

HESI A2 Cheat Sheet

MATHEMATICS

Decimal numbers

Ways to think about decimal numbers:

▸ As a whole number plus tenths, hundredths, etc.
Eg. $2.3 = 2$ and 3 tenths; $13.76 = 13$ and 7 tenths and 6 hundredths

▸ As a decimal fraction.

$$\text{Eg. } 2.3 = \frac{23}{10}, 13.76 = \frac{1376}{100}$$

▸ As a whole number and decimal fraction.

$$\text{Eg. } 2.3 = 2 + \frac{3}{10}, 13.76 = 13 + \frac{76}{100}$$

Fractions

Multiplication:

$$\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times d}$$

Division:

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$$

Addition

(with common denominator):

$$\frac{a}{c} + \frac{b}{c} = \frac{a + b}{c}$$

Addition of fractions

(without common denominator):

$$\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$$

Subtraction of fractions

(with common denominator):

$$\frac{a}{c} - \frac{b}{c} = \frac{a - b}{c}$$

Subtraction of fractions

(without common denominator):

$$\frac{a}{b} - \frac{c}{d} = \frac{ad - bc}{bd}$$

Mixed number:

$$a \frac{b}{c}$$

Conversion of mixed number to improper fraction:

$$a \frac{b}{c} = \frac{a \times c + b}{c}$$

Converting fractions to decimals:

▸ If the fraction has 10, 100, or 1000 as the denominator, reverse the process we used to convert decimals to fractions:

$$\text{Eg. } 0.7 = \frac{7}{10}, 0.87 = \frac{87}{100}, 0.543 = \frac{543}{1000}$$

- If the fraction doesn't have 10, 100, or 1000 as the denominator, **change it to an equivalent fraction:**

$$\text{Eg. } \frac{2}{5} = \frac{4}{10} = 0.4, \frac{3}{50} = \frac{6}{100} = 0.06, \frac{7}{250} = \frac{28}{1000} = 0.028$$

- If we are not able to find an equivalent fraction, **divide the numerator by the denominator:**

$$\text{Eg. } \frac{5}{8} = 5 \div 8 = 0.625$$

Proportions and ratios

Inverse proportion:

$$y \propto \frac{1}{x}$$

Continued proportion:

$$a : b = b : c$$

Ratio:

$$a : b = \frac{a}{b}$$

Percentages

Basic percentage:

$$10\% = \frac{10}{100} = \frac{1}{10} \text{ or } 0.1$$

Converting percentages into decimals:

$$40\% = \frac{40}{100} = 0.4$$

Converting decimals into percentages:

$$0.4 = 0.4 \times 100 = 40\%$$

Calculating percentage:

- By changing the denominator of the fraction to 100:

$$\frac{4}{25} = \frac{4}{25} \times \frac{4}{4} = \frac{16}{100} = 16\%$$

- By using the unitary method:

$$\frac{4}{25} \times 100 = \frac{400}{25} = 16\%$$

12-hour clock to military time

If the time is 1:00 pm or greater, add 12 to the hours and that will get you the time in military time.

For instance, 1:00 pm + 12 = 1300 hours, 2:00pm + 12 = 1400hrs and is pronounced 14 hundred hours.

Algebraic formulas

Linear Equation:

$$y = mx + b$$

Quadratic Equation:

$$ax^2 + bx + c = 0$$

Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Exponential Function:

$$y = a \times b^x$$

Logarithmic Function:

$$y = \log_b(x)$$

Factorization:

$$x^2 - a^2 = (x + a)(x - a)$$

Rational Function:

$$R(x) = \frac{P(x)}{Q(x)}$$

Summation:

$$S = \sum_{i=1}^n a_i$$

Binomial Expansion (using binomial coefficient):

$$(x + y)^n = \sum_{k=0}^n \binom{n}{k} x^{n-k} y^k$$