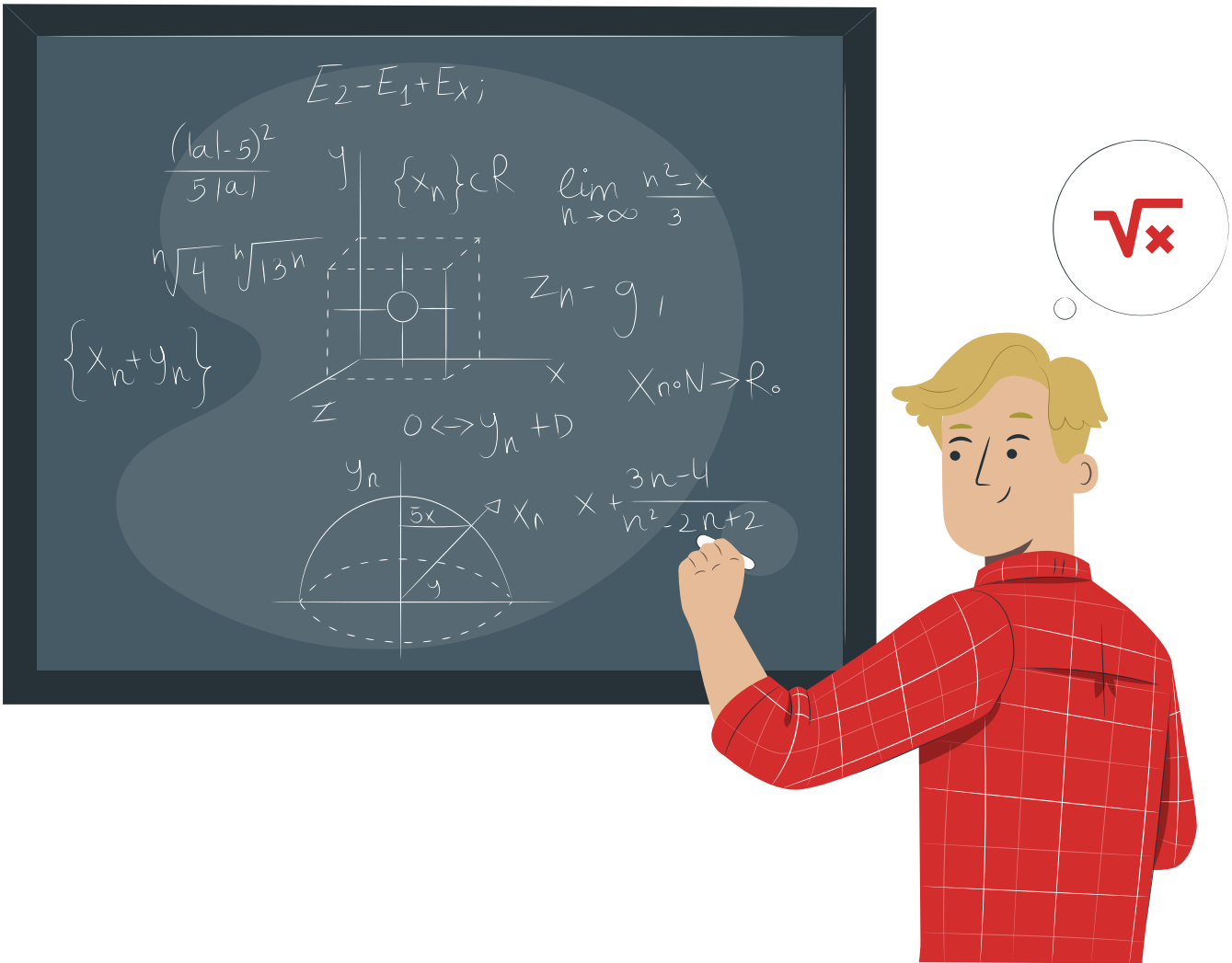
HESI® A2

MATH CRAM SHEET

Tips, strategies, and practice to ace the HESI Math test



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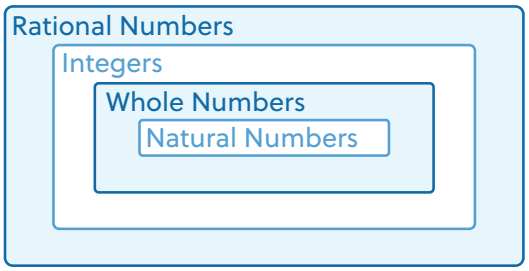
NUMBER BASICS



Each number system is a subset another.

A rational number is also a real number, a real number is also a complex number, etc.

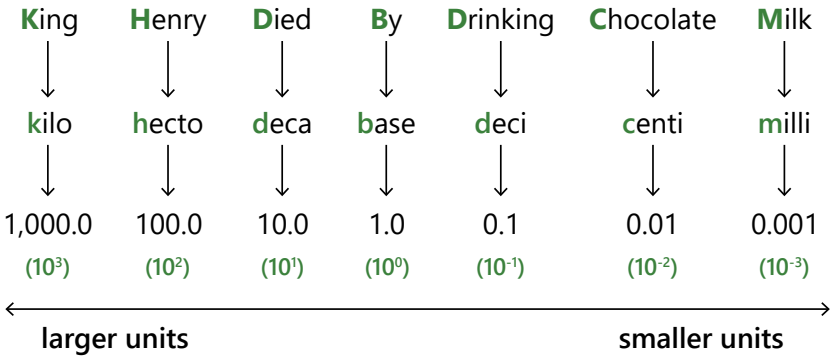
Number Class	Definition	Examples
Natural numbers	The number 1 or any number obtained by adding 1 to it one or more times.	1, 2, 3, 4, 5, ...
Whole Numbers	Whole numbers do not include fractions or decimal parts and is a positive integer or zero.	0, 1, 2, 3, 4, 5, ...
Integers	Any whole number or its opposite.	..., −5, −4, −3, −2, −1, 0, 1, 2, 3, 4, 5, ...
Rational numbers	A number can that be expressed as a ratio or fraction.	• 2/10.6 • 3/10 • 2.957
Real Numbers	A number that has no imaginary part. All real numbers can be located on a number line.	• −92 • 5/9 • √2
Complex Numbers	$a + bi$ where a and b are real numbers and i (imaginary number) is a formal square root of −1 (i= √-1, i^2 = -1)	• -1 + 2i • 7 - 9i • -6i

Place Value

Place	thousands	hundreds	tens	ones	tenths	hundredths	thousandths
Value	1,000	100	10	1	0.1	0.01	0.001

METRIC CONVERSIONS

Metric units are multiples of 10s. To convert to a larger unit, divide numbers by base of 10s. To convert to a smaller unit, multiply numbers by base of 10s.



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FRACTIONS

Proper Fraction
$\frac{1}{8}$ Numerator is less than the denominator

Improper Fraction
$\frac{8}{3}$ Numerator is greater than the denominator

Mixed Number
$3\frac{1}{8}$ Whole number and proper fraction together

Add or subtract fractions with different denominators

1. Change to equivalent fractions with common denominators using a scale factor
2. Add or subtract following the rules for fractions with the same denominators

$$\frac{A}{B} + \frac{C}{D} = \frac{AD}{BD} + \frac{BC}{BD} = \frac{AD + BC}{BD}$$

$$\frac{A}{B} - \frac{C}{D} = \frac{AD}{BD} - \frac{BC}{BD} = \frac{AD - BC}{BD}$$

Add or subtract fractions with the same denominators

1. Add or subtract the numerators
2. Keep the denominator the same
3. Simplify if possible

$$\frac{A}{B} + \frac{C}{B} = \frac{A + C}{B}$$

$$\frac{A}{B} - \frac{C}{B} = \frac{A - C}{B}$$

Multiply fractions

1. Multiply the numerators
2. Multiply the denominators
3. Simplify

$$\frac{A}{B} \times \frac{C}{D} = \frac{A \times C}{B \times D}$$

Divide fractions

1. Keep the first fraction as is
2. Change from division to multiplication
3. Flip the second fraction to its reciprocal
4. Follow multiplication of fractions rules

$$\frac{A}{B} \div \frac{C}{D} = \frac{A}{B} \times \frac{D}{C} = \frac{A \times D}{B \times C}$$

Convert Mixed Number

$$4\frac{2}{8} = \frac{(4 \times 8) + 2}{8} = \frac{34}{8} = \frac{17}{4}$$

Keep the original denominator when converting a mixed number to an impromper fraction.

Simplify if needed.

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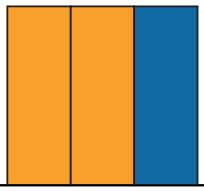
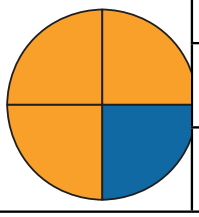
RATIOS AND PROPORTIONS

Ratios

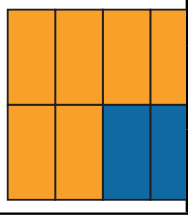


Part to part		Part to whole	
2:1	1:2	2:3	1:3
2/1	1/2	2/3	1/3
2 to 1	1 to 2	2 to 3	1 to 3

Proportions

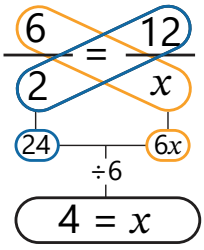


3:4	=	6:8
3:4	::	6:8
3 is to 4	as	6 is to 8



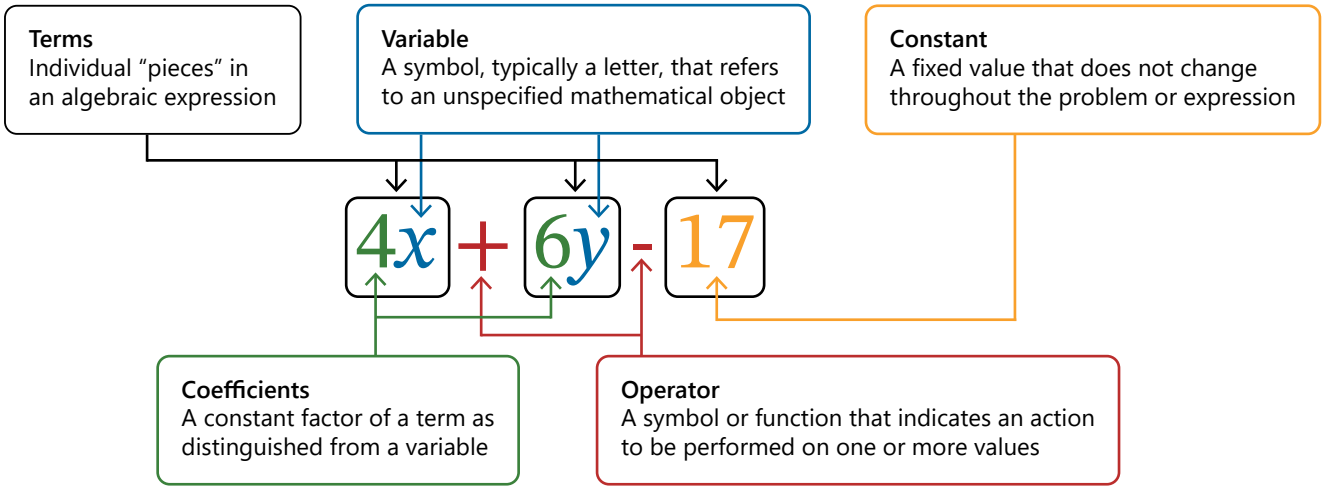
Calculating Proportions

$$\frac{6}{2} = \frac{12}{?}$$



$$\frac{6}{2} = \frac{12}{4}$$

ALGEBRAIC EXPRESSION



FOIL METHOD

Using the FOIL method on binomials: $(x + 2)$ and $(x - 3)$

F	Multiply the first terms of each binomial	$(x + 2)(x + (-3))$	→	$(x)(x)$	$= x^2$
O	Multiply the outer terms	$(x + 2)(x + (-3))$	→	$(x)(-3)$	$= -3x$
I	Multiply the inner terms	$(x + 2)(x + (-3))$	→	$(2)(x)$	$= 2x$
L	Multiply the last terms of each binomial	$(x + 2)(x + (-3))$	→	$(2)(-3)$	$= -6$

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PERCENTS, FRACTIONS, AND DECIMALS

Percent Increase

$$\left(\frac{\text{new value} - \text{original value}}{\text{original value}}\right) \times 100$$

Percent Decrease

$$\left(\frac{\text{original value} - \text{new value}}{\text{original value}}\right) \times 100$$

Percent to Fraction/Decimal

$$\frac{\text{Percentage}}{100}$$

Fraction to Decimal

$$\frac{\text{numerator}}{\text{denominator}}$$

Fraction to Percent

$$\left(\frac{\text{numerator}}{\text{denominator}}\right) \times 100$$

Decimal to Fraction

$$\frac{\text{decimal}}{1} \times \frac{10^n}{10^n}$$

n is the number of places behind the decimal point

Decimal to Percent

decimal × 100

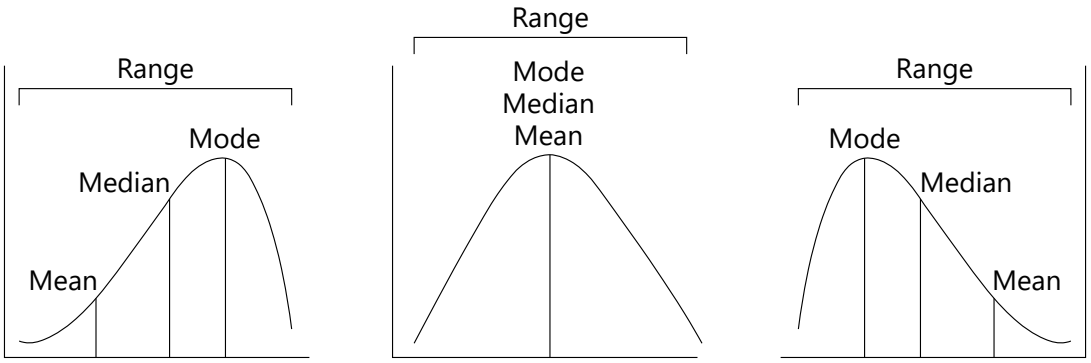
STATISTICS

Mean
sum of all items / total number of items

Range (Spread)
Distance between smallest and largest item

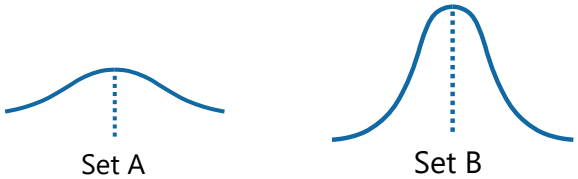
Mode
Most/common item

Median
Middle item when ordered from least to greatest



Left Skew (Negative) | **Normal Distribution** | **Right Skew (Positive)**

Greater spread equals greater deviation.



Margin of Error
sample statistic ± margin of error with confidence level of XX%

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12-HOUR CLOCK vs. MILITARY TIME

12-Hour Clock	Military Time
12:00 a.m.	0000
1:00 a.m.	0100
2:00 a.m.	0200
3:00 a.m.	0300
4:00 a.m.	0400
5:00 a.m.	0500
6:00 a.m.	0600
7:00 a.m.	0700
8:00 a.m.	0800
9:00 a.m.	0900
10:00 a.m.	1000
11:00 a.m.	1100

12-Hour Clock	Military Time
12:00 p.m.	1200
1:00 p.m.	1300
2:00 p.m.	1400
3:00 p.m.	1500
4:00 p.m.	1600
5:00 p.m.	1700
6:00 p.m.	1800
7:00 p.m.	1900
8:00 p.m.	2000
9:00 p.m.	2100
10:00 p.m.	2200
11:00 p.m.	2300

ROMAN NUMERALS

Roman Numeral	Value
I	1
V	5
X	10
L	50
C	100
D	500
M	1,000

When multple Roman numerals are placed together, their values are generally added:

$$LXVI = 50 + 10 + 5 + 1 = 66$$

When a smaller numeral is placed before a larger numeral, the smaller value must be subtracted from the larger value that immediately follows it:

$$IV = 5 - 1 = 4$$

$$XL = 50 - 10 = 40$$

$$CM = 1{,}000 - 100 = 900$$

For longer strings of Roman numerals, you have to perform a mix of addition and subtraction to determine the final value:

$$XCVI = (100 - 10) + 5 + 1 = 96$$

$$CMXLVIII = (1{,}000 - 100) + (50 - 10) + 5 + 3 = 948$$

$$MCMXCIX = 1{,}000 + (1{,}000 - 10) + (100 - 10) + (10 - 1) = 1{,}999$$

$$MMMMCDXC = 1{,}000 + 1{,}000 + 1{,}000 + 1{,}000 + (500 - 100) + (100 - 10) = 4{,}490$$

Additional HESI Resources

Mastering math is about more than just memorizing formulas—it's about making sure your calculations are accurate, which will prevent needless and serious mistakes.

These strategies not only prepare you for the HESI A2 exam but also equip you for lifelong learning.

Keep practicing, stay curious, and trust your ability to express yourself clearly and effectively. Success comes with persistence and the right tools.

You've got this!

Need more resources? Scan the QR codes below to check out test prep materials from Mometrix that are specifically designed to help you ace the HESI.

You can also visit https://www.mometrix.com/academy/hesi-a2-practice-test/ to take a HESI practice test.

HESI A2 Study Guide

HESI A2 Flashcards