Name: _____ Date: _____

1. Write the first five terms of the sequence. (Assume that *n* begins with 1.)

   $a_n = -2n - 7$

   A) –1, 4, 9, 14, 19
   B) 6, 11, 16, 21, 26
   C) 11, 10, 15, 20, 25
   D) 11, 16, 21, 26, 31
   E) 11, 17, 23, 29, 35

2. Write the first five terms of the sequence. (Assume that *n* begins with 1.)

   $a_n = (-1)^n (n-2)(n-3)$

   A) 25, –12, 6, –2, 0
   B) –12, 6, –2, 0, 0
   C) –12, –6, –2, 0, 0
   D) –6, 2, 0, 0, –2
   E) –2, 0, 2, –4, 6

3. Find the indicated term of the sequence.

   $a_n = (-1)^n (4n-6)$

   $a_{24} =$ ☐

   A) –86
   B) 90
   C) 102
   D) –18
   E) 92

4. Find the sum.

$$\sum_{k=1}^{3} \frac{1}{k^2+4}$$

A) $\frac{209}{520}$

B) $\frac{1}{11}$

C) 1

D) $\frac{13}{12}$

E) $\frac{12}{11}$

5. Use sigma notation to write the sum.

$$\frac{1}{3\cdot 2}+\frac{1}{4\cdot 3}+\cdots+\frac{1}{8\cdot 7}$$

A) $\sum_{n=1}^{6} \frac{1}{(n+1)(n+2)}$

B) $\sum_{n=1}^{6} \frac{1}{n(n+1)}$

C) $\sum_{n=1}^{6} \frac{n}{(n+2)!}$

D) $\sum_{n=1}^{4} \frac{1}{(n+1)(n+2)}$

E) $\sum_{n=0}^{5} \frac{1}{(n+1)(n+2)}$

6. Find the sum of the infinite series.

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

A) undefined

B) $\frac{4}{5}$

C) 4

D) $\frac{8}{3}$

E) $\frac{4}{3}$

7. The first two terms of the arithmetic sequence are given. Find the indicated term.

$a_1 = 6, a_2 = 13, a_6 =$ ☐

A) 48

B) 37

C) 43

D) 55

E) 41

8. Determine whether the sequence is geometric. If so, find the common ratio.

5, –10, 20, –40, ...

A) –2

B) 5

C) $-\frac{1}{2}$

D) 2

E) not geometric

9. Determine whether the sequence is geometric. If so, find the common ratio.

–4, –1, 2, 5, ...

A) 3

B) –4

C) $\frac{1}{3}$

D) –3

E) not geometric

10. Find the indicated *n*th term of the geometric sequence.
9th term: 2, –6, 18,...

A) –22
B) 13,122
C) –39,366
D) –768
E) –1536

11. Find the sum of the finite geometric sequence.

$$\sum_{n=1}^{7} -3\left(-\frac{3}{5}\right)^{n-1}$$

A) $\frac{48,008}{15,625}$
B) $-\frac{2187}{5}$
C) $10,039$
D) $\frac{1862}{3125}$
E) $-\frac{30,117}{15,625}$

12. Use summation notation to write the sum.
$-1+3-9+\ldots-729$

A) $\sum_{n=0}^{5} 4(3)^{n-1}$
B) $\sum_{n=1}^{4} 4(3)^{n}$
C) $\sum_{n=1}^{5} 4(-2)^{n-1}$
D) $\sum_{n=1}^{4} 4(3)^{n-1}$
E) $\sum_{n=1}^{5} 4(3)^{n+1}$

13. Find the sum of the infinite geometric series.

$$\sum_{n=0}^{\infty} -4\left(-\frac{4}{5}\right)^n$$

A) $\frac{3}{2}$

B) $-\frac{20}{9}$

C) $-\frac{1}{2}$

D) $\frac{2}{3}$

E) undefined

14. Find the rational number representation of the repeating decimal.

$0.\overline{424}$

A) $\frac{424}{9999}$

B) $\frac{42.4}{999}$

C) $\frac{424}{9}$

D) $\frac{424}{999}$

E) $\frac{424}{99}$

15. Calculate the binomial coefficient: ${}_{12}C_4$

A) 11,880

B) 48

C) 495

D) 1

E) 0

16. Calculate the binomial coefficient: $\binom{12}{6}$

A) 11,880
B) 48
C) 495
D) 1
E) 0

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

$(q-1)^5$

A) $x^5 - 30x^4 + 360x^3 - 2160x^2 + 6480x$
B) $x^4 - 24x^3 + 216x^2 - 864x + 1296$
C) $s^5 - 20s^4 + 240s^3 - 960s^2 + 1280s - 1024$
D) $s^5 - 16s^4 + 144s^3 - 576s^2 + 1024s - 1024$
E) $x^5 - 30x^4 + 360x^3 - 2160x^2 + 6480x - 7776$

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

$(5x+3y)^4$

A) $625x^4 + 1500x^3y + 1350x^2y^2 + 540xy^3 + 81y^4$
B) $625x^4 + 375x^3y + 225x^2y^2 + 135xy^3 + 81y^4$
C) $625x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$
D) $125x^4 + 300x^3y + 270x^2y^2 + 108xy^3 + 81y^4$
E) $125x^3 - 75x^2y + 15xy^2 - y^3$

19. Find the specified *n*th term in the expansion of the binomial. (Write the expansion in descending powers of *x*.)

$(x-5y)^{10}, n=6$

A) $210x^4y^6$
B) $-787,500x^5y^5$
C) $210x^4y^6$
D) $9,765,625y^{10}$
E) $151,200x^4y^6$

20. Expand the binomial by using Pascal's triangle to determine the coefficients. Show your work.

$(5x + 4y)^6$

Answer Key - MATH 171 Exam5Review

1. D
2. B
3. B
4. A
5. A
6. E
7. E
8. A
9. E
10. B
11. E
12. C
13. B
14. D
15. C
16. C
17. E
18. A
19. B
20.

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1

$$(2x+3y)^6 = (1)(2x)^6 + (6)(2x)^5(3y)$$
$$+(15)(2x)^4(3y)^2 + (20)(2x)^3(3y)^3 + (15)(2x)^2(3y)^4 + (6)(2x)(3y)^5 + (3y)^6$$
$$= 64x^6 + 576x^5y + 2160x^4y^2 + 4320x^3y^3 + 4860x^2y^4 + 2916xy^5 + 729y^6$$