**Name:** _____ **Class:** _____ **Date:** _____ **ID: A**

## Pre-Calculus Chapter 8 Practice Test

1. Write an expression for the apparent *n*th term of the sequence. (Assume that *n* begins with 1.)

   $5-\frac{4}{1}, 5-\frac{4}{2}, 5-\frac{4}{3}, 5-\frac{4}{4}, 5-\frac{4}{5},$

   a. $a_n = 4-\frac{n}{5}$

   b. $a_n = 5-\frac{4}{n}$

   c. $a_n = 4-\frac{5}{n}$

   d. $a_n = 5-\frac{n}{4}$

   e. $a_n = 5-\frac{4}{n+1}$

2. Use sigma notation to write the sum.

   $\frac{1}{3\cdot 2}+\frac{1}{4\cdot 3}+\ldots+\frac{1}{7\cdot 6}$

   a. $\sum_{n=1}^{5}\frac{1}{n(n+1)}$

   b. $\sum_{n=1}^{5}\frac{1}{(n+1)(n+2)}$

   c. $\sum_{n=1}^{3}\frac{1}{(n+1)(n+2)}$

   d. $\sum_{n=1}^{5}\frac{1}{(n+2)!}$

   e. $\sum_{n=0}^{4}\frac{1}{(n+1)(n+2)}$

3. Find the sum of the infinite series.

   $\sum_{i=1}^{\infty} 4\left(-\frac{1}{3}\right)^i$

   a. $\frac{3}{2}$

   b. undefined

   c. $-\frac{2}{1}$

   d. 4

   e. $-\frac{1}{1}$

4. Find a formula for $a_n$ for the arithmetic sequence.

   $a_1 = -4,\ d = -7$

   a. $a_n = -4-7^{n-1}$

   b. $a_n = -4\left(\frac{1}{-7}\right)^{n-1}$

   c. $a_n = -4-8n$

   d. $a_n = -7-4(n-1)$

   e. $a_n = 3-7n$

5. Find a formula for $a_n$ for the arithmetic sequence.

   $a_3 = 20,\ a_7 = 48$

   a. $a_n = 7+6n$

   b. $a_n = 6+7n$

   c. $a_n = 67^n$

   d. $a_n = 1+6n$

   e. $a_n = -1+7n$

6. Write the *n*th term of the arithmetic sequence as a function of *n*.

   $a_1 = -1,\ a_{k+1} = a_k + 3$

   a. $a_n = -1 + 3n$
   b. $a_n = -4 + 3n$
   c. $a_n = 2 + 3n$
   d. $a_n = 4 - n$
   e. $a_n = 2 + 3n$

7. Several logs are stored in a pile with 36 logs on the bottom layer, 35 on the second layer, 34 on the third layer, and so on. If the top layer has one log, how many logs are in the pile?

   a. 630
   b. 666
   c. 665
   d. 648
   e. none of the above

8. Find the eighth term of the geometric sequence whose second and fourth terms are 15 and 135.

   a. $a_8 = 10{,}935$
   b. $a_8 = 3{,}645$
   c. $a_8 = 32{,}805$
   d. $a_8 = 98{,}415$
   e. $a_8 = 1{,}215$

9. Find the indicated *n*th term of the geometric sequence.

   7th term: $a_6 = \frac{2}{243}, a_{11} = -\frac{2}{59{,}049}$

   a. $-\frac{2}{729}$
   b. $-\frac{3}{64}$
   c. $\frac{2}{2187}$
   d. $\frac{2}{243}$
   e. $-\frac{2}{6561}$

10. Use summation notation to write the sum.

    $2 + 6 + 18 + \ldots + 486$

    a. $\sum_{n=1}^{6} 2(3)^{n-1}$
    b. $\sum_{n=0}^{5} 2(3)^{n-1}$
    c. $\sum_{n=1}^{4} 2(3)^{n-1}$
    d. $\sum_{n=1}^{4} 2(3)^{n}$
    e. $\sum_{n=1}^{5} 2(3)^{n+1}$

11. Find $P_{k+1}$ for the given $P_k$.

    $P_k = \frac{4}{k(k+1)}$

    a. $P_{k+1} = \frac{16}{(k+1)(k+2)}$
    b. $P_{k+1} = \frac{4}{(k+1)(k+2)}$
    c. $P_{k+1} = \frac{4}{k(k+1)} + \frac{4}{(k+1)(k+2)}$
    d. $P_{k+1} = \frac{4}{k(k+2)}$
    e. $P_{k+1} = \frac{4}{k(k+1)} + 1$

12. Find a quadratic model for the sequence with the indicated terms.

    $a_0 = -7, a_1 = -9, a_3 = -7$

    a. $a_n = n^2 + 7n + 3$
    b. $a_n = n^2 - 10n - 7$
    c. $a_n = n^2 - 7$
    d. $a_n = n^2 - 3n - 7$
    e. $a_n = n^2 + 7n - 7$

13. Use the Binomial Theorem to expand and simplify the expression.

$(x-2)^5$

a. $x^4 - 8x^3 + 24x^2 - 32x + 16$
b. $x^5 - 8x^4 + 36x^3 - 72x^2 + 64x - 32$
c. $x^5 - 10x^4 + 40x^3 - 80x^2 + 80x - 32$
d. $x^5 - 10x^4 + 60x^3 - 120x^2 + 80x - 32$
e. $x^5 - 10x^4 + 40x^3 - 80x^2 + 80x$

14. Use the Binomial Theorem to expand and simplify the expression.

$\left(4x + y\right)^4$

a. $256x^4 + 64x^3y + 16x^2y^2 + 4xy^3 + y^4$
b. $64x^3 + 48x^2y + 12xy^2 + y^3$
c. $64x^4 + 64x^3y + 24x^2y^2 + 4xy^3 + y^4$
d. $256x^4 + 256x^3y + 96x^2y^2 + 16xy^3 + y^4$
e. $256x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$

15. Use the binomial theorem to expand the binomial.

$(\frac{c}{2} + b)^4$

a. $\frac{1}{8}c^4 + \frac{1}{2}c^3b + \frac{3}{2}c^2b^2 + 2cb^3 + b^4$
b. $c^4 + c^3b + c^2b^2 + cb^3 + b^4$
c. $\frac{1}{16}c^4 + \frac{1}{8}c^3b + \frac{1}{4}c^2b^2 + \frac{1}{2}cb^3 + b^4$
d. $\frac{1}{16}c^4 + \frac{1}{2}c^3b + \frac{3}{2}c^2b^2 + 2cb^3 + b^4$
e. $\frac{1}{2}c^4 + b^4$

16. Find the 5th term in the binomial expansion.

$(z + y)^{17}$

a. $1{,}190z^{13}y^4$
b. $12{,}376z^{12}y^7$
c. $2{,}380z^{13}y^4$
d. $28z^{12}y^7$
e. $2{,}380z^{12}y^5$

17. Find the coefficient $a$ of the term in the expansion of the binomial.

| *Binomial* | *Term* |
|---|---|
| $(x - 3y)^8$ | $ax^2y^6$ |

a. $a = 20,160$
b. $a = 20,412$
c. $a = 14$
d. $a = 16$
e. $a = 6561$

18. Use the Binomial Theorem to expand the complex number. Simplify your result.

$(2-4i)^4$

a. $112-384i$
b. $-112-384i$
c. $-112+384i$
d. $16$
e. $112+384i$

19. The probability that a basketball player will make a given free throw is $\frac{7}{10}$. To find the probability that the player makes exactly 6 out of her next 10 free throws, evaluate the term

$${}_{10}C_6\left(\frac{7}{10}\right)^6\left(\frac{3}{10}\right)^4$$

in the expansion of $\left(\frac{7}{10}+\frac{3}{10}\right)^{10}$. Round to four decimal places.

a. 0.0368
b. 5.9320
c. 24.7063
d. 0.0012
e. 0.2001

20. Determine the number of ways a computer can randomly generate an integer between 10 and 20 that is divisible by 3

a. 3
b. 6
c. 4
d. 5
e. 2

21. At a high school cafeteria, diners can choose one vegetable from a choice of 4 vegetables, one meat from a choice of 3 meats, one serving of bread from among 3 breads, and a dessert from among 2 desserts. How many meal configurations are possible?

a. 12
b. 36
c. 72
d. 18
e. 4

22. How many 3-digit numbers can be formed if the leading digit cannot be zero and repeats are not allowed?

a. 997

b. 810

c. 648

d. 504

e. 900

23. Evaluate: ${}_7P_3$

a. 21
b. 35
c. undefined
d. 210
e. 840

24. Find the number of distinguishable permutations of the group of letters.

E, S, T, I, M, A, T, E

a. 8

b. 40,320

c. 10,080

d. 20,160

e. 3360

25. Find the probability for the experiment of selecting one card from a standard deck of 52 playing cards such that the card is *not* a red face card.

a. $\frac{11}{13}$

b. $\frac{23}{26}$

c. $\frac{49}{52}$

d. $\frac{10}{13}$

e. $\frac{3}{26}$

26. Find the probability for the experiment of drawing two marbles (without replacement) from a bag containing 4 green, 3 yellow, and 2 red marbles such that both marbles are yellow.
    a. $\frac{1}{8}$
    b. $\frac{2}{3}$
    c. $\frac{1}{12}$
    d. $\frac{1}{9}$
    e. $\frac{1}{2}$

27. Find the probability for the experiment of drawing two marbles (without replacement) from a bag containing three green, four yellow, and five red marbles such that the marbles are different colors.
    a. $\frac{47}{66}$
    b. $\frac{2}{3}$
    c. $\frac{47}{30}$
    d. $\frac{1}{6}$
    e. $\frac{47}{132}$

28. You are given the probability that an event *will not* happen. Find the probability that the event *will* happen.

    $P(E') = \frac{11}{37}$

    a. $\frac{13}{37}$
    b. 1
    c. 0
    d. $\frac{26}{37}$
    e. $\frac{11}{37}$

29. Find the sum of the infinite geometric sequence.

    $\sum_{n=1}^{\infty} 10(-\frac{1}{4})^{n-1}$

30. Find the sum of the infinite geometric sequence.

    5 + 2.5 + 1.25 ...

# Pre-Calculus Chapter 8 Practice Test
## Answer Section

1. B
2. B
3. E
4. E
5. E
6. B
7. B
8. A
9. A
10. A
11. B
12. D
13. C
14. D
15. D
16. C
17. B
18. C
19. E
20. A
21. C
22. C
23. D
24. C
25. B
26. C
27. A
28. D
29. 8
30. 10