* 1. **(a + b)(a – b) = a2 – b2**
  2. **(a + b + c)2 = a2 + b2 + c2 + 2(ab + bc + ca)**
  3. **(a ± b)2 = a2 + b2± 2ab**
  4. **(a + b + c + d)2 = a2 + b2 + c2 + d2 + 2(ab + ac + ad + bc + bd + cd)**
  5. **(a ± b)3 = a3 ± b3 ± 3ab(a ± b)**
  6. **(a ± b)(a2 + b2 m ab) = a3 ± b3**
  7. **(a + b + c)(a2 + b2 + c2 -ab – bc – ca) = a3 + b3 + c3 – 3abc =**

**1/2 (a + b + c)[(a - b)2 + (b - c)2 + (c - a)2]**

* 1. **when a + b + c = 0, a3 + b3 + c3 = 3abc**
  2. **(x + a)(x + b) (x + c) = x3 + (a + b + c) x2 + (ab + bc + ac)x + abc**
  3. **(x – a)(x – b) (x – c) = x3 – (a + b + c) x2 + (ab + bc + ac)x – abc**
  4. **a4 + a2b2 + b4 = (a2 + ab + b2)( a2 – ab + b2)**
  5. **a4 + b4 = (a2 – √2ab + b2)( a2 + √2ab + b2)**
  6. **an + bn = (a + b) (a n-1 – a n-2 b + a n-3 b2 – a n-4 b3 +…….. + b n-1)**

**(valid only if n is odd)**

* 1. **an – bn = (a – b) (a n-1 + a n-2 b + a n-3 b2 + a n-4 b3 +……… + b n-1)**

**{where n ϵ N)**

* 1. **(a ± b)2n is always positive while -(a ± b)2n is always negative, for any real values of a and b**
  2. **(a – b)2n = (b – a)2” and (a – b)2n+1 = – (b – a)2n+1**
  3. **if α and β are the roots of equation ax2 + bx + c = 0, roots of cx” + bx + a = 0 are 1/α and 1/β.  
     if α and β are the roots of equation ax2 + bx + c = 0, roots of ax2 – bx + c = 0 are -α and -β.**
     + - **n(n + l)(2n + 1) is always divisible by 6.**
       - **32n leaves remainder = 1 when divided by 8**
       - **n3 + (n + 1 )3 + (n + 2 )3 is always divisible by 9**
       - **102n + 1 + 1 is always divisible by 11**
       - **n(n2- 1) is always divisible by 6**
       - **n2+ n is always even**
       - **23n-1 is always divisible by 7**
       - **152n-1 +l is always divisible by 16**
       - **n3 + 2n is always divisible by 3**
       - **34n – 4 3n is always divisible by 17**
     + **n! + 1 is not divisible by any number between 2 and n**

**(where n! = n (n – l)(n – 2)(n – 3)…….3.2.1)**

**for eg 5! = 5.4.3.2.1 = 120 and similarly 10! = 10.9.8…….2.1= 3628800**

* 1. **Product of n consecutive numbers is always divisible by n!.**
  2. **If n is a positive integer and p is a prime, then np – n is divisible by p.**
  3. **|x| = x if x ≥ 0 and |x| = – x if x ≤ 0.**
  4. **Minimum value of a2.sec2Ɵ + b2.cosec2Ɵ is (a + b)2; (0° < Ɵ < 90°)**

**for eg. minimum value of 49 sec2Ɵ + 64.cosec2Ɵ is (7 + 8)2 = 225.**

* 1. **among all shapes with the same perimeter a circle has the largest area.**
  2. **if one diagonal of a quadrilateral bisects the other, then it also bisects the quadrilateral.**
  3. **sum of all the angles of a convex quadrilateral = (n – 2)180°**
  4. **number of diagonals in a convex quadrilateral = 0.5n(n – 3)**

10th formula

**Q. 9. http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image052.gif**term of an A.P http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image054.gif= a + (n-1 ) d

**Q. 10.** um of n terms of an A.P :

http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image058.gif  
(or)

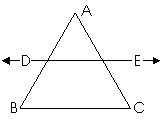
http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image060.gif

**Q. 11.** Two triangles are said to be similar , if

(i) All the corresponding angles are equal

(ii) All the corresponding sides are proportional.

**Q. 12.** Basic proportionality theorem (Thales theorem ). In a triangle , if a line is drawn parallel to one side of a triangle it divides the other two sides in the same ratio,



i.e., if in http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image063.gifABC , DE|| BC , then http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image067.gif= http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image069.gif

**Q. 13.** CONVERSE OF BASIC PROPORTIONALITY THEOREM : In a triangle , if a line divides the two sides in the same ratio , then line is parallel to the third side .  
  
i. e ., in http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image063.gifABC , if DE is a line such that http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image067.gif= http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image069.gif= , then DE|| BC

**Q. 14.** If two triangles are similar , then the ratio of their areas is equal to the ratio of the squares of their corresponding sides .i.e., if http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image063.gifABC http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image071.gifhttp://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image063.gifDEF Then

http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image073.gif=http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image075.gif = http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image077.gif= http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image079.gif

**Q. 15.** PYTHAGORAS THEOREM :In a right angled triangle , the square of the hypotenuse is equal to sum of the squares of the other two sides .

**Q. 16.** CONVERSE OF THE PYTHAGORAS THEOREM : In a triangle , if square of one side is equal to the sum of the squares of the other two sides , then triangle is right angled .

**Q. 17.** DISTANCE FORMULA : Distance between two points , A ( http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image081.gif,http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image083.gif ) and B( http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image085.gif, http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image087.gif) is given by   
AB =

http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image089.gif

**Q. 21.** AREA OF TRIANGLE: area of triangle with vertices A (x1 ,y1 ) , B ( x2 ,y2 ) and C ( x3 ,y3 ) is given by ar =http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image063.gifABC .

= http://www.cbseguess.com/ebooks/x/images/image020.gif

If points A (x1 ,y1 ) , B ( x2 ,y2 ) and C ( x3 ,y3 ) are collinear then area of triangle formed is zero.

**Q. 22.** On x-axis the point is (x,0)  
On y-axis the point is (0,y)

**Q. 23.** Trigonometry :

sinhttp://www.cbseguess.com/ebooks/x/images/image022.gif cos http://www.cbseguess.com/ebooks/x/images/image024.giftan http://www.cbseguess.com/ebooks/x/images/image026.gif

cosechttp://www.cbseguess.com/ebooks/x/images/image028.gif sec http://www.cbseguess.com/ebooks/x/images/image030.gifcot http://www.cbseguess.com/ebooks/x/images/image032.gifhttp://www.cbseguess.com/ebooks/x/images/image034.gif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 0o | 30o | 45o | 60o | 90o |
| sin http://www.cbseguess.com/ebooks/x/images/image038.gif | 0 | http://www.cbseguess.com/ebooks/x/images/image040.gif | http://www.cbseguess.com/ebooks/x/images/image042.gif | http://www.cbseguess.com/ebooks/x/images/image044.gif | 1 |
| Cos http://www.cbseguess.com/ebooks/x/images/image038.gif | 1 | http://www.cbseguess.com/ebooks/x/images/image044.gif | http://www.cbseguess.com/ebooks/x/images/image046.gif | http://www.cbseguess.com/ebooks/x/images/image040.gif | 0 |
| Tan http://www.cbseguess.com/ebooks/x/images/image038.gif | 0 | http://www.cbseguess.com/ebooks/x/images/image048.gif | 1 | http://www.cbseguess.com/ebooks/x/images/image050.gif | N.D |
| Cosec http://www.cbseguess.com/ebooks/x/images/image038.gif | N.D | 2 | http://www.cbseguess.com/ebooks/x/images/image054.gif | http://www.cbseguess.com/ebooks/x/images/image056.gif | 1 |
| Sec http://www.cbseguess.com/ebooks/x/images/image038.gif | 1 | http://www.cbseguess.com/ebooks/x/images/image056.gif | http://www.cbseguess.com/ebooks/x/images/image054.gif | 2 | N.D |
| Cot http://www.cbseguess.com/ebooks/x/images/image038.gif | N.D | http://www.cbseguess.com/ebooks/x/images/image050.gif | 1 | http://www.cbseguess.com/ebooks/x/images/image048.gif | 0 |

**Q. 24.** Sin (90- http://www.cbseguess.com/ebooks/x/images/image038.gif) =coshttp://www.cbseguess.com/ebooks/x/images/image038.gif tan (90-http://www.cbseguess.com/ebooks/x/images/image038.gif ) =cot http://www.cbseguess.com/ebooks/x/images/image038.gifsec (90-http://www.cbseguess.com/ebooks/x/images/image038.gif ) =cos**http://www.cbseguess.com/ebooks/x/images/image060.gif**   
cos (90- http://www.cbseguess.com/ebooks/x/images/image038.gif) =sinhttp://www.cbseguess.com/ebooks/x/images/image038.gif cot (90- http://www.cbseguess.com/ebooks/x/images/image038.gif) =tan http://www.cbseguess.com/ebooks/x/images/image038.gifcosec (90-http://www.cbseguess.com/ebooks/x/images/image038.gif ) =sechttp://www.cbseguess.com/ebooks/x/images/image038.gif

**Q. 25.**

**http://www.cbseguess.com/ebooks/x/images/image062.gif**A + **http://www.cbseguess.com/ebooks/x/images/image064.gif**; 1 +**http://www.cbseguess.com/ebooks/x/images/image066.gif http://www.cbseguess.com/ebooks/x/images/image068.gif**; **http://www.cbseguess.com/ebooks/x/images/image070.gif**+ 1= **http://www.cbseguess.com/ebooks/x/images/image072.gif**A  
**http://www.cbseguess.com/ebooks/x/images/image062.gif**A = 1 - **http://www.cbseguess.com/ebooks/x/images/image074.gif**; **http://www.cbseguess.com/ebooks/x/images/image068.gif**A -**http://www.cbseguess.com/ebooks/x/images/image078.gif** ; **http://www.cbseguess.com/ebooks/x/images/image072.gif**A - **http://www.cbseguess.com/ebooks/x/images/image080.gif**  
**http://www.cbseguess.com/ebooks/x/images/image082.gif**A = 1 -**http://www.cbseguess.com/ebooks/x/images/image084.gif** ; **http://www.cbseguess.com/ebooks/x/images/image086.gif**A =**http://www.cbseguess.com/ebooks/x/images/image088.gif** ; **http://www.cbseguess.com/ebooks/x/images/image090.gif**A = **http://www.cbseguess.com/ebooks/x/images/image092.gif**

**Q. 26.** Area of the sector = **http://www.cbseguess.com/ebooks/x/images/image094.gif**

**Q. 27.** Length of an arc of a sector (l) = **http://www.cbseguess.com/ebooks/x/images/image096.gif**

**Q. 28.** Perimeter of sector = l+2r

**Q. 29.** Area of an equilateral triangle = **http://www.cbseguess.com/ebooks/x/images/image098.gifhttp://www.cbseguess.com/ebooks/x/images/image100.gif**

**Q. 30.** Volume of a cube = **http://www.cbseguess.com/ebooks/x/images/image102.gif**

**Q. 31.** Volume of a cuboid = l\*b\*h

**Q. 32.** Lateral surface area of a cube = 4 **http://www.cbseguess.com/ebooks/x/images/image100.gif**

**Q. 33.** L.S.A of a cuboid (area of four wall) = 2 h ( l + b)

**Q. 34.** Total surface area of a cube = http://www.cbseguess.com/ebooks/x/images/image106.gif

**Q. 35.** T.S.A of a cuboid = 2 (lb + bh + hl )

**Q. 36.** Volume of a cylinder = http://www.cbseguess.com/ebooks/x/images/image108.gif

**Q. 37.** Curved surface area of cylinder = 2http://www.cbseguess.com/ebooks/x/images/image110.gif h

**Q. 38.** T.S.A of cylinder = 2 http://www.cbseguess.com/ebooks/x/images/image112.gif

**Q. 39.** Volume of a cone = http://www.cbseguess.com/ebooks/x/images/image114.gif

**Q. 40.** C.S.A of a cone = http://www.cbseguess.com/ebooks/x/images/image116.gifwhere l = http://www.cbseguess.com/ebooks/x/images/image118.gifwhere l is slant height

**Q. 41.** T.S.A of a cone = http://www.cbseguess.com/ebooks/x/images/image120.gif

**Q. 42.** Volume of sphere = http://www.cbseguess.com/ebooks/x/images/image122.gif

**Q. 43.** Surface area of a sphere = 4http://www.cbseguess.com/ebooks/x/images/image124.gif

**Q. 44.** Volume of a hemi sphere = http://www.cbseguess.com/ebooks/x/images/image126.gif

**Q. 45.** C.S.A of a hemisphere = 2http://www.cbseguess.com/ebooks/x/images/image124.gif

**Q. 46.** T.S.A of a hemisphere = 3http://www.cbseguess.com/ebooks/x/images/image124.gif

**Q. 47.** Volume of a frustum = http://www.cbseguess.com/ebooks/x/images/image128.gif

**Q. 48.** C.S.A of a frustum = http://www.cbseguess.com/ebooks/x/images/image130.gifwhere l = http://www.cbseguess.com/ebooks/x/images/image132.gif

**Q. 49.** T.S.A of a frustum = http://www.cbseguess.com/ebooks/x/images/image134.gif+ http://www.cbseguess.com/ebooks/x/images/image136.gif+ n http://www.cbseguess.com/ebooks/x/images/image138.gif

**Q. 50.** Surface area of a bucket = http://www.cbseguess.com/ebooks/x/images/image134.gif+ http://www.cbseguess.com/ebooks/x/images/image136.gifwhere http://www.cbseguess.com/ebooks/x/images/image138.gifis the radius of the base (open at the top)

**STATISTICS :**

**Q. 51.** Mean ( http://www.cbseguess.com/ebooks/x/images/image140.gif(direct method )

**Q. 52.** Mean ( http://www.cbseguess.com/ebooks/x/images/image142.gifx c (step derivation method)

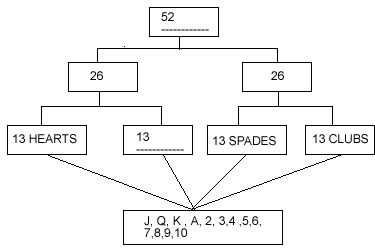
**Q. 53.** Median = http://www.cbseguess.com/ebooks/x/images/image144.gif

**Q. 54.** Mode = where ; http://www.cbseguess.com/ebooks/x/images/image146.gifwhere http://www.cbseguess.com/ebooks/x/images/image148.gifhttp://www.cbseguess.com/ebooks/x/images/image150.gif; http://www.cbseguess.com/ebooks/x/images/image152.gifhttp://www.cbseguess.com/ebooks/x/images/image154.gif

**Q. 55.** Less than cum frequency -(upper limit, c.f)  
More than cum .frequency -(lower limit , c.f)

**Q. 56.** Probability : P(E) = http://www.cbseguess.com/ebooks/x/images/image156.gif

**Q. 57.** Cards.

  
  
King, queen, jack are face cards.

**Q. 58.** 3 coins  
H H H  
T H H  
H T H  
H H T  
T T T  
H T T  
T H T  
T T H

**Q. 59.** 2 coins (H,H) (H,T) (T,H) (T,T)

**Q. 1.** Euclids Division lemma : Given positive integers a and b there exist unique positive integers q and r satisfying a = bq + r , 0 http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image002.gifr < b

**Q.2.** Fundamental theorem of arithmetic: Every composite no. can be expressed as a product of primes , and this factorization is unique apart from the order in which the prime factor occur.

**Q. 3.** H.C.F X L.C.M =Product of two numbers .

**Q.4.** ahttp://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image004.gif + bx + c is a polynomial a http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image006.gif0 ,

sum of the zeroes = http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image008.gif= http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image010.gif

product of zeroes =http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image012.gif = http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image014.gif

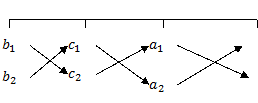
**Q.5.** http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image016.gifare zeroes of polynomial : http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image004.gif- (http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image016.gif x + http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image020.gif

**Q.6.http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image022.gif** x+ http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image024.gif

1. http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image026.gif
2. http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image028.gif
3. http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image030.gif

**Q. 7.** Cross multiplication method:

X y l

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http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image040.gif= http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image042.gif= http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image044.gif

**Q. 8.** Nature of roots : a http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image004.gif+bx +c =0   
D = http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image048.gif- 4ac if D = 0 roots are real and equal   
If D > 0 roots are real and unequal  
If D < 0 roots are imaginary  
Quadratic formula http://www.cbseguess.com/ebooks/x/images/maths_def_formula_clip_image050.gifwhere D = http://www.cbseguess.com/ebooks/x/images/image048.gif- 4ac