

Part 1: Multiple Choice (35 items)

MA 1.3 G.9/1 Understand and apply properties of inequality to analyze and solve problems using linear inequalities in one variable.

1. Which of the following statements is **true** about the solutions of the inequality $|x - 1| > 0$?

- a. All real numbers
b. All real numbers except 1
c. No solutions, for $x \in \mathbb{R}$
d. $-1 < x < 1$

2. Which of the following **does not** represent the inequality symbol " \leq " ?

- a. maximum
b. no more than
c. at most
d. at least

3. Which of the following describes the inequality: $-3 \geq x$?

- a. 
b. 
c. 
d. 

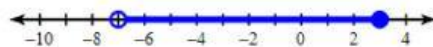
4. Which of the following inequalities is represented by the graph?

- a. $x \leq 3$
b. $x > 3$
c. $x < 3$
d. $3 < x$

5. Which of the following shows the solution to the compound inequality: $-2 \leq \frac{n}{3} \leq 0$?

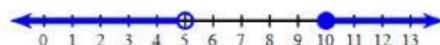
- a. 
b. 
c. 
d. 

6. Which statement best represents the inequality illustrated in the graph below?



- a. A number is at least -7 and at most 3
b. A number is no less than -7 and no more than 3
c. A number is greater than -7 and at most 3
d. A number is greater than -7 and less than 3

7. Which of the following correctly describes the inequality in interval notation based on the diagram below?



- a. $(-\infty, 5] \cup [10, \infty)$
b. $(-\infty, 5) \cup [10, \infty)$
c. $(-\infty, 5) \cup (10, \infty)$
d. $(5, 10]$

For items 8 – 9, refer to the statement below:

The sum of three consecutive even numbers is no less than 96

8. Which of the following best translates the statement above into an inequality?

- a. $x + x + 1 + x + 2 > 96$
- b. $x + x + 1 + x + 2 \geq 96$
- c. $x + x + 2 + x + 4 \geq 96$
- d. $x + x + 2 + x + 4 \leq 96$

9. What are three possible consecutive even numbers?

- a. 30, 31, 32
- b. 28, 30, 32
- c. 30, 32, 34
- d. 32, 34, 36

For items 10 – 12, refer to the inequality below:

$$\frac{|x - 6|}{6} \geq 3$$

10. Which values satisfy the inequality shown above?

- a. $-10 \leq x \leq 10$
- b. $-4 \leq x \leq 4$
- c. $x \geq 24$ or $x \leq -12$
- d. $x \leq -10$ or $x \geq 10$

11. Which of the following represents the solution of the inequality on a number line?

- a. 
- b. 
- c. 
- d. 

12. Which of the following represents the solution to the inequality in interval notation?

- a. $[-10, 10)$
- b. $(-\infty, -10] \cup (10, \infty)$
- c. $(-\infty, -12] \cup [24, \infty)$
- d. $[-4, 4]$

For items 13 – 16, refer to the statement below

The rectangle has a length longer than twice the width by 5m. Its perimeter is at least 142m. Find the area of the rectangle. Suppose x be the width.

13. Which of the following best represents the length of the rectangle?

- a. $2 + 5x$
- b. $2x + 5$
- c. $5 - 2x$
- d. $2x - 5$

14. Which of the following best translates the statement above into an inequality?

- a. $2x + 2(2 + 5x) \geq 142$
- b. $2x + 2(2x + 5) \geq 142$
- c. $2x + 2(5 - 2x) \geq 142$
- d. $2x + 2(2x - 5) \geq 142$

15. What are the dimensions of the rectangle?
- the length is at least 49m and the width is at least 22m
 - the length is at least 27m and the width is at least 11m
 - the width is at least 13m and the length is at least 31m
 - the width is at least 20m and the length is at least 45m
16. What is the area of the rectangle?
- At least 1078m^2
 - less than 1078m^2
 - 1078m^2
 - more than 1078m^2
17. Which of the following inequalities has no solutions, for $x \in \mathbb{R}$?
- $\left|\frac{x}{6}\right| - 6 \geq -5$
 - $|-10 + x| + 4 > -5$
 - $|5 + x| - 2 < 0$
 - $-9 + |9x| \leq -18$

For items 18 – 19, refer to the statement below

A farmer raises some chickens, 10 of them are dead and the remaining chickens are not less than 9 and not more than 12. How many chickens were there on the farm before? Suppose x be the number of chickens on the farm.

18. Which of the following best translates the statement above into an inequality?
- $9 \leq x - 10 < 12$
 - $9 \leq x - 10 \leq 12$
 - $9 < x + 10 < 12$
 - $9 < x - 10 \leq 12$
19. How many chickens were there on the farm?
- 20 or 21 chickens
 - 19 or 22 chickens
 - 19, 20, 21, or 22 chickens
 - more than 19 chickens
20. Which of the following is the solution of the inequality $\frac{3}{4}x - 2 > \frac{x}{4} + 2$?
- $x > \frac{7}{2}$
 - $x > \frac{5}{3}$
 - $x > \frac{9}{2}$
 - $x > \frac{1}{3}$

MA 1.2 G.9/1 Understand and apply the knowledge of factoring polynomials of degrees higher than two to solving mathematical problems.

21. Which of the following is the correct expanded form of $(x + 2)^3$?
- $x^3 + 3x^2 + 6x + 8$
 - $x^3 + 4x^2 + 6x + 8$
 - $x^3 - 8x^2 + 6x - 8$
 - $x^3 + 6x^2 + 12x + 8$

22. What expression is missing in the expanded form of $(a - b)^5$? (Hint: Use Pascal's triangle)

$$a^5 - 5a^4b + 10a^3b^2 - 10a^2b^3 + \underline{\hspace{2cm}} - b^5$$

a. $-5ab^4$

b. $5ab^4$

c. $10b^4$

d. $-10b^4$

For items 23 – 24, refer to the given polynomial

Given a trinomial: $kx^4 - 36x^2y + 36y^2$

23. What is the value of k that makes the polynomial a perfect square trinomial?

a. 3

b. 4

c. 6

d. 9

24. Which of the following is the correct factor of the polynomial in item 24?

a. $(9x^2 - 4y)(9x^2 + 4y)$

b. $(9x^2 - 4y)^2$

c. $(3x^2 - 6y)^2$

d. $(3x^2 - 6y)(3x^2 + 6y)$

For items 25 – 26, refer to the given polynomial

Given a polynomial : $8x^3 + 48x^2 + k + 64$

25. What value of k makes the polynomial the expansion of a cube of a binomial?

a. $64x$

b. $96x$

c. 48

d. 96

26. Which of the following is the correct factor of the polynomial in item 25?

a. $(2x + 8)^3$

b. $(x + 4)^3$

c. $(2x + 4)^3$

d. $(4x + 3)^3$

27. Which of the following are the factors of $x^2y^4 - 1$?

a. $(xy^2 - 1)(xy^3 + xy^2 + 1)$

b. $(xy^2 + 1)(xy^2 - 1)$

c. $(xy^2 - 1)(xy^2 - 1)$

d. $(xy^2 + 1)(xy^2 + 1)$

28. Which of the following are the factors of $375x^3 - 192y^6$?

a. $3(5x - 4y^2)(5x^2 - 20xy^2 + 16y^4)$

b. $3(5x - 4y^2)(25x^2 + 20xy^2 + 16y^4)$

c. $3(5x - 4y^2)(25x^2 - 20xy^2 + 16y^4)$

d. $3(5x - 4y^2)(25x^2 + 20xy^2 + 16y^2)$

29. Factor the polynomial completely : $x^4 - 2x^2y + y^2 - 64$

a. $(x^2 - y^2 - 8)(x^2 - y^2 + 8)$

b. $(x^2 - y - 8)(x^2 - y + 8)$

c. $(x^2 - y - 8)(x^2 - y - 8)$

d. $(x^2 - y^2 - 8)(x^2 - y^2 - 8)$

30. Factor the polynomial completely: $16p^4 - 32p^2q^5 + 16q^{10}$

a. $16(p^2 - q^5)^2$

b. $(4p^2 - 4q^5)^2$

c. $(4p^2 + 4q^5)^2$

d. both a and b



31. If $(5x + 6y^2)(25x^2 + \text{---} + 36y^4)$ are factors of $125x^3 + 216y^6$, which one fills the blank?

- a. $30xy^2$
- b. $-30xy^2$
- c. $30x^2y$
- d. $-30x^2y$

32. Which of the following polynomials contains a factor of $(2x^3 - 3)$?

- a. $4x^6 - 16x^2 + 9$
- b. $4x^6 - 9$
- c. $8x^6 - 27$
- d. all of these

33. Which of the following is not a factor of the polynomial: $2x^3 + 5x^2 - 2x - 5$?

- a. $2x - 5$
- b. $2x + 5$
- c. $x + 1$
- d. $x - 1$

34. Which of the following is the correct expanded form: $(2x + 1)^4$?

- a. $16x^4 + 8$
- b. $16x^4 + 32x^3 + 24x^2 + 8x + 1$
- c. $16x^4 + 32x^3 + 32x^2 + 12x + 1$
- d. $16x^4 + 32x^3 + 24x^2 + 12x + 4$

35. Factor the polynomial completely: $9x^4 + 50x^2 + 81$

- a. $(3x^2 + 2x + 9)(3x^2 - 2x + 9)$
- b. $(3x^2 - 9)^2$
- c. $(3x^2 + 9)^2$
- d. $(3x^2 + 4x + 9)(3x^2 - 4x + 9)$



Part 2: Problem solving. Read each problem carefully and show your solutions as much as possible.

1. The perimeter of a square is at most 96 inches. What is the greatest possible area of the square?

Solution:

∴ The possible area of the square is _____.

2. Pupha is 5 years younger than his friend. If the sum of their ages after 3 years is at least 45, what are their minimum present ages?

Solution :

	Present age	Age in 3 years
Pupha		
His friend		

∴ At present , Pupha is _____ and his friend is _____.