Mth 100  Practice problems  Sec 2.1 – 5.1

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

SECTION 2.1
Solve the equation.
1) $12t - 34 = 4t - 14$
   \[ 8t = 20 \]
   \[ t = 2.5 \]

2) $-[7x + (6x + 7)] = 4 - (9x + 8)$
   \[ 7x + 6x + 7 = 4 - 9x - 8 \]
   \[ 13x + 7 = -4x - 4 \]
   \[ 17x = -11 \]
   \[ x = -\frac{11}{17} \]

3) \[ \frac{a}{5} - \frac{1}{5} = -4 \]
   \[ \frac{a - 1}{5} = -4 \]
   \[ a - 1 = -20 \]
   \[ a = -19 \]

4) \[ \frac{r + 6}{3} = \frac{r + 8}{6} \]
   \[ 2(r + 6) = r + 8 \]
   \[ 2r + 12 = r + 8 \]
   \[ r = -4 \]

Solve.
5) $-0.06y + 0.08(1100 - y) = 0.36y$
   \[ -0.06y + 88 - 0.08y = 0.36y \]
   \[ -0.14y + 88 = 0.36y \]
   \[ -0.5y = -88 \]
   \[ y = 176 \]

Decide whether the equation is conditional, an identity, or a contradiction. Give the solution set.
6) $2x + 6(x + 1) + 2 = 8 - 3x$
   \[ 8x + 16 = 8 - 3x \]
   \[ 11x = -8 \]
   \[ x = -\frac{8}{11} \]

7) $-8s + 11 + 4(2s - 1) = 0$
   \[ -8s + 22s - 4 = 0 \]
   \[ 14s = 4 \]
   \[ s = \frac{1}{3.5} \]

SECTION 2.3
Solve the percent problem.
8) At the end of the day, a storekeeper had $1133 in the cash register, counting both the sale of goods and the sales tax of 3%. Find the amount that is the tax.
   $1133 + 0.03(1133) = 1133 + 34 = 1167$

Solve the investment problem.
9) Walt made an extra $9000 last year from a part–time job. He invested part of the money at 8% and the rest at 7%. He made a total of $680 in interest. How much was invested at 7%?
   \[ 0.08x + 0.07(9000 - x) = 680 \]
   \[ 0.08x + 630 - 0.07x = 680 \]
   \[ 0.01x = 50 \]
   \[ x = 5000 \]

Solve the mixture problem.
10) How many liters of a 30% alcohol solution must be mixed with 20 liters of a 70% solution to get a 40% solution?
   \[ \frac{0.30x + 0.70(20)}{x + 20} = 0.40 \]
   \[ 0.30x + 14 = 0.40x + 8 \]
   \[ 0.10x = 6 \]
   \[ x = 60 \]

SECTION 3.1
Solve the inequality, giving its solution set in both interval and graph forms.
11) $-9x \leq 90$
   \[ x \geq -10 \]

12) $-10y + 5 \leq -11y + 13$
   \[ y \leq -8 \]

13) $-(4x - 2) - 10 + 5x < 7x$
   \[ -4x - 12 + 5x < 7x \]
   \[ x < 8 \]

14) \[ \frac{2}{3}x \leq -\frac{9}{10} \]
   \[ x \leq -\frac{27}{20} \]

15) $-30 \leq 5(x - 1) \leq 5$
   \[ -7 \leq x \leq 3 \]

16) $-10 < 3x + 2 \leq 2$
   \[ -12 < 3x \leq 0 \]

17) $6 \leq \frac{3x - 1}{2} \leq 9$
   \[ 12 \leq 3x - 1 \leq 18 \]
   \[ 13 \leq 3x \leq 19 \]
   \[ 4 \frac{1}{3} \leq x \leq 6 \]

SECTION 3.2
Let $A = \{q, s, u, v, w, x, y, z\}$, $B = \{q, s, y, z\}$, $C = \{v, w, x, y, z\}$, and $D = \{s\}$. List the elements in the following set.
18) $A \cap B$
   \[ \{q, s, y, z\} \]

19) $C \cup B$
   \[ \{v, w, x, y, z, s\} \]
For the given compound inequality, state whether intersection or union should be used. Then give the solution set in both interval and graph forms.

30) \( x - 1 < 2 \) and \( x + 2 > 3 \)

31) \(-6x > -24\) or \(-2x < -10\)

Solve.

32) \(|4x - 6| = 3\)

33) \(|5 - \frac{1}{8}x| = 4\)

SECTION 3.3
Solve the given equation or inequality. If an equation is given, then write the solution set in set notation. If an inequality is given, then write the solution set in interval notation.

34) \(|5k - 1| - 1 \geq 6\)

Solve.

35) \(|2x - 4| = 10\)

36) \(|8 - 4p| = -40\)

Solve the inequality and graph the solution set.

37) \(|4x + 2| < 5\)

38) \(|5 - x| \leq 8\)

39) \(|-6 + k| > 8\)
SECTION 4.1
Find the x– and y-intercepts. Then graph the equation.
40) $6x - 18y = 18$

SECTION 4.2
Find the slope of the line.
43)

Find the x– and y-intercepts. Then graph the equation.
41) $x + 2y = 0$

42) $y = 3$

Find the slope of the line through the pair of points.
45) $(1, -6)$ and $(-9, -5)$

46) $(6, 8)$ and $(9, 8)$
Find the slope of the line.

47) 

Find the slope of the line through the pair of points.

48) (-1, -5) and (-1, 2)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the equation in slope–intercept form of the line satisfying the conditions.

49) \( m = -\frac{4}{9}, \) y-intercept \( \left( 0, -\frac{43}{9} \right) \)

A) \( y = \frac{4}{9} x - \frac{43}{9} \)
B) \( y = -\frac{4}{9} x - \frac{43}{9} \)
C) \( y = -\frac{4}{9} x + \frac{43}{9} \)
D) \( y = -\frac{43}{9} x - \frac{4}{9} \)

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the slope of the line, and sketch the graph.

50) \( x + 3y = 3 \)

51) \( x - 5 = 0 \)

Graph the line.

52) Through (6, -9); \( m = 0 \)

53) Through (-5, -5); \( m = \frac{1}{2} \)
54) Through $(0, 6); \ m = -\frac{1}{5}$

55) Through $(-2, 9); \ \text{slope undefined}$

Decide whether the pair of lines is parallel, perpendicular, or neither.

56) $3x - 6y = 19$ and $18x + 9y = 14$

57) $12x + 4y = 16$ and $18x + 6y = 27$

58) The line through $(3, -5)$ and $(-1, 7)$ and the line through $(6, -13)$ and $(-2, 11)$

SECTION 4.3 Write the equation in slope–intercept form, state the slope and $y$–intercept, and graph the equation.

59) $3x - 6y = -18$

60) Through $(4, 3); \ m = -\frac{3}{5}$

61) Through $(-2, -8); \ \text{undefined slope}$

62) Through $(-4, -8); \text{0 slope}$

Write the equation in standard form of the line satisfying the given conditions.

63) $(7, -4)$ and $(5, 1)$

Find an equation of the line satisfying the conditions.
Write the equation in slope–intercept form.

64) Through $(-3, 8); \text{perpendicular to } -3x + 4y = -23$

65) Through $(-6, 7); \text{parallel to } 3x + 7y = 3$
SECTION 4.4
Graph the linear inequality in two variables.
66) $5x - y \leq -1$

67) $y \geq 3x$

Graph the compound inequality.
68) $2x - y > 4$ and $x \leq 4$

SECTION 4.5
Decide whether the relation is a function, and give the domain and range.
70)

Solve the problem.
71) Find $f(-1)$ when $f(x) = x^2 - 2x - 4$.
72) Find $g(a - 1)$ when $g(x) = 2x - 5$.

SECTION 5.1
Solve the system by substitution.
73) $8y - 8 = -x$
    $4x - 5y = -5$

Solve the system by elimination. If the system is inconsistent or has dependent equations, say so.
74) $7x + 5y = -25$
    $2x + 2y = -10$
Answer Key
Testname: 100 A PRACTICE PROBLEMS 2.1 TO 5.1

1) \(\left\{\frac{5}{2}\right\}\)
2) \(\left\{-\frac{3}{4}\right\}\)
3) \([-19]\)
4) \([-4]\)
5) \([176]\)
6) Conditional; \(\{0\}\)
7) Contradiction; \(\emptyset\)
8) $33
9) $4000
10) 60 liters
11) \([-10, \infty)\)

12) \((\infty, 8]\)

13) \((\infty, 4]\)

14) \(\left[\frac{27}{20}, \infty\right)\)

15) \([-5, 2]\)

16) \((-4, 0]\)

17) \(\left[\frac{13}{3}, \frac{19}{3}\right]\)

18) \(\{q, s, y, z\}\)
19) \(\{q, s, v, w, x, y, z\}\)
20) 

\[\begin{array}{c}
-15 & -14 & -13 & -12 & -11 & -10 & -9 & -8 & -7 & -6 & -5 \\
\hline
123456789 & 1 & 0 & 1 & 1 & 1 & 2 & 1 & 3 & 1 & 4 & 1 & 5
\end{array}\]
Answer Key
Testname: 100 A PRACTICE PROBLEMS 2.1 TO 5.1

21) 

22) [4, 7]

23) φ

24) [-6, -2]

25) (-∞, 4] ∪ [5, ∞)

26) (-∞, 8)

27) (-∞, ∞)

28) [-8, 7]

29) (-6, 7]

30) Intersection; (1, 3)

31) Union; (-∞, -4) ∪ (5, ∞)

32) \[ \frac{3}{4}, \frac{9}{4} \]

33) [8, 72]

34) (-∞, -6] ∪ \[ \frac{8}{5}, \infty \]

35) (-3, 7)

36) (-8, 12)

37) \[ -\frac{7}{4}, \frac{3}{4} \]
Answer Key
Testname: 100 A PRACTICE PROBLEMS 2.1 TO 5.1

38) \([-3, 13]\) 

39) \((-\infty, -2) \cup (14, \infty)\) 

40) \((3, 0); (0, -1)\) 

41) \((0, 0); (0, 0)\) 

42) None; \((0, 3)\) 

43) Undefined
Answer Key
Testname: 100 A PRACTICE PROBLEMS 2.1 TO 5.1

44) 0
45) $-\frac{1}{10}$
46) 0
47) $-1$
48) Undefined
49) B
50) Slope: $-\frac{1}{3}$

51) Slope: Undefined
52)

53)

54)
Answer Key
Testname: 100 A PRACTICE PROBLEMS 2.1 TO 5.1

55) 

56) Perpendicular
57) Parallel
58) Parallel
59) $y = \frac{1}{2}x + 3$;

slope: $\frac{1}{2}$, y-intercept $(0, 3)$

60) $3x + 5y = 27$
61) $x = -2$
62) $y = -8$
63) $5x + 2y = 27$
64) $y = -\frac{4}{3}x + 4$
65) $y = -\frac{3}{7}x + \frac{31}{7}$
Answer Key
Testname: 100 A PRACTICE PROBLEMS 2.1 TO 5.1

66) [Graph of a line]

67) [Graph of a line]

68) [Graph of a line]
Answer Key
Testname: 100 A PRACTICE PROBLEMS 2.1 TO 5.1

69) 

70) Not a function; domain: (-∞, 2]; range: (-∞, ∞)

71) -5

72) 2a - 7

73) {(0, 1)}

74) {(0, -5)}