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# Math Fundamentals 3 (Quickstudy: Academic)

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**Quick Study ACADEMIC**

WORD'S UP! ACADEMIC OUTLINE

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**Algebraic Equations & much more!**

# Math Fundamentals 3

**What is Algebra?**

**Mathematics** (abbreviated, **math**) is a form of science that deals with numbers—number theory, operations and measurements, all are part of mathematics.

**Fundamentals** are **essentials** or **basics**—something that a thing or system needs to make it what it is.

## OPERATIONS

**Operation Solution**

|   |                |            |
|---|----------------|------------|
| + | addition       | sum        |
| - | subtraction    | difference |
| × | multiplication | product    |
| ÷ | division       | quotient   |

**Order of Operations**

- 1 **Grouping symbols** – solve inside grouping symbols first; grouping symbols include ( ), [ ], { }, <math>\overline{\phantom{x}}</math>
- 2 **Exponents** – always set superscript (i.e., above figure) EX:  $10^2$ ,  $10^{-1}$
- 3 **Multiplication & Division** – in the order of appearance (i.e., first come, first served)
- 4 **Addition & Subtraction** – in the order of appearance (i.e., first come, first served)

**Decimal Operations**

|          | Use Up Decimals? | Process                                                                                                                                                                             | Examples                                                                                        |
|----------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>+</b> | yes              | Line up decimals.<br>Add normally.<br>Drop decimal straight down to sum.                                                                                                            | $23.06 + 3.08$ change to<br>23.06<br>+ 3.08<br>-----<br>26.14                                   |
| <b>-</b> | yes              | Line up decimals.<br>Subtract normally.<br>Drop decimal straight down to difference.                                                                                                | $8.807 - 3.412$ change to<br>8.807<br>- 3.412<br>-----<br>5.395                                 |
| <b>×</b> | no               | Multiply normally.<br>Count places to right of all decimals to problem.<br>Most decimal to left same number of places to solution.                                                  | $31.2 \times 87$ change to<br>31.2<br>× 87<br>-----<br>2714.4                                   |
| <b>÷</b> | no               | 8 NO decimal to divide.<br>Divide normally.<br>Bring UP decimal from dividend into quotient.                                                                                        | $20.5 \div 5$ change to<br>4.1<br>8 20.5                                                        |
| <b>+</b> | no               | 8 decimal to divide.<br>Move decimal to divide to right to create whole number.<br>Most decimal to dividend same number of places.<br>Bring UP decimal from dividend into quotient. | $75.2 \div 6.25$ change to<br>8.2 75.2 change to<br>8.2 752.0<br>-----<br>12.048<br>8.2 7520.00 |

**Integer Operations**

|          | Signs           | Process                                                                                          | Examples                                                        |
|----------|-----------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>+</b> | Same Signs      | Answer keeps same sign.<br>plus + plus = plus<br>neg + neg = neg                                 | $-3 + -4 = -7$                                                  |
| <b>+</b> | Different Signs | Subtract the numbers.<br>Keep sign of number with greatest absolute value, or answer negative.   | $6 + -3 = 3$ (6 has greater absolute value, so answer positive) |
| <b>-</b> | Same Signs      | "Add the Opposite" – change to addition, use opposite of 2nd integer; follow addition procedure. | $5 - -4$ change to $5 + 4 = 9$                                  |
| <b>-</b> | Different Signs | "Add the Opposite" – change to addition, use opposite of 2nd integer; follow addition procedure. | $7 - 12$ change to $7 + -12 = -5$                               |
| <b>×</b> | Same Signs      | Positive product<br>plus + plus = plus<br>neg + plus = neg                                       | $6 \times 3 = 18$                                               |
| <b>×</b> | Different Signs | Negative product<br>plus + neg = neg<br>neg + plus = neg                                         | $-6 \times 3 = -18$                                             |
| <b>÷</b> | Same Signs      | Positive quotient<br>plus + plus = plus<br>neg + neg = plus                                      | $24 \div 4 = 6$                                                 |
| <b>÷</b> | Different Signs | Negative quotient<br>plus + neg = neg<br>neg + plus = neg                                        | $27 \div -3 = -9$                                               |

**SYMBOL**

- ≠ unequal
- ≠ not equal
- < less than
- > greater than
- ≤ less than or equal to
- ≥ greater than or equal to
- + add
- subtract
- × multiply
- ÷ divide

**PLACE VALUE**

|          |                   |              |                    |               |           |          |      |      |        |            |             |                 |                     |            |
|----------|-------------------|--------------|--------------------|---------------|-----------|----------|------|------|--------|------------|-------------|-----------------|---------------------|------------|
| billions | hundreds millions | ten millions | hundreds thousands | ten thousands | thousands | hundreds | tens | ones | tenths | hundredths | thousandths | ten thousandths | hundred thousandths | millionths |
|----------|-------------------|--------------|--------------------|---------------|-----------|----------|------|------|--------|------------|-------------|-----------------|---------------------|------------|

1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6

**ROMAN NUMERALS**

|      |    |       |    |         |     |         |       |
|------|----|-------|----|---------|-----|---------|-------|
| I    | 1  | IX    | 9  | XC      | 90  | CM      | 900   |
| II   | 2  | X     | 10 | C       | 100 | CC      | 200   |
| III  | 3  | XI    | 11 | CC      | 200 | CCC     | 300   |
| IV   | 4  | XII   | 12 | CCC     | 300 | CD      | 400   |
| V    | 5  | XIII  | 13 | CD      | 400 | DC      | 500   |
| VI   | 6  | XIV   | 14 | DC      | 600 | CCCLXXV | 675   |
| VII  | 7  | XV    | 15 | CCCLXXV | 675 | DCC     | 700   |
| VIII | 8  | XVI   | 16 | DCC     | 700 | DCCLXXV | 775   |
| IX   | 9  | XVII  | 17 | DCCLXXV | 775 | DCCC    | 800   |
| X    | 10 | XVIII | 18 | DCCC    | 800 | CM      | 900   |
|      |    | XIX   | 19 | CM      | 900 | M       | 1,000 |

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## Synopsis

This fantastic overview of points, lines, angles, planes, solids and space figures is great for middle and high school students. It will help boost math confidence and test scores.

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I pulled this for a quick desk reference and now my son has decided he likes it. I find these guides very clear and for someone who has done a lot of math in the past it is a perfect reminder to get the brain to recall long lost knowledge.

Hey, I love math. This is a good study to keep the mind working.

Extremely useful!

Great reference for elementary maths.

All good thank you

I have a 14yr old that I home school and he is having trouble with Math. These charts are very detailed and self explanatory and I would encourage anyone struggling in Math to try these out. They really do help. The cost is very low and they deliver very very quickly!

Ordered for grand kids, their parents couldn't put it down. Excellent gift.

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