MATH 100 PRACTICE FINAL EXAM

Lecture Version

Name:	
ID Number:	
Instructor:	
Section:	

Do not open this booklet until told to do so!

On the separate answer sheet, fill in your name and identification number and code the appropriate spaces with a No. 2 pencil. Use the spaces marked "Year" under Birth Date to code the version of the exam you are taking.

The exam has 50 multiple choice questions. Select the one best answer for each problem. Use a No. 2 pencil to mark your answers on the answer sheet. Be sure to clearly mark your answer with a heavy mark. Should you change an answer, be sure to erase your original answer completely.

The test booklet has a limited amount of space with each problem. If the space is not sufficient to show your work, use the back of the previous page. Label your work. Mark your answer in the exam booklet and on the answer sheet. Answer all questions. There is no penalty for guessing.

Good Luck!

1. Solve the linear equation

$$\frac{1}{5}(10x - 20) = x - 3$$

a) $\{-1\}$

b) {17}

c) {3}

- d) {1}
- 2. Decide whether the equation is an identity, a conditional equation, or a 2._____ contradiction.

$$2(3x - 4) = 6x + 5$$

a) identity

b) conditional equation

c) contradiction

- d) none of these
- 3. The formula for the perimeter of a rectangle is given by P = 2l + 2w, 3. where l is the length and w is the width. Assume the perimeter of a rectangular plot of land is 480 ft. The length is twice the width. Find the length of the rectangular plot of land.
 - a) 80 ft

b) 120 ft

c) 160 ft

- d) 240 ft
- 4. A car dealership uses the linear model y = -1100x + 25000 to predict the depreciation of car values as time progresses. If x is how old the vehicle is in years and y is the current value of the vehicle, what will the value of the vehicle be 5 years after purchase?
- 4.____

a) \$18,400

b) \$19,500

c) \$22,700

d) \$23,900

5. Find the following sum.

$$7(3x^2 + 2x - 5) + 2(-x^2 + 3)$$

a)
$$20x^2 + 14x - 32$$
 b) $19x^2 + 2x - 2$

b)
$$19x^2 + 2x - 2$$

c)
$$28x^2 + 14x - 28$$

d)
$$19x^2 + 14x - 29$$

6. Find the following product.

$$(1-3x)(x^2+2x-5)$$

a)
$$-3x^3 - 5x^2 + 17x - 5$$
 b) $x^2 - x - 4$

b)
$$x^2 - x - 4$$

c)
$$-3x^3 + 7x^2 + 13x - 5$$
 d) $-7x^2 + 17x - 5$

d)
$$-7x^2 + 17x - 5$$

Factor out the greatest common factor from the following polynomial. 7._____ 7. $3a^7b^3 - 21a^4b^3$

a)
$$a^4b^3(3a^3-21)$$

b)
$$3a^4b^3(a^3-7)$$

c)
$$a^4b^3(3a^3b - 21ab)$$
 d) $3a^4b^3(a^3b - 7ab)$

d)
$$3a^4b^3(a^3b - 7ab)$$

8. Factor the following polynomial by grouping.

$$15ab - 6b + 10a - 4$$

a)
$$(3b+2)(5a-2)$$

a)
$$(3b+2)(5a-2)$$
 b) $(3b-2)(5a+2)$

c)
$$(3b+2)(5a+2)$$

c)
$$(3b+2)(5a+2)$$
 d) $(3b-2)(5a-2)$

9. Factor the following trinomial.

$$6x^2 + 11x - 10$$

a)
$$(3x-2)(2x-5)$$

b)
$$(3x + 2)(2x - 5)$$

c)
$$(3x-2)(2x+5)$$

c)
$$(3x-2)(2x+5)$$
 d) $(x+6)(11x-10)$

10. Factor the following polynomial.

$$25x^2 + 40x + 16$$

a)
$$(5x + 4)(5x - 4)$$

b)
$$(5x + 4)(5x + 4)$$

c)
$$(5x-4)(5x-4)$$

d)
$$(x + 40)(25x + 16)$$

11. Write the following complex number in standard form a + bi.

11.

$$\frac{-24+\sqrt{-126}}{3}$$

a)
$$-8 + 14i$$

b)
$$-8 - i\sqrt{14}$$

c)
$$-8 + i\sqrt{126}$$

d)
$$-8 + i\sqrt{14}$$

12. Find the sum or difference. Write the answer in standard form a + bi. 12._____ (3-5i) - (-5+11i) + (9+6i)

a)
$$7 + 12i$$

b)
$$7 - 10i$$

c)
$$17 + 12i$$

d)
$$17 - 10i$$

13. Find the numerator of the quotient. Write the answer in standard form 13. a + bi.

$$\frac{5-3i}{2+7i}$$

a)
$$-11 - 41i$$

b)
$$31 + 21i$$

c)
$$16 - 30i$$

d)
$$11 + 41i$$

14. Solve the following quadratic equation by the zero-factor property.

$$3x^2 - x = 14$$

b)
$$\left\{2, -\frac{7}{3}\right\}$$

c)
$$\left\{-2, \frac{7}{3}\right\}$$

- 15. Solve the following quadratic equation by the square root property. 15._____

 (2x 1)^2 = 9

 a) {-1}
 b) {2}
 c) {-1,2}
 d) No solutions

 16. Solve the following quadratic equation by completing the square $9x^2 + 12x 3 = 0$ a) $\left\{-3, \frac{5}{3}\right\}$ b) {1,-1}
- c) $\left\{\frac{2}{3} \pm 6\sqrt{7}\right\}$ d) $\left\{\frac{-2\pm\sqrt{7}}{3}\right\}$ 17. The Pythagorean Theorem for a right triangle is $a^2 + b^2 = c^2$, where a and b are the legs of the triangle and c is its hypotenuse. The shorter

leg is 10 inches less than the other leg, and the hypotenuse is 10 inches

longer than that other leg. What is the length of the hypotenuse?

a) 30 inches

b) 40 inches

c) 50 inches

- d) 60 inches
- 18. Bob wants to plant a 7 foot by 10 foot garden with a uniform border of petunias around the outside and still have 28 square feet to plant tomatoes and roses in the middle. How wide should the border of petunias be?
 - a) 1.5 ft

b) 2 ft

c) 3 ft

d) 3.25 ft

- 19. The height of a cannon ball, in feet, shot from a pirate ship is given by the equation $h = -0.03x^2 + 2.84x + 20$, where x is given in seconds. After how many seconds does the cannon ball splash into the water?
 - a) -6.58 sec

b) 101.25 sec

c) 47.33 sec

- d) 87.21 sec
- 20. Find and simplify the product of the following rational expression.

 $\frac{(x+2)}{x(x-3)} \cdot \frac{3(x-3)}{4}$

 $\frac{2}{x-3} + \frac{4}{5x+2}$

a) $\frac{4x+8}{3x}$

b) $\frac{3x+6}{4x}$

c) $\frac{4x+8}{3x^3-18x^2+27x}$

- d) $\frac{3x^2-3x-18}{4x^2-12x}$
- 21. Perform the following addition or subtraction.

a)
$$\frac{6}{6x-1}$$

b)
$$\frac{6}{(x-3)(5x+2)}$$

c)
$$\frac{6x+16}{(x-3)(5x+2)}$$

d)
$$\frac{14x-8}{(x-3)(5x+2)}$$

22. Perform the indicated operations. Write each answer using only positive exponents. Assume all variables represent positive real numbers.

$$\frac{9m^{1/2}n^{3/2}}{m^{-7}n(m^3n)^{1/2}}$$

a)
$$9m^6$$

b)
$$9m^6n^3$$

c)
$$9m^5n^3$$

d)
$$\frac{9n^3}{m^5}$$

23. Solve the following rational equation.

$$\frac{2}{x+3} - \frac{1}{2x+1} = \frac{8}{2x^2 + 7x + 3}$$

a) $\{-3\}$

b) {3}

c) $\left\{-\frac{1}{2}\right\}$

- d) No solutions
- 24. Solve the following radical equation.

23.____

a) {-3}

b) {4}

c) $\{-3,4\}$

- d) No solutions.
- 25. Solve the following inequality. Write the solution set in interval notation.

$$2x + 1 \le 3x - 2$$

 $\sqrt{3x+13} = x+1$

a) $(-\infty, -3]$

b) [3,∞)

c) (-∞,3]

- d) $[-3, \infty)$
- 26. Solve the following inequality. Write the solution set in interval notation.

$$2 \ge \frac{5 - 3x}{4} > -3$$

- a) $\left(-1, \frac{17}{3}\right)$
- b) $\left(-1, \frac{17}{3}\right]$
- c) $\left[-1, \frac{17}{3}\right)$

- d) $\left[-1, \frac{17}{3}\right]$
- 27. Solve the following quadratic inequality. Write the solution set in interval notation.

$$x^2 - 2x - 35 < 0$$

a) (-5,7)

b) $(-\infty, -5) \cup (7, \infty)$

c) [-5,7]

d) $(-\infty, -5] \cup [7, \infty)$

- 28. Solve the following rational inequality. Write the solution set in interval notation.
- 28.____

$$\frac{x+9}{x-6} \le 0$$

|2x + 11| = 7

- a) (-9,6] b) [-9,6) c) $(-\infty, -9) \cup [6, \infty)$ d) $(-\infty, -9] \cup (6, \infty)$
- 29. Solve the following absolute value equation.

a) $\{-2\}$

b) {-9}

c) $\{-2, -9\}$

- d) No solutions.
- Solve the following absolute value inequality. 30.

$$|5x - 3| \ge -1$$

a) No solutions.

- b) $(\frac{2}{5}, \frac{4}{5})$
- c) $\left(-\infty, \frac{2}{5}\right) \cup \left(\frac{4}{5}, \infty\right)$ d) $\left(-\infty, \infty\right)$
- Given the following center-radius form of the equation for a circle, 31. find the center of the circle.

$$(x-3)^2 + (y+2)^2 = 16$$

a) (3,2)

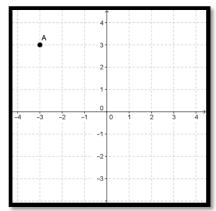
b) (-3,2)

c) (3,-2)

d) (-3, -2)

32. Consider the following graph of the point A.





Which quadrant does A lie in?

- a) Quadrant I
- b) Quadrant II
- c) Quadrant III
- d) Quadrant IV
- 33. Decide whether the following relation defines a function. $\{(0,1), (1,2), (-1,0), (2,-3), (3,-2)\}$
- 33.____

34.____

- a) Yes, this is a function.
- b) No, this is not a function.
- 34. Give the domain and range of the following relation.

$$y = \sqrt{x - 1}$$

- a) Domain is $(-\infty, \infty)$ and Range is $(-\infty, \infty)$
- b) Domain is $[1, \infty)$ and Range is $(0, \infty)$
- c) Domain is $(1, \infty)$ and Range is $[0, \infty)$
- d) Domain is $[1, \infty)$ and Range is $[0, \infty)$

35. For the function $f(x) = 3x^2 - 7$, find f(-3).

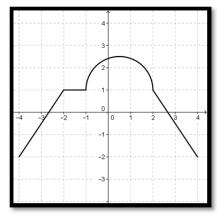
35.____

a) -34

b) 20

c) -16

- d) 2
- 36. Determine the intervals of the domain for which the following function 36._____ is decreasing.



- a) $[-4, -2] \cup [-1, 0.5]$
- b) [-2, -1]

c) [0.5,4]

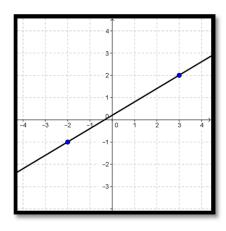
- d) [-2,2.5]
- 37. Which of the following pairs of points has slope 2/9?

37.____

- a) (1,3) and (2,-7)
- b) (1,2) and (3,-7)
- c) (2,3) and (-7,1)
- d) (3,1) and (-7,2)

38. Given the following graph of a linear function, what is the slope?





a) 3/5

b) 5/3

c) -3/5

- d) -5/3
- 39. Write the equation of the line passing through the point (-3,7) with 39. slope zero.
 - a) x = -3

b) y = -3

c) x = 7

- d) y = 7
- 40. Write the equation in slope-intercept form for a line passing through the point (-3,2) that is parallel to 4x y = 7.
 - a) y = 4x + 14

- b) y = -4x 10
- c) $y = -\frac{1}{4}x + \frac{5}{4}$
- d) $y = \frac{1}{4}x + \frac{11}{4}$

41. The following table lists data collected during a recent experiment. In this case, *x* represents age (in years) and *y* represents the given diameter (in inches).

ſ	х	1	3	5	7	9	11	13
Ī	у	5.73	6.44	7.01	7.67	8.23	9.11	9.85

Use the linear regression feature on your graphing calculator to find a line of best fit for this data. Use the equation you found to predict the diameter given an age of 6 years.

a) 7.38 inches

b) 1.91 inches

c) 1.06 inches

- d) 7.04 inches
- 42. For the following piecewise-defined function, find f(-1).

42.

$$f(x) = \begin{cases} 1 - 5x & \text{if } x < -2\\ x^2 - 2x & \text{if } -2 \le x \le 1\\ -1 + 2x & \text{if } x > 1 \end{cases}$$

a) -3

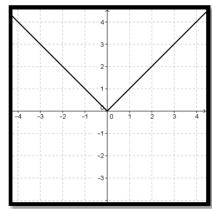
b) -1

c) 3

d) 6

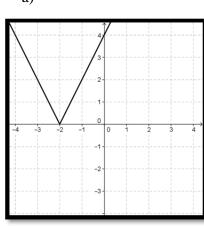
43. The following is a graph of y = f(x).



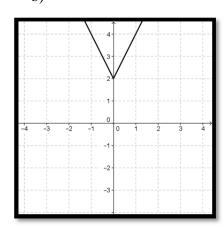


Which is the graph of y = 2f(x) - 2?

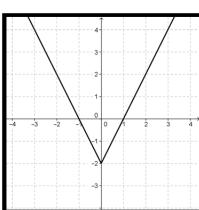
a)



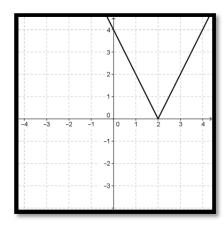
b)



c)



d)



- Suppose that the point (1,4) is on the graph of y = f(x). Find a point 44.____ on the graph when y is translated left 3 units and reflected across the x-axis.
 - a) (1, -4)

b) (4, -4)

c) (-2,4)

- d) (-2, -4)
- 45. Decide which of the following functions is even.

45.____

a) f(x) = |x|

b) f(x) = x + 1

c) $f(x) = \sqrt{x}$

- d) $f(x) = x^3$
- 46. Let $f(x) = 3x^2 1$ and g(x) = -2x + 7. Find (f + g)(-3).
- 46.____

a) 27

b) 39

c) -41

- d) -14
- 47. Use the following table to evaluate (f/g)(2).

47.	

_			
x	f(x)	g(x)	
-1	2	7	
0	0	-1	
2	-3	4	
8	5	2	

a) -3/4

b) -1/8

c) 7/5

- d) 5/7
- 48. For the function f(x) = -3x + 4, find and simplify $\frac{f(x+h) f(x)}{h}$

a)
$$-3x + 4$$

b)
$$-3x - 3h + 4$$

c)
$$-3h$$

49. Use the following table to evaluate $(g \circ f)(-1)$.

x	f(x)	g(x)
-3	5	-1
-1	-3	5
5	8	-3
8	-1	8

a) -3

b) -1

c) 5

- d) 8
- 50. Let $f(x) = -2x^2 + 1$ and g(x) = 4x - 3. Find $(f \circ g)(x)$.

49.____

- a) $-8x^3 + 6x^2 + 4x 3$ b) $-2x^2 + 4x 2$

c) $-8x^2 + 5$

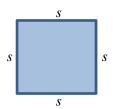
d) $-32x^2 + 48x - 17$

Geometry Formulas

Square

Perimeter: P = 4s

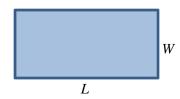
Area: $A = s^2$



Rectangle

Perimeter: P = 2L + 2W

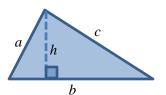
Area: A = LW



Triangle

Perimeter: P = a + b + c

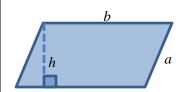
Area: $A = \frac{1}{2}bh$



Parallelogram

Perimeter: P = 2a + 2b

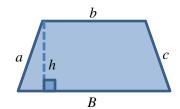
Area: A = bh



Trapezoid

Perimeter: P = a + b + c + B

Area: $A = \frac{1}{2}h(b+B)$

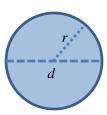


Circle

Diameter: d = 2r

Circumference: $C = 2\pi r = \pi d$

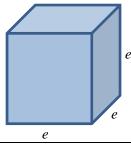
Area: $A = \pi r^2$



Cube

Volume: $V = e^3$

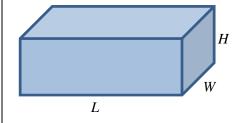
Surface Area: $S = 6e^2$



Rectangular Solid

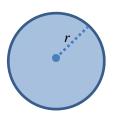
Volume: V = LWH

Surface Area: S = 2HW + 2LW + 2LH



Sphere

Volume: $V = \frac{4}{3}\pi r^3$ Surface Area: $S = 4\pi r^2$

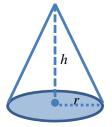


Cone

Volume: $V = \frac{1}{3}\pi r^2 h$

Surface Area: $S = \pi r \sqrt{r^2 + h^2}$

(excludes the base)

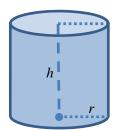


Right Circular Cylinder

Volume: $V = \pi r^2 h$

Surface Area: $S = 2\pi rh + 2\pi r^2$

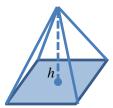
(includes top and bottom)



Right Pyramid

Volume: $V = \frac{1}{3}Bh$

B = area of the base



Answer Key:

1. D	11. D	21. D	31. C	41. A
2. C	12. D	22. A	32. B	42. C
3. C	13. A	23. B	33. A	43. C
4. B	14. C	24. B	34. D	44. D
5. D	15. C	25. B	35. B	45. A
6. A	16. D	26. C	36. C	46. B
7. B	17. C	27. A	37. C	47. A
8. A	18. A	28. B	38. A	48. D
9. C	19. B	29. C	39. D	49. B
10. B	20. B	30. D	40. A	50. D