//For the easy questions, take your time to work out each data sufficiency point before you answer. Take your time to make the easy calculations as well. For the difficult questions, know when to cut your losses and just guess. If still stuck after 1.5mins, make a guess and move on//

# Arithmetic Concepts

## Even and Odd

* Even x Even = Even
* Even x Odd = Even
* Odd x Odd = Odd
* **Even / even = even, odd or non-integer**
* Even / odd = even or non-integer
* Odd / even = non-integer
* Odd / odd = odd or non-integer

//Even numbers always have “2” as a factor//

//Plugging in works for even/odd questions at times as well//

## Exponents

//Exponent of 10 indicates number of places the decimal point is to be moved in the number it multiples.//

## Variance/Standard Deviation

* Variance – average of the squared differences from the mean
* Standard dev – squareroot that bitch

## Permuntation / Combination

* 10 c 2 = N! / [n-k]! k!
* 10 p 2 = N! / [N-k!]
* Number of ways something can be ordered – n!

// Avoid using when there are multiple sources involved (picking from multiple sources), or repetition is allowed (picking the same thing more than once)//

//Forbidden choice strategy//

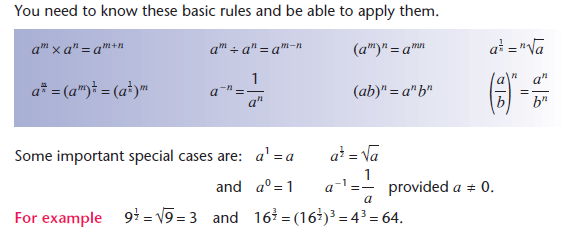
* 1. Sometimes you may run into questions where you have a standard permutation, with a wrinkle, the forbidden choice (‘the digit 2 may only be used once’).
  2. The approach is calculate as if there is no forbidden choice. Then calculate the forbidden choice situations. Then a – b

//10 people, choose 5 teams of 2. This will be 10C2 => It is stil a 2 element combination from any 10 element set// \*practice a few questions!

//Consider the compound questions (i.e. combi first, permu second)//

## Indices

* Whenever you have (xy) + (xy+10), always try to think of factorising out what you can.
* Remember the simple rules



* 3a = 5b -> a = 0, b = 0 //different base situation
* 220 x 320 = 620

## Rules of Divisibility

* + Number is divisible by 4 if the number formed by the last two digits is divisible by 4
  + Number is divisible by 6 if it is divisible by 2 and 3
  + Number is divisible by 8 if number formed by the last 3 digits is divisible by 8
  + Number is divisible by 9 if sum of its digits are divisible by 9

// Zero is divisible by every number!//

## Prime Numbers

* 1. Perfect squares are a collection of pairs of prime factors
  2. If x3 is an integar, its prime factors will come in threes. Same for x4. And so on an so forth.
  3. Is a divisible by b? Sometimes you need to try and prime factorize it out to confirm this. Hints will include variables, but no remainder mentioned. Variables are limited to integers.

Divisibility quick solution - Is 1,386 divisible by 231?

* + 1. 231 = 3 • 7 • 11
    2. 1386 = 2 • 3 • 3 • 7 • 11
    3. Since 1386 contains all of the prime factors of 231 (plus some extras), it is divisible. Works both ways as well (i.e. multiple)

## Lowest Common Multiples / HCF

* LCM – take the highest count of each prime number. Multiply accordingly
* HCF – take the prime factors that belong to each numbers. Multiply accordingly.

//Big numbers. Rely on your approaches. Don’t be afraid to work with the exponents //

## Others

1. Rounding Off
   1. Trust what you know – 0.5 rounds up, 0.49 rounds down
2. Simultaneous equations
   1. 2 equations, 2 variables. If one equation is a multiple of the other, the question is not solvable
   2. Three way simultaneous equations can be solved. (e.g. L x H x W)
      1. Lx W = 30

→ L = 30 / W

* + 1. W x H = 72

→ H = 72 / W

* + 1. L x H = 60

→ (30 / W) x (72 / W) = 60

1. Pattern recongition questions
   1. Sometimes try plugging in variables to spot the pattern
2. Sum of sequence
   1. Sum of sequence = average of sequence x no. of integers
   2. Average of consecutive sequence = average of first and last number , or average of any equidistant pair from the middle
   3. Average of consecutive sequence = median of consecutive sequence

//consecutive = constant difference between one term to the next. Not necessarily 1 2 3//

* 1. In a sequence with constant difference the nth term can be expressed = (the first term) + (the difference between any 2 terms) multiplied by (n-1).

An = A1 + (n - 1)d

* 1. Plugging in, simple brute force is sometimes necessary

1. Multiples Rules
   1. Multiple of k – multiple of k = another multiple of k (e.g. 2k2-3k = (n)(k))
   2. Multiple of k + multiple of k = another multiple of k (e.g. 2k2-3k = (a)(k))
2. Cancelling
   1. When there are integers involved in a fraction, always look for the point that proves an unknown is actually a mutple of another number
      1. E.g. a = 53b / 35 ==========> This means that b contains (3x3x3x3x3).
      2. E.g. (5/4)x = y ===========> This means x contains (2x2).

(assuming a and b are integers)

* 1. See - <https://gmat.economist.com/gmat-advice/gmat-quantitative-section/arithmetic-concepts-gmat-quant/properties-integers-breaking-numbers-primes>

1. Plugging in
   1. Generally, can try plugging in figures, or plugging in the answer options themselves
   2. Plugging in for percentage change questions works as well
2. Inequalities
   1. Remember to flip the sign if multiplying or dividing by negative sign
   2. Be careful when multiple/dividing if you don’t know the sign (e.g. a variable/unknown)

# Geometry

**General Rules**

* 180(n-2) – sum of angles in a polygon

**Triangle Rules**

* Triangle – sum of length any two sides is greater than the third
* Any triangle in which the lengths of the sides are in the ratio 3:4:5 is a right triangle.
* In 45°− 45°− 90° triangles, the lengths of the sides are in the ratio 1:1: 2 .
* In 30°− 60°− 90° triangles, the lengths of the sides are in the ratio 1: sqroot3:2. // (sides that are opposite the angle)
* Unique Pythagorean triples => 3-4-5, 5-12-13, 8-15-17 [and any multiples of these]

**Area/Volume Rules**

* Area of parrallelogram = b x h
* Area of trapezoid = (1/2) (length1) (length 2) (h)
* Volume of cone = (1/3)(pi r sqaure)(h)
* Volume of sphere = 4/3 pi r cube
* Volume of pyramid = (1/3) (base) (h)

**Circle Rules**

Minor vs Major Arc (Note the Difference between them)

|  |  |
| --- | --- |
| In a circle, the measure of an inscribed angle is half the measure of the central angle with the same intercepted arc. | **http://www.geom.uiuc.edu/~dwiggins/pict44.GIF** |
| In a circle, two inscribed angles with the same intercepted arc are congruent. | **http://www.geom.uiuc.edu/~dwiggins/pict45.GIF** |

# Rate of work

1/ x + 1/y = 1/z

x – number of hours dude x would take to finish the task

y – number of hours dude y would take to finish the task

z – number of hours dude x and y would take to finish the task together

# Interest

Quick trick for compound/interest rate questions – compounded sum will always be larger. So you can calculate simple interest quickly, and make sure answer is larger