



Midterm Review Math 0309 - Introductory Algebra

INSTRUCTIONS: This set of problems is meant to help you practice the kind of material that may appear on your midterm and does not represent exactly what your midterm will look like. There may be questions on your midterm that are unlike questions on this review and vice versa. No question on the review will be duplicated exactly on the midterm. Your midterm will consist of 25 multiple choice questions, so you should bring a scantron with you on the day of your midterm exam.

MIDTERM CALCULATOR POLICY: You are allowed to use a basic calculator during the midterm. You are NOT allowed to use a scientific or graphing calculator. Any calculator that is used must be a nonprogrammable calculator that is not capable of accessing the internet or interfacing with any other device, has a single line display, and has math operation keys that do not exceed addition, subtraction, multiplication, division, square root, percent, and negation (plus/minus). Using a smartphone as a calculator is strictly forbidden.

- 1) Write the set using roster notation:
The set of even natural numbers less than 10.
- 2) Write the set using set-builder notation:
 $\{1, 3, 5, \dots, 25\}$
- 3) Find the cardinal number for the set.
 $A = \{5, 10, 15, \dots, 50\}$
- 4) Find all subsets of the set. $\{1, 7, 11\}$.
- 5) True or False? $\{4\} \in \{2, 4, 6, 8, 10\}$
- 6) True or False? $\{4\} \subseteq \{2, 4, 6, 8, 10\}$
- 7) Since the student union is being remodeled, there is a limited choice of foods and drinks a student can buy for a snack between classes. Students can choose none, some, or all of these: soda, fries, chips, and sandwich
How many different selections can be made?
- 8) Let $U = \{5, 10, 15, 20, 25, 30, 35, 40\}$
 $A = \{5, 10, 15, 20\}$
 $V = \{25, 30, 35, 40\}$
 $C = \{10, 20, 30, 40\}$.
Find $A \cup C$.
- 9) Let $U = \{5, 10, 15, 20, 25, 30, 35, 40\}$
 $A = \{5, 10, 15, 20\}$
 $B = \{25, 30, 35, 40\}$
 $C = \{10, 20, 30, 40\}$.
Find $A' \cap (B' \cup C')$.

10) Determine whether each sentence is a statement or not.

- i. $2 \times 3 = 0$
- ii. He is not home.
- iii. She went to Spain.
- iv. Are you going to try again?

11) Classify each statement as simple or compound.

- i. You get paid if and only if you shc
- ii. I am going to get a dog or a cat.
- iii. She has over \$2000 in her savings
- iv. She is either five or six years old.

12) Write the negation of the statement.
He is done studying.

13) Create the truth table for the statement
 $p \vee \sim q$.

14) Create the truth table for the statement
 $q \rightarrow p$

15) Let p = "Greg is in my history class."
Let q = "Lew is in my Spanish class."
Write the following statement in words
 $\sim p \wedge \sim q$

16) Let p = "My homework is finished."
Write the following statement in symbols.

It is false that my homework is not finis

17) Evaluate the expression for the given substitution.

$$3z - 7; \text{ when } z = 3$$

18) Which is a false statement?

- A) All integers are whole numbers.
- B) All natural numbers are rational numbers.
- C) All irrational numbers are real numbers.
- D All rational numbers are real) numbers.

19) Write these numbers in order from least to greatest: 0, 5, -3, -8, 1

20) Which statement is false?

- A) $|-4| = |4|$
- B) $|-4| \geq |4|$
- C) $|-4| \leq |4|$
- D) $|-4| < |4|$

21) Write the product using exponents.
 $12 \cdot a \cdot a \cdot a \cdot b \cdot b \cdot b \cdot b$

22) Simplify the square root.

$$\sqrt{\frac{16}{9}}$$

23) Use the order of operations to simplify the expression.

$$4(2 - 3)^2 + 9^2$$

24) Simplify: $3\sqrt{67 - 42} + |2 - 7| + 2 \cdot (-4)$

25) Translate the phrase into an algebraic expression.

The product of five and the difference of eleven and t

26) Subtract the numbers.

$$\frac{1}{3} - \left(-\frac{2}{9}\right)$$

27) Divide the real numbers.

$$55 \div 0$$

28) Divide the real numbers.

$$\frac{1}{8} \div (-3)$$

29) Use the distributive property to clear the parentheses.

$$2(10x + 7)$$

30) Simplify by combining like terms.

$$2x - 5 + 5x - 4 - 4x$$

31) Determine whether the given number is a solution to the equation.

$$8t + 4 = -76; \quad -10$$

32) Which of the following is not a linear equation?

A) $\frac{y}{8} + 3 = -\frac{1}{4} - \frac{y}{5}$

B) $2z - 3 = 4z + 2$

C) $2x + 3 = 4 - x^2$

D) $2(y + 5) = y$

33) Solve the equation using the addition or subtraction property of equality.

$$-\frac{3}{8} + m = \frac{1}{4}$$

34) Solve the equation using the multiplication or division property of equality.

$$-5x = 40$$

35) Solve the equation.

$$18 - 8t = 36$$

36) Solve the equation.

$$-2(2y + 3) + 2 = 0$$

37) Identify the equation as a conditional equation, a contradiction or an identity.

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

38) Solve the formula for y .

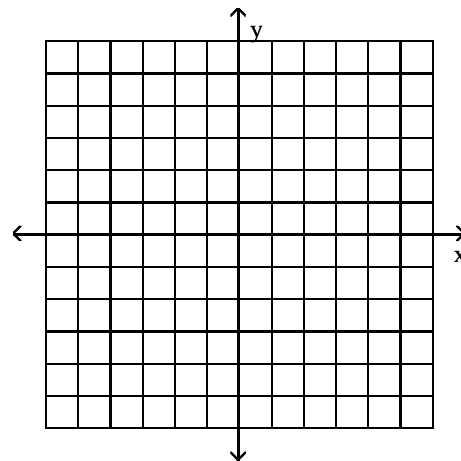
$$-6x + 10y = 6$$

39) Solve the formula for m .

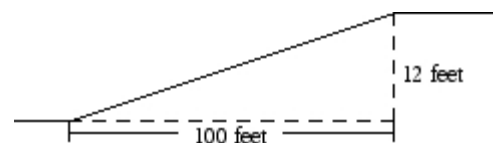
$$3n - \frac{m}{2} + 5 = 8n$$

40) Plot each of the following points on the same set of axes.

$$(3, 5), (-2, 1), (5, 0), (0, -4)$$



41) Find the slope of the ramp pictured.

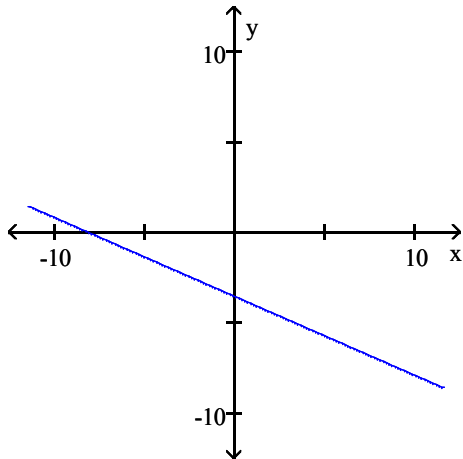


42) The linear equation

$y = -1,500x + 14,000$ can be used to approximate the resale value of a pickup truck in dollars, where x represents the number of years after its initial purchase. Find the value of the truck 4 years after it was purchased.

43) Find the slope of the line that passes through the points $(6, -1)$ and $(8, -7)$.

- 44) Does the line pictured below have positive, negative, zero, or undefined slope?



- 45) Graph the line through the point $(1, 2)$ having slope 1.

- 46) Write an equation of the line with slope $-\frac{1}{4}$ and y -intercept $\left(0, \frac{4}{3}\right)$.

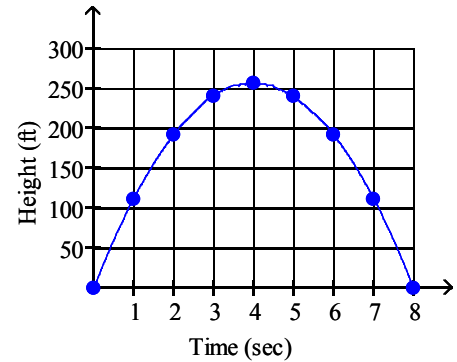
- 47) Write an equation of the line with slope $\frac{1}{4}$ that passes through the point $(-12, -6)$.

- 48) The graph of a quadratic model is in the shape of what letter? What is the formal name of the graph of a quadratic model?

- A) I; line B) U; parabola
C) S; Cubic D) O; circle

- 49) A two-bedroom apartment at an apartment complex near campus requires a deposit of \$600 plus rent of \$910 per month. Write an equation to model the cost y (in \$) to rent the apartment for x months.

- 50) The height of a pop fly baseball is recorded at various times after it is hit. The height y (in ft) of the ball, x seconds after being hit is shown below. Identify the maximum height of the ball.



Answer Key

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- 1) {2, 4, 6, 8}
- 2) $\{x \mid x \text{ is an odd natural number less than } 26\}$
- 3) $n(A) = 10$
- 4) $\emptyset; \{1\}; \{7\}; \{11\}; \{1, 7\}; \{1, 11\}; \{7, 11\}; \{1, 7, 11\}$
- 5) False
- 6) True
- 7) 16
- 8) $A \cup C = \{5, 10, 15, 20, 30, 40\}$
- 9) $A' \cap (B' \cup C') = \{25, 35\}$
- 10) Yes, Yes, Yes, No
- 11) Compound, Compound, Simple, Compound
- 12) He is not done studying.
- 13)

p	q	$p \vee \sim q$
T	T	T
T	F	T
F	T	F
F	F	T

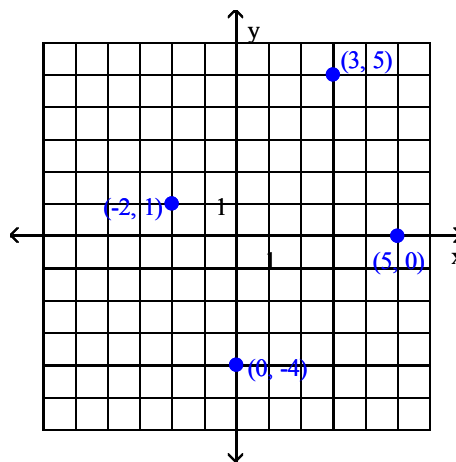
p	q	$q \rightarrow p$
T	T	T
T	F	T
F	T	F
F	F	T

14)

- 15) Greg is not in my history class, and
Lew is not in my Spanish class.

- 16) $\sim(\sim p)$
- 17) 2
- 18) A
- 19) -8, -3, 0, 1, 5
- 20) D
- 21) $12a^3b^4$
- 22) $\frac{4}{3}$
- 23) 85
- 24) 12
- 25) $5(11 - t)$

- 26) $\frac{5}{9}$
- 27) undefined
- 28) $-\frac{1}{24}$
- 29) $20x + 14$
- 30) $3x - 9$
- 31) yes
- 32) C
- 33) $m = \frac{5}{8}$
- 34) $x = -8$
- 35) $t = -\frac{9}{4}$
- 36) $y = -1$
- 37) identity
- 38) $y = \frac{3}{5}x + \frac{3}{5}$
- 39) $m = 10 - 10n$
- 40)

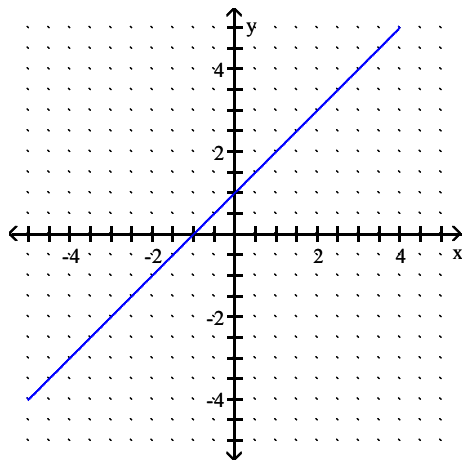


- 41) $\frac{3}{25}$
- 42) \$8,000
- 43) $m = -3$
- 44) negative

Answer Key

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45)



46) $y = -\frac{1}{4}x + \frac{4}{3}$

47) $y = \frac{1}{4}x - 3$

48) B

49) $y = 910x + 600$

50) 256