Math 35 Practice Final Exam

Date of Final: __________
Time of Final: __________
Location of Final: __________

Solve.

1) \( \frac{1}{3}a - \frac{1}{3} = -2 \)

Solve for the given letter.

2) \( A = \frac{1}{2} (b_1 + b_2) \) for \( b_1 \)

Solve the problem.

3) The perimeter of a rectangle, \( P \), is given by \( P = 2L + 2W \), where \( L \) is its length and \( W \) is its width. What is the perimeter of a rectangle of length 15 ft and width 15 ft?

Solve the equation.

4) \( |b - 3| = 7 \)

Solve the absolute value inequality. Write the solution set using interval notation.

5) \( \frac{5 - 4x}{7} \leq 2 \)

Solve.

6) \(-27 \leq -4c + 5 < -3\)

Solve and graph.

7) \(-3x + 1 \geq 7 \) or \( 7x + 3 \geq -25 \)

Solve.

8) A rectangular Persian carpet has a perimeter of 204 inches. The length of the carpet is 30 inches more than the width. What are the dimensions of the carpet?
Find the function value.

12) Find \( f(5) \) when \( f(x) = -x + 6 \).

Solve the problem.

13) The function \( P(d) = 1 + \frac{d}{33} \) gives the pressure, in atmospheres (atm), at a depth \( d \) feet in the sea. Find the pressure at 56 feet.

Graph the function.

14) \( f(x) = x^2 - 2x - 1 \)

Determine whether the graph is the graph of a function.

15)

Find the domain.

16) \( f(x) = \frac{-3}{x + 5} \)

For the function represented in the graph, determine the domain or range, as requested.

17) Find the range.

Solve the problem.

18) (5, 3) and (9, 2)

Solve.

19) \( x - 2y = 13 \)
   \(-2x - 3y = 9 \)

20) \( 9x + 9y = 27 \)
   \(-5x + 7y = -15 \)

Determine the slope and the \( y \)-intercept.

21) \( 2x - 4y = -12 \)

Find a linear function whose graph has the given slope and \( y \)-intercept.

22) Slope = \( \frac{5}{2} \), \( y \)-intercept \((0, 8)\)

Find an equation of the line having the specified slope and containing the indicated point. Write your answer in slope-intercept form.

23) \( m = -5; (-8, 6) \)

Find an equation of the line containing the given pair of points. Write your final answer as a linear function in slope-intercept form.

24) \((3, 5) \) and \((5, 1)\)

Multiply.

25) \( 5(-6x + 2) \)

26) \((x + 8)(5x + 9) \)
27) \((7x + 2y)^2\)

28) \((11 - 13r)(11 + 13r)\)

Factor.
29) \(6wx - 12wy - 12wz\)

30) \(8x^6 + 20x^3 + 6x^3 + 15\)

31) \(x^2 + 7x - 60\)

32) \(12x^3 - 52x^2 - 40x\)

33) \(64x^2 - 224x + 196\)

Factor completely.
34) \(81k^3m + 36k^2m^2 + 4km^3\)

35) \(n^4 + n^3 + n + 1\)

Multiply and simplify.
36) \(\frac{y^2 - 25}{2y + 10}, \frac{y - 3}{y - 5}\)

37) \(\frac{25x^2 - 9y^2}{125x^3 - 27y^3}, \frac{25x^2 + 15xy + 9y^2}{25x^2 + 30xy + 9y^2}\)

Divide and simplify.
38) \(\frac{z^2 + 13z + 36}{z^2 + 15z + 54}, \frac{z^2 + 4z}{z^2 + 9z + 18}\)

Perform the indicated operation and simplify.
39) \(\frac{1}{x - 1} + \frac{6}{1 - x}\)

40) \(\frac{y + 2}{y - 3}, \frac{y - 1}{y + 6}\)

Perform the indicated operations and simplify.
41) \(\frac{2}{x + 8} - \frac{x}{x - 6}, \frac{x^2 + 12}{x^2 + 2x - 48}\)

Divide.
42) \(\frac{6x^2y^2 + 4x^4y^6 - 4x^5y^3}{2x^2y^2}\)

43) \(\frac{(p^2 + 6p - 7)}{(p + 8)}\)

44) \(\frac{7m^3 + 10m^2 - 2m + 12}{(m + 2)}\)

45) \(\frac{(x^4 + 6x^2 + 9)}{(x^2 + 1)}\)

Simplify.
46) \(\frac{2 + 3}{x}, \frac{y}{x}

\(\frac{3 - 2}{x}, \frac{2}{y}\)

Solve.
47) \(\frac{x}{5} - \frac{x}{8} = 4\)

48) \(1 + \frac{1}{x} = \frac{72}{x^2}\)

49) \(\frac{3}{x^2 - 11x + 30}, \frac{1}{x - 6} = \frac{1}{9x - 45}\)

50) Martha can rake the leaves in her yard in 4 hours. Her younger brother can do the job in 5 hours. How long will it take them to do the job if they work together?

51) Amy can clean the house in 9 hours. When she works together with Tom, the job takes 5 hours. How long would it take Tom, working by himself, to clean the house?

52) A quality-control inspector examined 290 calculators and found 8 of them to be defective. At this rate, how many defective calculators will there be in a batch of 17,400 calculators?

53) Fred bicycles 3 km/h slower than Samantha. In the time it takes Fred to bicycle 56 km, Samantha travels 68 km. How fast does Fred bicycle?
Solve the formula for the specified letter.
54) \( S = \frac{a}{1 - r} \) for \( r \)

Graph.
55) \( f(x) = \sqrt{x - 3} \)

For the given function, find the indicated function value.
56) For \( f(x) = \sqrt{4x - 14} \), find \( f(11) \).

Find the value.
57) \(-\frac{121}{256}\)

Use the laws of exponents to simplify. Write the answer with positive exponents.
58) \((8a^{1/7}b^{5/7})^2\)

Use rational exponents to simplify. Write the answer in radical notation if appropriate.
59) \(\sqrt[7]{\frac{8}{\sqrt{x}}}\)

Simplify by factoring. Assume that all expressions under radicals represent nonnegative numbers.
60) \(\sqrt{50x^2y}\)

Multiply and simplify. Assume that all expressions under radicals represent nonnegative numbers.
61) \(\sqrt{14m^5 \cdot \sqrt{7m^{15}}}\)

Rationalize the denominator. Assume that all expressions under radicals represent positive numbers.
62) \(\frac{7}{8 - \sqrt{10}}\)

Solve.
63) \(\frac{50}{x}\)
64) \(\sqrt{x + 8} + 4 = x\)
65) \(\sqrt{3x + 1} = 3 + \sqrt{x - 4}\)

Add or subtract. Then simplify by collecting like radical terms, if possible.
66) \(-3\sqrt{2} - 5\sqrt{2}\)

Add or subtract. Then simplify by collecting like radical terms, if possible. Assume that all expressions under radicals represent nonnegative numbers.
67) \(\sqrt{6a - 2\sqrt{216a + 4\sqrt{24a}}\)}

Solve the problem. If necessary, round to the nearest tenth.
68) On a sunny day, a flag pole and its shadow form the sides of a right triangle. If the hypotenuse is 35 m long and the shadow is 28 m, how tall is the flag pole?

Multiply.
69) \((8 - 2i)(7 + 4i)\)

Simplify.
70) \(i^{14}\)

Simplify to the form \(a + bi\).
71) \(\frac{-3i}{-9 + 5i}\)

Solve.
72) \(7n^2 = -10n - 2\)
73) \(x^2 + x + 6 = 0\)

Solve. Give exact solutions.
74) \((p - 5)^2 = 14\)

Solve. Provide answers in interval notation.
75) \(p^2 + 10p + 21 > 0\)
Graph the function.
76) \( f(x) = 3(x - 1) \). Is \( f \) one-to-one?

Graph the equation using a solid line, and then graph the inverse using a dashed line.
78) \( y = 6x - 4 \), where \(-1 \leq x \leq 3\)

Determine whether the given function is one-to-one. If so, find a formula for the inverse.
77) \( f(x) = \frac{4}{x - 5} \)

Find the requested composition of functions.
79) Given \( f(x) = 2x^2 - 3 \) and \( g(x) = \frac{5}{x} \), find \( f \circ g(x) \).

Solve.
80) \( \log x = -3 \)

Find the logarithm.
81) \( \log_{10} 32 \)

Find the common logarithm to four decimal places.
82) \( \log_{10} 8348 \)

Find the center and the radius of the circle.
86) \( (x + 8)^2 + y^2 = 49 \)

Find the equation.
83) \( 17^x = 30 \) (Round to the nearest hundredth.)

84) \( 3^x = 81 \)

85) \( \ln(5x - 6) = \ln 24 - \ln (x - 4) \)

Graph the circle.
87) \( (x - 3)^2 + (y - 2)^2 = 36 \)

Graph.
88) \( \frac{x^2}{49} + \frac{y^2}{4} = 1 \)
Graph the hyperbola.

89) $\frac{y^2}{4} - \frac{x^2}{16} = 1$

Evaluate the sum.

90) $\sum_{k=2}^{5} (4k - 5)$

Find the indicated term for the given arithmetic sequence.

91) 5, 11, 17,...  (12th term)
1) -5
2) \( b_1 = \frac{2A - (h)(b_2)}{h} \)
3) 60 ft
4) \{10, -4\}
5) \[\begin{array}{c}
-9 \\
19
\end{array}, \begin{array}{c}
4 \\
4
\end{array}\]
6) (2, 8)
7) \((\infty, \infty)\)
8) 36 in., 66 in.
9) \(\frac{89}{33}\) atm
10) \(\frac{1}{2}\), \(y\)-intercept (0, 3)
11) \(\frac{1}{2}\)
12) 1
13) \(\frac{89}{33}\) atm
14) \(\frac{1}{2}\), \(y\)-intercept (0, 3)
15) Not a function
16) \(\{x | x \text{ is a real number and } x \neq -5\}\)
17) \(\{y | -4 \leq y \leq 2\}\)
18) \(-\frac{1}{4}\)
19) (3, -5)
20) (3, 0)
21) Slope \(\frac{1}{2}\), \(y\)-intercept (0, 3)
22) \(f(x) = -\frac{5}{2}x + 8\)
23) \(y = -5x - 34\)
24) \(f(x) = -2x + 11\)
25) \(-30x + 10\)
26) \(5x^2 + 49x + 72\)
27) \(49x^2 + 28xy + 4y^2\)
28) \(121 - 169x^2\)
29) \(3w(2x - 4y - 4z)\)
30) \((4x^3 + 3)(2x^3 + 5)\)
31) (x + 12)(x - 5)  
32) 4x(3x + 2)(x - 5)  
33) 4(4x - 7)^2  
34) km(9k + 2m)^2  
35) (n + 1)^2(n^2 - n + 1)  
36) \frac{y - 3}{2}  
37) \frac{1}{5x + 3y}  
38) \frac{z + 3}{z}  
39) \frac{-5}{x - 1}  
40) \frac{2y^2 + 4y + 15}{(y - 3)(y + 6)}  
41) \frac{-6x}{(x + 8)(x - 6)}  
42) 3 + 2x^2 + y^2 - 2x^3y  
43) p = 2 + \frac{9}{p + 8}  
44) 7m^2 - 4m + 6  
45) x^2 + 5 + \frac{4}{x^2 + 1}  
46) \frac{2y + 3x}{3y - 2x}  
47) \frac{160}{3}  
48) x = -9 or x = 8  
49) x = \frac{39}{5}  
50) \frac{20}{9} \text{ hr}  
51) 11\frac{1}{4} \text{ hr}  
52) 480  
53) 14 \text{ km/h}  
54) r = \frac{S - a}{S}  
55)  
56) \sqrt{30}  
57) \frac{11}{16}  
58) 64a^2/7b^10/7  
59) \sqrt[6]{x}  
60) 5x\sqrt{2}y  
61) 7m10\sqrt{2}  
62) \frac{56 + 7\sqrt{10}}{54}  
63) \frac{5\sqrt{2x}}{x}  
64) 8  
65) 5, 8  
66) -8\sqrt{2}  
67) -3\sqrt{6} a  
68) 21 m  
69) 64 + 18i  
70) -1  
71) -\frac{15}{106} + \frac{27}{106} i  
72) -\frac{5 + \sqrt{11}}{7}  
73) -\frac{1 + i\sqrt{23}}{2}  
74) \sqrt{14 + 5}, -\sqrt{14 + 5}  
75) (-\infty, -7) \cup (-3, \infty)
Answer Key
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76) 

77) \[ f^{-1}(x) = \frac{5x + 4}{x} \]

78) 

79) \[ \frac{50}{x^2} - 3 \]

80) \[ \frac{1}{125} \]

81) \[ \frac{5}{3} \]

82) 3.9216

83) 1.20

84) 4

85) \[ \frac{26}{5} \]

86) \((-8, 0), r = 7\)