MTH 100
Practice Problems for Test I

Decide whether the following is an expression or an equation.

1) $9x + 1 + 6x + 4$

2) $3(2x - 2) = 5(x + 4)$

Solve the equation.

3) $14x - 7 = 11$

4) $23t - 16 = 15t - 10$

5) $5(x + 5) = (5x + 25)$

6) $3m + 7 + 5(2m - 3) = 3(m + 3)$

7) $-6x + 5(-2x - 5) = -32 - 9x$

8) $\frac{2x}{5} - \frac{x}{3} = 4$

9) $\frac{3x + 8}{5} + \frac{7}{5} = -\frac{7x}{4}$

10) $\frac{7x + 6}{4} + 2 = -\frac{3x}{5}$

11) $\frac{-4x + 3}{6} + \frac{3}{2} = -\frac{7x}{3}$

12) $-0.08y + 0.13(9000 - y) = 0.29y$

Decide whether the equation is conditional, an identity, or a contradiction. Give the solution set.

13) $16m + 6 = 2(5m + 21)$

14) $5(2f - 31) = 10f - 155$

15) $20k + 3 = 5(4k - 1)$

Solve the problem.

16) A pie-shaped (triangular) lake-front lot has a perimeter of 1300 ft. One side is 100 ft longer than the shortest side, while the third side is 300 ft longer than the shortest side. Find the lengths of all three sides.

17) A biologist collected 267 fern and moss samples. There were 83 fewer ferns than moss samples. How many fern samples did the biologist collect?

Solve the investment problem.

18) Mardi received an inheritance of $70,000. She invested part at 10% and deposited the remainder in tax-free bonds at 8%. Her total annual income from the investments was $6200. Find the amount invested at 10%.

Solve the mixture problem.

19) In a chemistry class, 6 liters of a 4% silver iodide solution must be mixed with a 10% solution to get a 6% solution. How many liters of the 10% solution are needed?

Solve the inequality. Give the solution set in both interval and graph forms.

20) $a + 4 < -8$

21) $13y + 6 \leq 12y + 16$

22) $-2(4x + 10) < -10x - 6$
23) \( \frac{7x - 5}{-9} < \frac{-58}{7} \)

24) \( 3(6x - 6) < 2(9x - 6) \)

25) \(-3x + 9(x - 4) > 6x - 2\)

26) \(-7 < x + 1 \leq 7\)

27) \(9 < -3y + 3 \leq 21\)

28) \(6 \leq \frac{3x - 1}{2} \leq 12\)

Let \( A = \{q, s, u, v, w, x, y, z\} \), \( B = \{q, s, y, z\} \), \( C = \{v, w, x, y, z\} \), and \( D = \{s\} \). Specify the following set.

29) \( C \cup B \)

30) \( B \cap C \)

31) \( C \cup A \)

For the compound inequality, give the solution set in both interval and graph forms.

32) \( x \geq 2 \) and \( x \geq -3 \)

33) \(-12 < 3x - 6 \) and \( 8x - 4 < 12\)

34) \(6x - 2 \geq -32 \) and \( 2x - 7 \geq -1\)

35) \( 4x - 10 \leq 18 \) and \( 2x - 1 \geq 13 \)

36) \( 5x - 1 < 4 \) and \( x - 2 > -1\)

37) \( x - 2 > 2 \) or \( x + 3 < 1\)

38) \(-7x + 1 \geq 15 \) or \( 6x + 3 \geq -21\)

Express the set in the simplest interval form.

39) \( (-\infty, 7) \cap (-\infty, \infty) \)

40) \( (-7, 4) \cup [-3, 9] \)

Solve the equation.

41) \( |2s - 3| = |s + 7| \)

42) \( |n - 2| = |2 - n| \)

43) \( |t - 9| = 0 \)

44) \( |6m + 5| = 6 \)

45) \( |11 - \frac{12}{5}x| = 3 \)

46) \( |b + 9| = -5 \)

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.

47) \( |4x + 7| + 5 < 3 \)

48) \( |y + 3| - 5 = 8 \)

49) \( |3y - 31| - 8 > -13 \)
Solve the inequality and graph the solution set.

50) \( |r - 4| > 3 \)

51) \( |4 - x| \geq 8 \)

52) \( |g - 3| < 4 \)

53) \( |2y - 4| > -9 \)

54) \( |z + 8| \geq 0 \)

55) \( |8 - x| \leq 18 \)

56) \( |m + 5| < 0 \)

Find the x- and y-intercepts. Then graph the equation.

60) \( 8y - 2x = -4 \)

61) \( -4x - 24y = 24 \)

Find the midpoint of the segment with the given endpoints.

62) (5, 3) and (2, 7)

63) (-6, 9) and (7, 4)

Find the slope of the line through the given pair of points, if possible. Based on the slope, indicate whether the line through the points rises from left to right, falls from left to right, is horizontal, or is vertical.

64) (-9, -8) and (4, 9)

65) (6, -9) and (6, 9)

66) (-5, 8) and (-3, 8)

67) (-8, -5) and (6, -7)
Find the slope of the line.

68) 

![Graph of line with slope](image)

Find the slope of the line and sketch the graph.

69) $2x - 5y = -16$

![Graph of line with slope](image)

70) $y + 2 = 0$

![Graph of line with slope](image)

71) $3x - 5y = -35$

![Graph of line with slope](image)

Graph the line described.

72) Through $(-4, -10)$; $m = 3$

![Graph of line with slope](image)

73) Through $(10, 2)$; $m = 0$

![Graph of line with slope](image)

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

74) $3x - 2y = -9$ and $2x + 3y = -3$

75) $3x - 8y = 8$ and $32x + 12y = 2$
76) The line through (−20, 5) and (−4, 7) and the line through (−5, 5) and (7, 4)

Find the equation in slope–intercept form of the line satisfying the conditions.
77) \(m = 7\), passes through (6, −8)

78) \(m = - \frac{5}{7}\); y-intercept \(0, \frac{31}{7}\)

79) \(m = \frac{9}{2}\); through (0, −6)

Write the equation in slope–intercept form.
80) \(9x + 5y = 5\)

81) \(x - 6y = 4\)

82) \(3x - 10y = -6\)

83) \(-7x + 5y = 6\)

Find the slope and the y–intercept of the line.
84) \(5x + 9y = 38\)

85) \(4x + 5y = 23\)

Find an equation of the line that satisfies the conditions.
Write the equation in standard form.
86) Through (2, 3); \(m = - \frac{3}{8}\)

87) Through (6, −7); horizontal

88) Through (−6, 3); undefined slope

Find an equation of the line passing through the two points. Write the equation in standard form.
89) (−8, 0) and (−3, 4)

90) (10, 9) and (10, 1)

91) (−2, 6) and (−1, 6)
Answer Key
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1) Expression
2) Equation
3) \( \left\{ \frac{9}{7} \right\} \)
4) \( \left\{ \frac{3}{4} \right\} \)
5) \{All real numbers\}
6) \( \left\{ \frac{17}{10} \right\} \)
7) \{1\}
8) \{60\}
9) \( \left\{ \frac{60}{47} \right\} \)
10) \( \left\{ -\frac{70}{47} \right\} \)
11) \( \left\{ -\frac{6}{5} \right\} \)
12) \{2340\}
13) Conditional; \{6\}
14) Identity; \{all real numbers\}
15) Contradiction; \( \emptyset \)
16) 300 ft, 400 ft, 600 ft
17) 92 fern samples
18) $30,000
19) 3 liters
20) \((-\infty, -12]\)
21) \((-\infty, 10]\)
22) \((-\infty, 7]\)
23) \(\left[ \frac{557}{49}, \infty \right)\)
24) \((-\infty, \infty)\)
25) \(\emptyset\)
26) \((-8, 6]\)
27) \([-6, -2)\)
28) \(\left[ \frac{13}{3}, \frac{25}{3} \right] \)
29) \{q, s, v, w, x, y, z\}
30) \{y, z\}
31) \{q, s, u, v, w, x, y, z\} or A
32) \(2, \infty)\)
33) \((-2, 2]\)
34) \(3, \infty)\)
35) \(\{7\}\)
36) \(\emptyset\)
37) \((-\infty, -2) \cup (4, \infty)\)
38) \((-\infty, \infty)\)
39) \((-8, 7]\)
40) \((-7, 9]\)
41) \(\left\{ 10, -\frac{4}{3} \right\} \)
42) \{2\}
43) \{9\}
44) \[\left\{ \frac{1}{6}, -\frac{11}{6} \right\}\]
45) \[\left\{ \frac{35}{6}, \frac{10}{3} \right\}\]
46) \(\emptyset\)
47) \(\emptyset\)
48) \([10, -16]\)
49) \((-\infty, \infty)\)
50) \((-\infty, 1) \cup (7, \infty)\)
51) \((-\infty, -4] \cup [12, \infty)\)
52) \((-1, 7)\)
53) \((-\infty, \infty)\)
54) \((-\infty, \infty)\)
55) \([-10, 26]\)
56) \(\emptyset\)
57) \((-\infty, \infty)\)
58) \((-\infty, \infty)\)
59) \(\emptyset\)

60) \((2, 0); \left(0, -\frac{1}{2}\right)\)

61) \((-6, 0); (0, -1)\)

62) \(\left\{ \frac{7}{2}, 5 \right\}\)
63) \(\left\{ \frac{1}{2}, \frac{13}{2} \right\}\)
64) \(\frac{17}{13}\); rises
65) Undefined; vertical
66) 0; horizontal
67) \(-\frac{1}{7}\); falls
68) \(-1\)
69) Slope: \(\frac{2}{5}\)

70) Slope: 0

71) Slope: \(\frac{3}{5}\)

72)

73)

74) Perpendicular
75) Perpendicular
76) Neither
77) \(y = 7x - 50\)
78) \(y = -\frac{5}{7}x + \frac{31}{7}\)
79) \(y = \frac{9}{2}x - 6\)
80) \(y = -\frac{9}{5}x + 1\)
81) \(y = \frac{1}{6}x - \frac{2}{3}\)
82) \(y = \frac{3}{10}x + \frac{3}{5}\)
83) \(y = \frac{7}{5}x + \frac{6}{5}\)
84) Slope \(-\frac{5}{9}\); y-intercept \(0, \frac{38}{9}\)
85) Slope \(-\frac{4}{5}\); y-intercept \(0, \frac{23}{5}\)
86) \(3x + 8y = 30\)
87) \(y = -7\)
Answer Key

Testname: MTH 100 FALL TEST 1 PRACTICE

88) \( x = -6 \)
89) \( 4x - 5y = -32 \)
90) \( x = 10 \)
91) \( y = 6 \)
92) \( y = \frac{7}{5}x + \frac{67}{5} \)
93) \( y = -\frac{4}{3}x + 4 \)