

Number facts to memorize

None of this is on the CLT formula sheet, and there is no calculator: memorize it.

- ✓ Times tables to 15×15
- ✓ Perfect squares to $20^2 = 400$; perfect cubes to $10^3 = 1000$
- ✓ Powers: $2^{10} = 1024$, $3^5 = 243$, $4^5 = 1024$, $5^4 = 625$
- ✓ Primes under 20: 2, 3, 5, 7, 11, 13, 17, 19 (don't forget 2)
- ✓ Cube roots: $\sqrt[3]{8} = 2$, $\sqrt[3]{27} = 3$, $\sqrt[3]{64} = 4$, $\sqrt[3]{125} = 5$

Number properties

Even and odd	Positive and negative
even $\pm$ even = even	pos $\times$ or $\div$ pos = pos
even $\pm$ odd = odd	pos $\times$ or $\div$ neg = neg
odd $\pm$ odd = even	neg $\times$ or $\div$ neg = pos
even $\times$ anything = even	
odd $\times$ odd = odd	
✓ Integer: a whole number, positive, negative or zero; 3 is one, 3.1 is not	
✓ Consecutive integers: 2, 3, 4; consecutive <i>even</i> 2, 4, 6	
✓ Plug in numbers , then a second set as different as possible: negative, 0, 1, a fraction	

Factors and multiples

- ✓ **Factor** (divisor): divides with no remainder; **multiple:** a number times an integer
- ✓ **Prime:** greater than 1, with no factors but 1 and itself; **composite:** more factors than that
- ✓ **Factor tree:** $48 = 2 \times 24 = \dots = 2^4 \times 3$; use it for GCF and LCM
- ✓ **GCF:** the largest shared factor; **LCM:** the smallest shared multiple
- ✓ **Divisible by 3 or 9** when the sum of the digits is

Two conditions questions

- ✓ Count the integers in a range that meet **both**, **at least one** or **neither** of two conditions
- ✓ **Inclusive count:** largest – smallest + 1: 100 to 500 inclusive is 401 numbers
- ✓ Start with the **limiting condition**, the one with fewer examples
- ✓ At least one: add the two lists, subtract the overlap

Percents

- ✓ percent = $\frac{\text{part}}{\text{whole}} \times 100$
- ✓ percent change = $\frac{\text{new} - \text{old}}{\text{old}} \times 100$
- ✓ **10%:** drop a zero; **1%:** drop two. 27% of 300 is $30 + 30 + 21 = 81$
- ✓ *Of* means multiply, *is* means equals, *what* means the variable
- ✓ No starting number? **Start with 100**
- ✓ **Three times as many** means 4 parts, not 3

Average, median, mode

- ✓ average = $\frac{\text{sum}}{\text{number}}$, so **sum** = **average** $\times$ **number**
- ✓ Missing score: target sum minus the sum you have
- ✓ **Median:** the middle value in order; with two middles, their average
- ✓ **Mode:** the most frequent value; there can be more than one
- ✓ Consecutive integers: average = $\frac{\text{smallest} + \text{largest}}{2}$

Probability

- ✓ $P = \frac{\text{desired outcomes}}{\text{total outcomes}}$, from 0 to 1
- ✓ A fraction or decimal, not a percent, unless the question asks for one
- ✓ 2 red for every 7 blue: red is 2 of 9 parts, so $2/9$

Sequences

- ✓ **Arithmetic:** add the same number each time: 0, -3, -6, -9
- ✓ **Geometric:** multiply by the same number: -4, 8, -16, 32, -64; a negative ratio alternates the signs
- ✓ **Neither:** look at the differences: 1, 3, 7, 15, 31 jumps by 2, 4, 8, 16, so it is $2^n - 1$

Logic: if-then statements

From "if A, then B"	Form	Valid?
Converse	if B, then A	No
Inverse	if not A, then not B	No
Contrapositive	if not B, then not A	Yes
✓ If cats are mammals, a non-mammal is not a cat; a mammal need not be a cat ✓ Universal (<i>all</i>, <i>no</i>) has no exceptions; particular (<i>some</i>, <i>most</i>) is easier to prove		