

### 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  $|x - 1| > 0$  ?

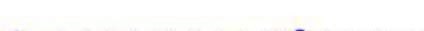
a. All real numbers      b. All real numbers except 1  
 c. No solutions, for  $x \in \mathbb{R}$       d.  $-1 < x < 1$

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

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

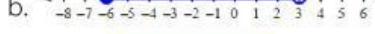
3. Which of the following describes the inequality:  $-3 \geq x$  ?

a.  b.   
 c.  d. 

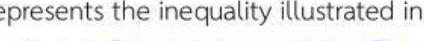
4. Which of the following inequalities is represented by the graph? 

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:  $-2 \leq \frac{n}{3} \leq 0$  ?

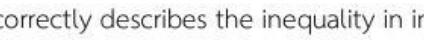
a.  b.   
 c.  d. 

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?

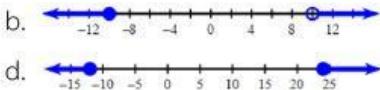
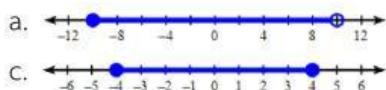
a.  $-10 \leq x \leq 10$

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?



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?

- a. the length is at least 49m and the width is at least 22m
- b. the length is at least 27m and the width is at least 11m
- c. the width is at least 13m and the length is at least 31m
- d. the width is at least 20m and the length is at least 45m

16. What is the area of the rectangle?

- a. At least 1078m<sup>2</sup>
- b. less than 1078m<sup>2</sup>
- c. 1078m<sup>2</sup>
- d. more than 1078m<sup>2</sup>

17. Which of the following inequalities has no solutions, for  $x \in \mathbb{R}$ ?

- a.  $\left|\frac{x}{6}\right| - 6 \geq -5$
- b.  $|-10 + x| + 4 > -5$
- c.  $|5 + x| - 2 < 0$
- d.  $-9 + |9x| \leq -18$

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?

- a.  $9 \leq x - 10 < 12$
- b.  $9 \leq x - 10 \leq 12$
- c.  $9 < x + 10 < 12$
- d.  $9 < x - 10 \leq 12$

19. How many chickens were there on the farm?

- a. 20 or 21 chickens
- b. 19 or 22 chickens
- c. 19, 20, 21, or 22 chickens
- d. more than 19 chickens

20. Which of the following is the solution of the inequality  $\frac{3}{4}x - 2 > \frac{x}{4} + 2$ ?

- a.  $x > \frac{7}{2}$
- b.  $x > \frac{5}{3}$
- c.  $x > \frac{9}{2}$
- d.  $x > \frac{1}{3}$

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  $(x + 2)^3$ ?

- a.  $x^3 + 3x^2 + 6x + 8$
- b.  $x^3 + 4x^2 + 6x + 8$
- c.  $x^3 - 8x^2 + 6x - 8$
- d.  $x^3 + 6x^2 + 12x + 8$

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

8/1

31. If  $(5x + 6y^2)(25x^2 + \underline{\hspace{2cm}} + 36y^4)$  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 \_\_\_\_\_.