MTH 112 Chapter 8 and Chapter 10 Practice Test Problems

Write the augmented matrix for the system of equations.

1) $\begin{aligned} -2x + 5y + 9z &= 52 \\ 3x + 9y + 8z &= 97 \\ 8x + 6y + 8z &= 88 \end{aligned}$

2) $\begin{aligned} x - 7y + z &= 17 \\ y + 6z &= 12 \\ z &= 11 \end{aligned}$

Write the system of linear equations represented by the augmented matrix. Use x, y, z, and, if necessary, w for the variables.

3) $\left[\begin{array}{ccc|c} 2 & 6 & 4 & -2 \\ 6 & 0 & 3 & 4 \\ 8 & 5 & 0 & 2 \end{array}\right]$

Write the system of linear equations represented by the augmented matrix. Use x, y, z, and, if necessary, w for the variables. Then use back–substitution to find the solution.

4) $\left[\begin{array}{ccc|c} 1 & 2 & 4 & 7 \\ 0 & 1 & -9 & 5 \\ 0 & 0 & 1 & -5 \end{array}\right]$

5) $\left[\begin{array}{cccc|c} 1 & 1 & -1 & 1 & -9 \\ 0 & 1 & -6 & 4 & 0 \\ 0 & 0 & 1 & 5 & 12 \\ 0 & 0 & 0 & 1 & -5 \end{array}\right]$

Perform the matrix row operation (or operations) and write the new matrix.

6) $\left[\begin{array}{ccc|c} 6 & -36 & -15 & -21 \\ 1 & 13 & -3 & 0 \\ 2 & -7 & 4 & 21 \end{array}\right]$ $\frac{1}{3}R_1$

7) $\left[\begin{array}{cccc|c} 1 & 1 & -1 & 1 & 2 \\ 0 & -5 & 3 & -5 & 0 \\ 5 & 0 & -2 & -1 & 2 \\ -5 & 1 & 0 & 5 & -1 \end{array}\right]$ $\begin{aligned} -5R_1 + R_3 \\ 3R_1 + R_4 \end{aligned}$

Solve the system of equations using matrices. Use Gaussian elimination with back–substitution. REMEMBER THAT YOU MAY USE YOUR CALCULATOR TO SOLVE THESE! SHOW YOUR RREF MATRIX AND THE SOLUTION.

8) $\begin{aligned} x + y + z &= -1 \\ x - y + 5z &= 5 \\ 5x + y + z &= 19 \end{aligned}$

9) $\begin{aligned} -4x - y - 3z &= -22 \\ -4x + 6z &= 16 \\ 9y + z &= 22 \end{aligned}$

10) $\begin{aligned} x + y + z - w &= 6 \\ 2x - y + 3z + 4w &= -4 \\ 4x + 2y - z - w &= -13 \\ -x - 2y + 4z + 3w &= 12 \end{aligned}$

Solve the system of equations using matrices. Use Gauss–Jordan elimination. REMEMBER THAT YOU MAY USE YOUR CALCULATOR TO SOLVE THESE! SHOW YOUR RREF MATRIX AND THE SOLUTION.

11) $\begin{aligned} 5x + 7y - z &= 23 \\ x - 3y + 8z &= 45 \\ 9x + y + z &= 35 \end{aligned}$

12) $\begin{aligned} x &= -10 - y - z \\ x - y + 4z &= -23 \\ 5x + y &= -26 - z \end{aligned}$

13) $\begin{aligned} x + y - z + w &= -5 \\ 3x - y + 3z - 2w &= 7 \\ -2x + 2y + z - w &= 16 \\ -x - 2y - 3z + 3w &= -22 \end{aligned}$

Write the first four terms of the sequence whose general term is given.

14) $a_n = 7n$

15) $a_n = 4n - 1$

16) $a_n = 4^n$

17) $a_n = (-4)^n$

18) $a_n = (-1)^n(n + 9)$

19) $a_n = \frac{n + 1}{2n - 1}$

20) $a_n = \frac{3}{n^2}$

21) $a_n = \frac{n^4}{(n - 1)!}$

22) $a_n = 2(n + 1)!$

23) $a_n = \frac{-4(n + 1)!}{n!}$

Find the indicated sum.

24) $\sum_{i=4}^{7} 9i$

25) $\sum_{i=3}^{6} (2i - 2)$

26) $\sum_{i=1}^{4} \frac{1}{i - 7}$

27) $\sum_{i=3}^{5} (i^2 + 9)$

28) $\sum_{k=1}^{4} (-1)^k(k + 12)$

29) $\sum_{i=1}^{4} \left(-\frac{1}{2}\right)^i$

30) $\sum_{i=3}^{6} \frac{i!}{(i - 1)!}$

Use the Binomial Theorem to expand the binomial and express the result in simplified form.

31) $(x + 2)^3$

32) $(x + 3y)^3$

33) $(x - 5)^4$

34) $(5x + 3)^4$

35) $(x^2 - 5y)^4$

36) $(x - 4)^5$

37) $(3x + 4)^5$

38) $(x - 6y)^5$

Find the term indicated in the expansion.

39) $(x - 2y)^{12}$; 11th term

40) $(x - 2y)^{12}$; 9th term

41) $(2x + 3y)^{10}$; 9th term

42) $(x^2 + y^4)^9$; 6th term

43) $(5x + 2)^5$; 5th term

Answer Key
Testname: MTH 112 BTZ PRACTICE PROBLEMS (CH. 8, CH. 10)

1)
$$\left[\begin{array}{ccc|c} -2 & 5 & 9 & 52 \\ 3 & 9 & 8 & 97 \\ 8 & 6 & 8 & 88 \end{array}\right]$$
2)
$$\left[\begin{array}{ccc|c} 1 & -7 & 1 & 17 \\ 0 & 1 & 6 & 12 \\ 0 & 0 & 1 & 11 \end{array}\right]$$
3) $2x + 6y + 4z = -2$
$6x + 3z = 4$
$8x + 5y = 2$
4) {(107, –40, –5)}
5) {(–209, 242, 37, –5)}
6)
$$\left[\begin{array}{ccc|c} 2 & -12 & -5 & -7 \\ 1 & 13 & -3 & 0 \\ 2 & -7 & 4 & 21 \end{array}\right]$$
7)
$$\left[\begin{array}{cccc|c} 1 & 1 & -1 & 1 & 2 \\ 0 & -5 & 3 & -5 & 0 \\ 0 & -5 & 3 & -6 & -8 \\ -2 & 4 & -3 & 8 & 5 \end{array}\right]$$
8) {(5, –5, –1)}
9) {(2, 2, 4)}
10) {(–4, 3, 5, –2)}
11) {(3, 2, 6)}
12) {(–4, –1, –5)}
13) {(–2, 3, 4, –2)}
14) 7, 14, 21, 28
15) 3, 7, 11, 15
16) 4, 16, 64, 256
17) –4, 16, –64, 256
18) –10, 11, –12, 13
19) $2, 1, \frac{4}{5}, \frac{5}{7}$
20) $3, \frac{3}{4}, \frac{3}{9}, \frac{3}{16}$
21) $1, 16, \frac{81}{2}, \frac{128}{3}$
22) 4, 12, 48, 240
23) –8, –12, –16, –20
24) 198
25) 28
26) $-\frac{19}{20}$
27) 77
28) 2
29) $-\frac{5}{16}$
30) 18
31) $x^3 + 6x^2 + 12x + 8$
32) $x^3 + 9x^2y + 27xy^2 + 27y^3$
33) $x^4 - 20x^3 + 150x^2 - 500x + 625$
34) $625x^4 + 1500x^3 + 1350x^2 + 540x + 81$
35) $x^8 - 20x^6y + 150x^4y^2 - 500x^2y^3 + 625y^4$
36) $x^5 - 20x^4 + 160x^3 - 640x^2 + 1280x - 1024$
37) $243x^5 + 1620x^4 + 4320x^3 + 5760x^2 + 3840x + 1024$
38) $x^5 - 30x^4y + 360x^3y^2 - 2160x^2y^3 + 6480xy^4 - 7776y^5$
39) $67{,}584x^2y^{10}$
40) $126{,}720x^4y^8$
41) $1{,}180{,}980x^2y^8$
42) $126x^8y^{20}$
43) 400x