

FAST FACTS

Multiplication and Division Facts Matrix

To find a multiplication fact: Locate one factor on the top horizontal row and the second on the leftmost vertical row. Draw an imaginary line from each number to the box in which the lines meet. The number in that box is the product of the two factors.

To find a division fact: Locate the divisor on the top horizontal row. Draw an imaginary line from that number down the page vertically until you come to the number being divided. Draw an imaginary line from that number to the leftmost box. The number in that box is the missing factor.

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

General Useful Definitions

1. **Digit** - one of ten symbols which all numbers are based on
0,1,2,3,4,5,6,7,8,9
2. **Infinite** - goes on forever, no end
3. **Whole Numbers**- set of infinite numbers beginning with zero
0,1,2,3,4,.....
4. **Counting or Natural Numbers** -set of infinite numbers beginning with one
1,2,3,4,5,.....
5. **Even Digits**- 0,2,4,6,8
6. **Odd Digits**- 1,3,5,7,9
7. **Consecutive Numbers** - one following the other like 11 and 12
8. **Integers** - Set of positive and negative numbers and zero
.....-3,-2,-1,0,1,2,3,.....
9. **Fraction** - part of a whole; made up of 2 parts a numerator and denominator
10. **Decimal** - part of a whole; a number containing a decimal point;
a fraction that uses place value system based on powers of 10
11. **Percent** - part of a whole; means a number out of 100
12. **Equivalent** - means equal; the same
13. **Exponent** - tells you how many times to multiply the number (the base) by itself

Glossary attached

Math Vocabulary - Choosing an Operation

Often a problem will tell you exactly which operation you should do. However, sometimes you will have to translate the words in a word problem into the operations. Look for these clues when you have to choose the operations.

You add (+) when you are asked to

- find a sum
- find a total
- combine amounts

Key words to look for:

- sum
- total
- all together

You subtract (-) when you are asked to

- find a difference
- take away an amount
- compare quantities

Key words to look for:

- difference
- take away
- how many more than
- how much less than
- how many fewer than
- how much is left over

You multiply (\times , \cdot) when you are asked to

- find a product
- add the same number over and over

Key words to look for:

- product
- times

You divide (\div) when you are asked to

- find a quotient
- split an amount into equal parts

Key words to look for:

- quotient
- per

Symbols

=	Equal	$2 + 3 = 5$
\neq	Not equal	$2 + 3 \neq 6$
$>$	Greater than	$5 > 3, 9 > 4 \times 2$
\nlessgtr	Not greater than	$4 \nlessgtr 5$
$<$	Less than	$3 < 7, 2 \times 5 < 12$
\nlessgtr	Not less than	$8 \nlessgtr 6 - 4$
\geq	Greater than or equal to	$7 \geq 5, 10 \geq 14 - 4$
\nlessgtr	Not greater than or equal to	$5 \nlessgtr 7, 12 \div 2 \nlessgtr 8$
\leq	Less than or equal to	$2 \leq 3, 2 \leq 3 - 1$
\nlessgtr	Not less than or equal to	$8 \nlessgtr 5, 2 \times 3 \nlessgtr 6 - 1$

SQUARES TO KNOW

Number	Square	Calculation
1	1	1×1
2	4	2×2
3	9	3×3
4	16	4×4
5	25	5×5
6	36	6×6
7	49	7×7
8	64	8×8
9	81	9×9
10	100	10×10
11	121	11×11
12	144	12×12
13	169	13×13
14	196	14×14
15	225	15×15
16	256	16×16
17	289	17×17
18	324	18×18
19	361	19×19
20	400	20×20
21	441	21×21
22	484	22×22
23	529	23×23
24	576	24×24
25	625	25×25

Order of Operations - PEMDAS

"Operations" means things like add, subtract, multiply, divide, squaring, etc.

If it isn't a number it is probably an operation.

But, when you see something like ...

$$7 + (6 \times 5^2 + 3)$$

... what part should you calculate first?

Start at the left and go to the right?

Or go from right to left?

Warning: Calculate them in the wrong order, and you will get a wrong answer!

Long ago people agreed to follow rules when doing calculations, and they are:

Order of Operations

Do things in Parentheses First. Example:

$$\checkmark 6 \times (5 + 3) = 6 \times 8 = 48$$

$$\times 6 \times (5 + 3) = 30 + 3 = 33 \text{ (wrong)}$$

Exponents (Powers, Roots) before Multiply, Divide, Add or Subtract. Example:

$$\checkmark 5 \times 2^2 = 5 \times 4 = 20$$

$$\times 5 \times 2^2 = 10^2 = 100 \text{ (wrong)}$$

Multiply or Divide before you Add or Subtract. Example:

$$\checkmark 2 + 5 \times 3 = 2 + 15 = 17$$

$$\times 2 + 5 \times 3 = 7 \times 3 = 21 \text{ (wrong)}$$

Otherwise just go left to right. Example:

$$\checkmark 30 \div 5 \times 3 = 6 \times 3 = 18$$

$$\times 30 \div 5 \times 3 = 30 \div 15 = 2 \text{ (wrong)}$$

How Do I Remember It All ... ? PEMDAS !

P Parentheses first

E Exponents (ie Powers and Square Roots, etc.)

MD Multiplication and Division (left-to-right)

AS Addition and Subtraction (left-to-right)

Divide and Multiply rank equally (and go left to right).

Add and Subtract rank equally (and go left to right)

After you have done "P" and "E", just go from left to right doing any "M" *or* "D" as you find them.

Then go from left to right doing any "A" *or* "S" as you find them.

You can remember by saying "Please Excuse My Dear Aunt Sally".

CORE MATH VOCABULARY

The following list contains key vocabulary terms for GED/TASC Mathematics. It is not meant to be all- inclusive.

NUMBER OPERATIONS AND NUMBER SENSE	MEASUREMENT AND GEOMETRY	DATA ANALYSIS	ALGEBRA, FUNCTIONS AND PATTERNS
Total	Formula ***	Data	Formula ***
Sum	Parallel	Trend *	Equation ***
Difference	Perpendicular	Mean	Function
Product	Transversal	Median	Constant
Quotient	Angle	Mode	Variable
Associative property **	Complementary	Range	Term
Commutative property **	Supplementary	Standard deviation	Evaluate *
Distributive property **	Right angle	Probability	
What part of	Right triangle	How much more	
Per *	Isosceles triangle	How many times more *	
Rate	Equilateral triangle	Infer	
Ratio	Similar triangle	Predict	
Unit rate/unit price*	Congruent triangle	Line of best fit	
Percent	Perimeter	Bias	
Percent of increase	Circumference	Infer	
Percent of decrease	Area	Interpolate **	
Interest	Volume	Extrapolate **	
Interest rate	Base		
Principal	Height		
Proportion	Length		
Power	Width		
Exponent	Radius		
Square root	Diameter		
Equivalent	Pi		
Ascending order	Pythagorean theorem		
Descending order	Hypotenuse		
Operation	Leg		
Inverse operation	Coordinate plane		
Order of operation	Axis		
Estimate	Intercept		
Round	Intersect		
Approximate	Origin		
Scientific notation	Rotate		
Equations ***	Reflect		
	Slope		

* Key vocabulary for the GED test.

** While the GED generally does not explicitly use this type of language, it may test understanding and ability to apply these concepts.

*** Word may be repeated in different domains, especially science