Mathematics Formula Sheet

Perimeter

square	$P = 4s$
rectangle	$P = 2l + 2w$
triangle	$P = s_1 + s_2 + s_3$
circle (circumference)	$C = 2\pi r$ or πd

Area

square	$A = s^2$
rectangle	$A = lw$
triangle	$A = \frac{1}{2} bh$
circle	$A = \pi r^2$
parallelogram	$A = bh$
trapezoid	$A = (\frac{1}{2})\ h(b_1 + b_2)$

Surface Area and Volume

rectangular/right prism	$SA = ph + 2B$	$V = Bh$
cylinder	$SA = 2\pi rh + 2\pi r^2$	$V = \pi r^2 h$
pyramid	$SA = (\frac{1}{2})\ ps + B$	$V = (\frac{1}{3})Bh$
cone	$SA = \pi rs + \pi r^2$	$V = (\frac{1}{3})\pi r^2 h$
sphere	$SA = 4\pi r^2$	$V = (\frac{4}{3})\pi r^3$

(p = perimeter of base B; $\pi \approx 3.14$)

Algebra

slope of a line	$m = (y_2 - y_1) / (x_2 - x_1)$
slope-intercept form of the equation of a line	$y = mx + b$
point-slope form of the equation of a line	$y - y_1 = m(x - x_1)$
standard form of a quadratic equation	$ax^2 + bx + c = y$
quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Pythagorean Theorem	$a^2 + b^2 = c^2$
simple interest	$I = prt$ (I = interest, p = principal, r = rate, t = time)
distance formula	$d = rt$
total cost	number of units × price per unit

Data

Mean	The total of the values of a data set, divided by the number of elements in the data set
Median	The middle value in an odd number of ordered values of a data set or the mean of the two middle values in an even number of ordered values in a data set

PRETEST

Mathematical Reasoning

46 questions | **115 minutes**

This pretest is intended to give you an idea of the topics you need to study to pass the GED® Mathematical Reasoning test. Try to work every problem, in a quiet area and with enough time so that you are free from distractions. The usual time allotted for the test is 115 minutes, but it is more important to be sure you get a chance to think about every problem than it is to finish ahead of time.

Answers and solutions for every problem can be found at the end of the pretest.

PART I: NO CALCULATOR

For questions 1–3, fill in the missing items.

	Decimal	Percent	Fraction
1.	0.03	_____	_____
2.	_____	45%	_____
3.	_____	_____	$\frac{7}{15}$

4. Arrange in order from least to greatest: $\frac{1}{8}, \frac{2}{3}, \frac{3}{5}, \frac{2}{7}, \frac{5}{6}$. *Write your answer in the space below.* **Note:** On the real GED® test, you will click on each fraction and "drag" it into position.

5. A group of 16 adults, 9 of whom are men, are placed in 4-person teams. How many different teams of all women are possible?

   A. 4
   B. 16
   C. 35
   D. 63

PART II: CALCULATOR ALLOWED

6. A store reduces the price of a toaster by 25%. The salesperson gives a customer an additional 10% off the already-reduced price. What is the total discount the customer is getting, expressed as a percentage?

   A. 1%
   B. 2.5%
   C. 32.5%
   D. 35%

7. If $A > B$, what is the correct relationship for

   $-A$ _____ $-B$?

   Write the correct symbol on the line.

8. What is the equation of a line parallel to $y = 7x + 2$ and passing through the point (5, 10)?

   A. $y = -7x + 2$
   B. $y = 7x - 2$
   C. $y = -7x - 25$
   D. $y = 7x - 25$

9. Convert the fraction $\frac{3}{8}$ to an equivalent fraction with a denominator of 32. *Write your answer in the box.*

PRETEST

10. Solve by factoring: $3x^2 - 5x - 12 = 0$.
    A. $x = 3$ or $\frac{-4}{3}$
    B. $x = 3$ or $\frac{4}{3}$
    C. $x = -3$ or $\frac{-4}{3}$
    D. $x = -3$ or $\frac{4}{3}$

11. Which of the lines below is not parallel to $x - 2y = 12$?
    A. $y = -\frac{1}{2}x - 4$
    B. $2x - 4y = 16$
    C. $y = \frac{1}{2}x + 21$
    D. $x - 2y = 8$

12. Solve for x: $3x + 12 > 2x + 1$.
    A. $x > 11$
    B. $x > -11$
    C. $x < 11$
    D. $x < -11$

13. Multiply $(2x - 7)(3x + 1)$.
    A. $6x - 21x - 7$
    B. $12x - 19x^2 - 7$
    C. $6x^2 - 19x - 7$
    D. $6x^2 + 23x + 7$

14. Add $\frac{1}{4} + \frac{2}{3}$.
    A. $\frac{11}{12}$
    B. $\frac{3}{7}$
    C. $\frac{1}{4}$
    D. $\frac{1}{6}$

15. What is the distance between −4 and 4 on the number line?
    A. 0
    B. −8
    C. 8
    D. 16

16. Given a 6-sided die (one of a pair of dice) that measures 1.75 centimeters on an edge, what is the volume of the die?
    A. 3.06 cm^3
    B. 5.36 cm^3
    C. 10.50 cm^3
    D. 18.38 cm^3

17. A bowl of colored balls contains 30% red balls, 20% blue balls, and 30% green balls; the rest are white balls. What is the percent probability of randomly selecting a color other than red on a single draw? *Write your answer in the box.*

    ____ %

For questions 18–19, write your answer in the space provided.

18. 25% : 75% :: _____ : 18

19. 3 : 10 :: _____ : 150

20. The ratio 5:7 is the same as
    A. 35
    B. $\frac{15}{21}$
    C. $\frac{7}{5}$
    D. 0.625

PRETEST

21. Suzy has made a mistake and added 4 teaspoons of baking powder to 5 cups of flour in a recipe that calls for 3 teaspoons of baking soda to 5 cups of flour. In order to not waste the entire batch, she has decided to add flour to get the proper proportion of baking powder to flour. How much flour should she add?

    A. $\frac{3}{5}$ cup
    B. $1\frac{2}{3}$ cups
    C. 5 cups
    D. $6\frac{2}{3}$ cups

22. Subtract $-7x + 2$ from $4x + 7$.

    A. $-3x + 9$
    B. $-3x + 5$
    C. $11x + 9$
    D. $11x + 5$

23. Which of the following is (are) NOT function(s)?

    A.

x	1	2	5	–1	–5
y	2	3	9	7	2

    B.

x	–2	–1	0	1	2
y	4	4	4	4	4

    C.

x	–1	2	–1	4	–1
y	2	4	3	11	2

    D.

x	–2	–1	0	–1	–2
y	15	7	0	7	15

24. A business owner adds 45% to the price of an item to cover operating costs and profit margin. What is the selling price of an item that costs the owner $120?

    A. $165
    B. $174
    C. $186
    D. $200

25. What is the value of $2x^2 + 3y^3$ when $x = 3.5$ and $y = 2.25$?

    A. 58.67
    B. 24.50
    C. 18.39
    D. 13.75

26. For which of the following integer values of x is $0 < x < 4$ true?
    Write your choices in the box. (**Note:** On the actual GED® test, you will click on an answer and "drag" it into the box.)

    –5 1
    –4 2
    –3 3
    –2 4
    –1 5
    0

    [ ]

27. Starting at –14 on the number line, in which direction must you go, left or right, to find –11?
    Write your answer in the box.

    [ ]

28. If $y = \sqrt{x - 2}$, y is a real number for what values of x?

    A. $x < 2$
    B. $x > 2$
    C. $x = 2$
    D. $x \geq 2$

29. What is the area of a triangle with a base of 15 units and a height of 6 units?

    A. 90 units
    B. 45 units
    C. 22.5 units
    D. 21 units

PRETEST

30. What is the slope of a line perpendicular to $3x + 4y = 13$?

    A. $\frac{4}{3}$
    B. $\frac{3}{4}$
    C. $-\frac{3}{4}$
    D. $-\frac{4}{3}$

31. What is the perimeter of a rectangular field that measures 660 feet by 330 feet?

    A. 217,800 ft.
    B. 3,960 ft.
    C. 1,980 ft.
    D. 990 ft.

32. Reduce to lowest terms: $\frac{x^5}{x^3}$.

    A. x^{15}
    B. x^8
    C. x^2
    D. x

33. Approximately how many cubic centimeters can a tin can hold if it is 11.0 centimeters high and its top is 7.4 centimeters in diameter?

    A. 1,891 cm^3
    B. 473 cm^3
    C. 128 cm^3
    D. 43 cm^3

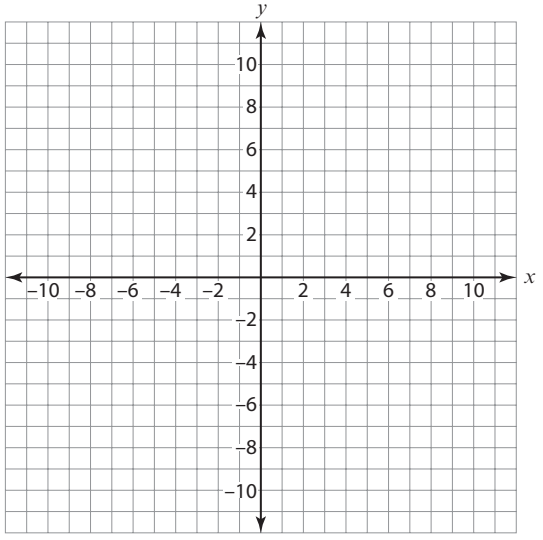
34. If $f(x) = 5x^2 - 7x + 4$, what is $f(-2)$?

    A. −30
    B. −14
    C. 10
    D. 38

35. What is x^{-3} if $x = -2$?

    A. 8
    B. $\frac{1}{8}$
    C. $-\frac{1}{8}$
    D. −8

36. Graph $3x - 5y = -10$. (**Note:** On the real GED® test, you will click on 2 points on the graph that are on the line to draw the line.)



PRETEST

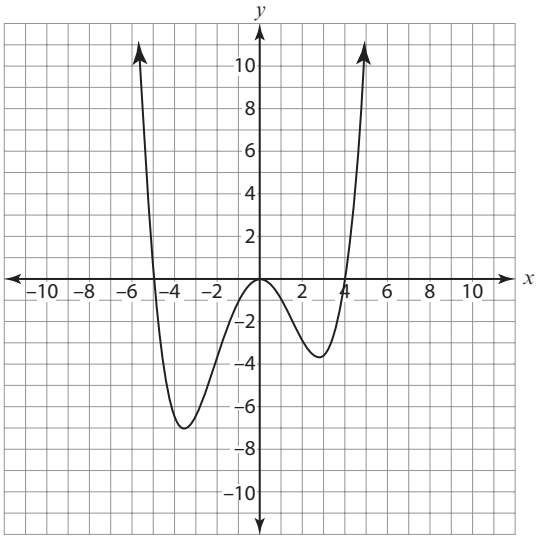
37. Simplify $\frac{6x^2 + 8x}{2x^2}$.

A. $\frac{3x+4}{x}$
B. $7x$
C. 7
D. $22x$

38. Simplify $\sqrt[4]{162}$.
Write each number in the appropriate box.

$\square \sqrt[\square]{\square}$

39. Is this the graph of a function?
Check ____ Yes or ____ No.



40. Multiply $(x+2)^2$.

A. $x^2 + 4$
B. $4x^2$
C. $x^2 + 2x + 4$
D. $x^2 + 4x + 4$

41. If housing prices have increased by 17% since last year, what was the old price of a house that today sells for $185,000?

A. $216,450
B. $158,120
C. $153,550
D. $31,450

42. Subtract $\frac{2x+2}{4y} - \frac{3x-7}{2x}$.

A. $\frac{x^2 + x - 3xy + 7y}{2xy}$
B. $\frac{x+5}{2(y-1)}$
C. $\frac{-4x+16}{y-x}$
D. $\frac{x^2 + x - 3xy + 7y}{4xy}$

43. Given the equation $y = 3x + 4$, what are the slope and y intercept?
Write your answers in the appropriate boxes.

Slope ☐

y-intercept ☐

PRETEST

44. A bag has 6 red marbles and 12 blue marbles. A marble is drawn from the bag at random. What is the probability that it is blue?

    A. $\frac{1}{3}$
    B. $\frac{1}{2}$
    C. $\frac{2}{3}$
    D. $\frac{3}{4}$

45. What are the mean, median, and mode of the data set {5, 3, 6, 4, 6, 2, 8, 2, 6, 3, 6, 9, 1, 4, 7}? *Write your answers in the appropriate boxes.*

    mean ☐

    median ☐

    mode ☐

46. Solve $x^2 - 5x - 6 = 0$.

    A. $x = -6$ or -5
    B. $x = -6$ or -1
    C. $x = 6$ or 1
    D. $x = 6$ or -1

THIS IS THE END OF THE MATHEMATICAL REASONING PRETEST.

ANSWERS AND SOLUTIONS BEGIN ON THE NEXT PAGE.