –2,500, –25,000, –250,000

9. Find the sum of an infinite geometric series in which $a_1 = -4$ and $r = -0.04$. Round to the nearest hundredth if necessary.

a. –3.85
b. –3.6
c. –4.17
d. 3.92

10. Use Pascal's Triangle to expand $(6a - 7y)^6$.

a. $46{,}656a^6 - 326{,}592ay^5 + 1905120a^2y^4 - 5715360a^3y^3 + 2593080a^4y^2 - 605{,}052a^5y + 117{,}649y^6$
b. $46{,}656a^6 + 326{,}592a^5y + 952{,}560a^4y^2 + 1{,}481{,}760a^3y^3 + 1{,}296{,}540a^2y^4 + 605{,}052ay^5 + 117{,}649y^6$
c. $46{,}656a^6 - 326{,}592a^5y + 952{,}560a^4y^2 - 1{,}481{,}760a^3y^3 + 1{,}296{,}540a^2y^4 - 605{,}052ay^5 + 117{,}649y^6$
d. $6a^6 - 36a^5y + 630a^4y^2 - 840a^3y^3 + 630a^2y^4 - 36ay^5 + 6y^6$

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11. Find $\sum_{k=1}^{6}(2k+2)$.

a. $4+6+8+10+12;\ 14$ b. $4+6+8+10+12;\ 54$
c. $6+8+10+12+14;\ 4$ d. $4+6+8+10+12+14;\ 54$

12. Form a sequence that has two arithmetic means between 18 and 54.3.

a. 18, 28.1, 40.2, 54.3 b. 18, 54.3, 90.6, 126.9
c. 18, 30.1, 42.2, 54.3 d. 18, 36.15, 54.3, 72.45

13. 4th partial sum of $a_n = \frac{-3n+1}{n}$.

a. $-\frac{311}{20}$ b. $-\frac{2577}{140}$
c. $-\frac{119}{12}$ d. $-\frac{2551}{120}$

14. Write an arithmetic sequence that has three arithmetic means between 10 and 90.

a. 90, 50, 10, 70, 30 b. 10, 20, 30, 40, 50, 60, 70, 80, 90
c. 10, 30, 50, 70, 90 d. 10, 50, 90

15. What is the first step to prove that $S_n \Rightarrow 2+4+6+\ldots+2n = n(n+1)$?

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

16. A pool was sprayed with insecticide, and 2400 mosquitoes were killed on the first day, 600 on the second day, 150 on the third day, and so on. What number of mosquitoes was killed on the sixth day after the spraying? (Round the answer to the nearest whole number.)

a. 2401 b. 2
c. 0 d. 1

**Write the expansion of each expression using sigma notation.**

17. $(-5m-2n)^{15}$

a. $\sum_{r}^{15}\binom{15}{r}(-5m)^{15-r}(-2n)^{r}$ b. $\sum_{r=0}^{15}\binom{r}{15}(-5m)^{15-r}(-2n)^{r}$
c. $\sum_{r=0}^{15}\binom{15}{r}(-5m)^{r}(-2n)^{15-r}$ d. $\sum_{r=0}^{15}\binom{15}{r}(-5m)^{15-r}(-2n)^{r}$

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18. Use the first five terms of the exponential series of $e^x$ and a calculator to approximate $e^{0.7}$. Round to the nearest hundredth.

a. $e^{0.7} \approx 1 + 0.7 + \frac{0.49}{2} + \frac{0.343}{6} + \frac{0.2401}{24} \approx 2.01$

b. $e^{0.7} \approx 1 + 0.7 + \frac{0.343}{6} + \frac{0.2401}{24} \approx 2.01$

c. $e^{0.7} \approx 0.7 + \frac{0.49}{2} + \frac{0.343}{6} + \frac{0.2401}{24} \approx 2.01$

d. $e^{0.7} \approx 1 + \frac{0.49}{2} + \frac{0.343}{6} + \frac{0.2401}{24} \approx 2.01$

19. Find $S_n$ if $a_1 = 10$, $d = -10$, and $n = 16$.

a. –1120 b. –2080
c. 2500 d. –1040

20. 7th partial sum of $a_n = \frac{3n+3}{n}$.

a. $\frac{507}{20}$ b. $\frac{73}{4}$
c. $\frac{4029}{140}$ d. $\frac{437}{20}$

21. What is the second step to prove that $S_n \Rightarrow 2 + 2^2 + 2^3 + \ldots + 2^n = 2(2^n - 1)$?

a. Assume that $S_n$ is valid for $n = k$ and prove that $S_n$ is valid for $n = k + 1$.
b. Show that $S_n$ is valid for $n = k$.
c. Show that $S_n$ is valid for $n = k + 2$.
d. Verify that $S_n$ is valid for $n = 1$.

22. Find the next term of the geometric sequence.

6, –24, 96, –384...

a. –5,625 b. 1,639
c. 1,409 d. 1,536

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**Use Pascal's triangle to expand each binomial.**

23. $(x - 4y)^3$

a. $x^3 + 3x^2y + 3xy^2 + y^3$
b. $x^3 - 12x^2y + 48xy^2 - 64y^3$
c. $y^3 - 4y^2x + 16yx^2 - 64x^3$
d. $x^3 - 4x^2y + 16xy^2 - 64y^3$

24. $(2x + y)^4$

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. $16x^4 + 8x^3y + 4x^2y^2 + 2xy^3 + y^4$

25. Find $a_1$ if $S_n = 89{,}405$, $r = 3.2$, and $n = 3$. Round to the nearest hundredth if necessary.

a. 5,479.13 b. 104
c. 6,191.48 d. 29,798.47

**Find the coefficient of the indicated term in each expansion.**

26. $(5x - 4y)^7$, $x^2y^5$ term

a. 42 b. –537,600
c. –1,075,200 d. –25,600

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

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

28. Find the sum of the first 18 terms of the sequence 10, 14, 18, 22, 26, ...

a. 792 b. 794
c. 793 d. 791

29. Find $a_1$ if $S_n = 7{,}308$, $r = 4$, and $n = 3$.

a. 87 b. 348
c. 1,392 d. 768

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30. 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. $e^{i\frac{7\pi}{4}}$

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