



Midterm Review Math 0314 - Intermediate 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) Solve the equation: $36t - 5 = 15t + 13$

2) Solve the equation:
 $-9x + 6(2x - 3) = -11 - 4x$

3) Solve the equation:
 $-\frac{1}{5}(t + 6) - 2 = 3t + \frac{2}{3}$.

4) Decide whether the equation is conditional, an identity, or a contradiction. Give the solution set.
 $5(2x - 31) = 10x - 155$

5) One fruit punch has 40% fruit juice and another is 80% fruit juice. How much of the 40% punch should be mixed with 10 gal of the 80% punch to create a fruit punch that is 50% fruit juice?

6) In a chemistry class, 8 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?

7) Solve the inequality. Write the solution set in interval notation.
 $9 - 5t \leq -3$

8) Two cars are 170 miles apart and travel toward each other on the same road. They meet in 2 hours. One car travels 1 mph faster than the other. What is the average speed of each car?

9) Solve the inequality. Write the solution set in interval notation.

$$\frac{3x + 10}{-3} \geq x - 5$$

10) Solve the inequality. Write the solution set in interval notation.

$$-2(6y - 7) + y \geq 2y - (-4 + y)$$

11) Let $C = \{x \mid x > 4\}$ and $D = \{x \mid x \leq -17\}$. Determine the given union. Express the answer in interval notation.

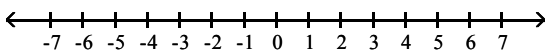
$$C \cup D$$

12) Solve the compound inequality. Write the answer in interval notation.

$$9x \geq 54 \quad \text{and} \quad 7 - x > -3$$

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

$$12x - 8 < 4x \quad \text{or} \quad -2x \leq -6$$



14) Solve the inequality. Write the answer in interval notation.

$$-20 \leq 2x - 9 < 16$$

15) Solve the absolute value equation.

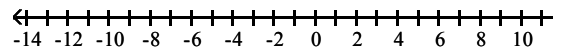
$$|8k - 4| = 16$$

16) Solve the absolute value equation.

$$|-5x + 4| - 12 = -4$$

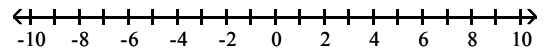
17) Solve the inequality and graph the solution set.

$$|6x - 4| \geq 5$$



18) Solve the inequality and graph the solution set.

$$|5x + 1| < 6$$



19) Use the slope formula to determine the slope of the line containing the two points.

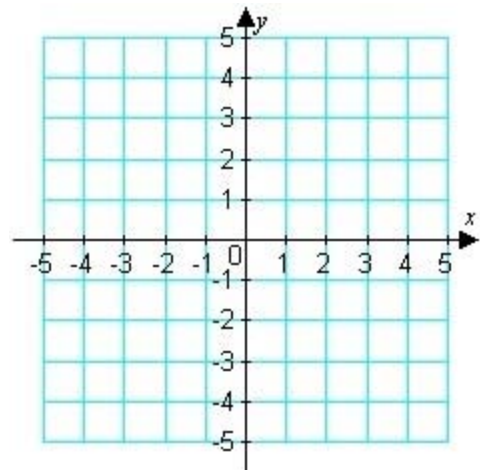
$$(2, 7) \quad \text{and} \quad (-9, 3)$$

20) Find the x -intercept and the y -intercept then graph the equation.

$$-5x - 3y = 15$$

21) Write the equation in slope-intercept form. Then, graph the line using the slope and y -intercept.

$$2x - 3y = 6$$



- 22) Write an equation of the line satisfying the given conditions. Write the answer in slope-intercept form.

The line passes through the point $(-4, -12)$ and has a slope of $\frac{5}{2}$.

- 23) Find an equation of the line satisfying the given conditions. Write the answer in slope-intercept form.

The line passes through $(2, 6)$ and $(3, 20)$.

- 24) Consider the function $h(x) = \{(-5, 22), (-2, 1), (1, -2), (4, 13), (9, 78)\}$
Find the function value $h(-2)$.

- 25) Solve the problem. Find $f(-3)$ when $f(x) = 4x^2 - 4x + 6$.

- 26) Simplify the expression. Write your answer with positive exponents only.
 $y^6 \cdot y^8$

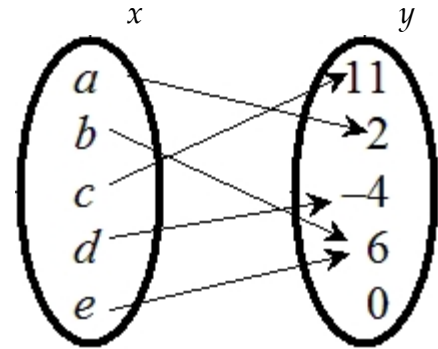
- 27) Simplify the expression. Write your answer with positive exponents only.
 $\frac{-54a^8b^4}{12a^2b^7}$

- 28) Simplify the expression. Write your answer with positive exponents only.
 $(3x^5)^3$

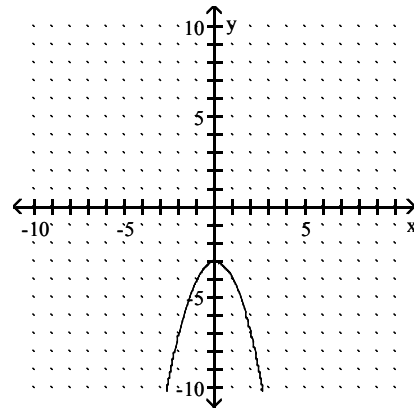
- 29) Add.
 $(4n^5 + 6n + 5n^2) + (-9n^2 + 3n^5 + 3n)$

- 30) Find the difference of $(-2v^9 - 2v^6 + 3v^2)$ and $(5v^2 - 7v^6 - 3v + 3)$.

- 31) Determine if the relation defines y as a function of x .



- 32) Decide whether the relation is a function, and give the domain and range.



- 33) Find the domain of the function. Write your answer in interval notation.
 $g(y) = \sqrt{y - 2}$

- 34) Multiply the polynomials.
 $(-6t^3u^2)(-4t^6u^7)$

- 35) Multiply the polynomials.
 $(-4w - 8)(w - 7)$

- 36) Multiply the polynomials.
 $(m - 3n)(m^2 + 7mn - 6n^2)$

37) Divide the polynomials.

$$\frac{24x^6y^4 - 30x^5y^4 - 3x^3y^6}{6x^5y^4}$$

49) $(x + 8)(x - 1) = 22$

38) Divide the polynomials by using long division.

$$(x^3 - 6x^2 - 30x - 7) \div (x + 3)$$

39) Divide the polynomials by using long division.

$$(63x^2 + 69x + 18) \div (7x + 3)$$

40) Factor out the greatest common factor.

$$70w^5 - 20w^4$$

41) Factor out the greatest common factor.

$$18t^2u - 30tu^2 + 12tu$$

Factor by grouping.

42) $t^2 + 9t + 5t + 45$

Factor by grouping.

43) $x^3 + 7x^2 - 10x - 70$

44) Factor the trinomial completely.

$$7m^2 - 21m + 14$$

45) Factor the binomial.

$$36q^2 - 16r^2$$

46) Factor the sum or difference of cubes.

$$64u^3 + 125$$

Solve the equation.

47) $x^2 + 5x - 14 = 0$

48) $2k^2 = -27k - 81$

Answer Key

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1) $\left\{\frac{6}{7}\right\}$

2) $\{1\}$

3) $t = -\frac{29}{24}$

4) Identity; {all real numbers}

5) 30 gal

6) 4 liters

7) $\left[\frac{12}{5}, \infty\right)$

8) 42 mph; 43 mph

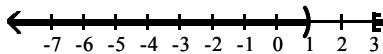
9) $\left(-\infty, \frac{5}{6}\right]$

10) $\left(-\infty, \frac{5}{6}\right]$

11) $(-\infty, -17] \cup (4, \infty)$

12) $[6, 10]$

13) $(-\infty, 1) \cup [3, \infty)$

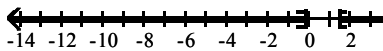


14) $\left[-\frac{11}{2}, \frac{25}{2}\right]$

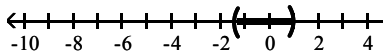
15) $\left\{\frac{5}{2}, -\frac{3}{2}\right\}$

16) $\left\{-\frac{4}{5}, \frac{12}{5}\right\}$

17) $\left(-\infty, -\frac{1}{6}\right) \cup \left[\frac{3}{2}, \infty\right)$

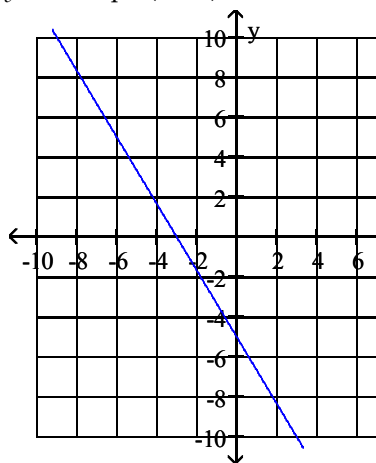


18) $\left[-\frac{7}{5}, 1\right]$

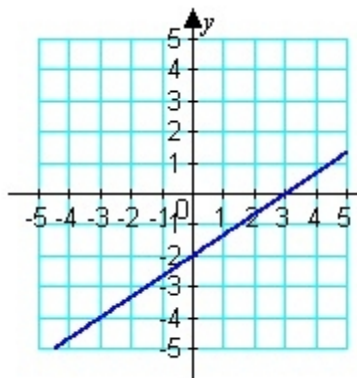


19) $\frac{4}{11}$

20) x-intercept: (-3, 0);
y-intercept: (0, -5)



21) $y = \frac{2}{3}x - 2$



22) $y = \frac{5}{2}x - 2$

23) $y = 14x - 22$

24) $g(-2) = 1$

25) 54

26) y^{14}

27) $-\frac{9a^6}{2b^3}$

28) $27x^{15}$

29) $7n^5 - 4n^2 + 9n$

30) $-2v^9 + 5v^6 - 2v^2 + 3v - 3$

31) Function

32) Function; domain: $(-\infty, \infty)$;
range: $(-\infty, -3]$

33) $[2, \infty)$

34) $24t^9u^9$

35) $-4w^2 + 20w + 56$

36) $m^3 + 4m^2n - 27mn^2 + 18n^3$

37) $4x - 5 - \frac{y^2}{2x^2}$

38) $x^2 - 9x - 3 + \frac{2}{x+3}$

39) $9x + 6$

40) $10w^4(7w - 2)$

41) $6tu(3t - 5u + 2)$

42) $(t + 9)(t + 5)$

43) $(x + 7)(x^2 - 10)$

44) $7(m - 2)(m - 1)$

45) $4(3q + 2r)(3q - 2r)$

46) $(4u + 5)(16u^2 - 20u + 25)$

47) $\{-7, 2\}$

48) $\left\{-\frac{9}{2}, -9\right\}$

49) $\{-10, 3\}$