|  |
| --- |
| **SQUARES**  12 = 1  22 = 4  32 = 9  42 = 16  52 = 25  62 = 36  72 =49  82 = 64  92 = 81  102 = 100  112 = 121  122 = 144  132 = 169  142 = 196  152 = 225  162 = 256  172 = 289  182 = 324  192 = 361  202 = 400  212 =441  222 = 484  232 = 529  242 = 576  252 = 625  302 = 900  352 =1225  402 =1600  452 =2025  502 =2500  552 =3025  602 =3600 |
| **CUBES**  13 = 1  23 = 8  33 = 27  43 = 64  53 = 125  63 = 216  73 = 343  83 = 512  93 = 729  103 = 1000  113 = 1331 |

**Prime numbers:** 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

**Pythagorean Triplets:**

(3, 4, 5)

(5, 12, 13)

(7, 24, 25)

(9, 40, 41)

(11, 60, 61)

(13, 84, 85)

**Divisibility Rules: A number is divisible by \_\_\_\_\_, if:**

2 – If the unit digit is even.

3 – If the sum of the digits of the number is a multiple of 3.

4 – If the last two digits are a multiple of four or 00.

5 – If the unit’s digit is 5 or 0.

6 – If the number is divisible by 2 and 3.

7 – If you double the unit’s digit, subtract that from the rest of the number and the result is 0 or a multiple of 7.

8 – If the last 3 digits are a multiple of 8 or 000.

9 – If the sum of the digits of the number is a multiple of 9.

10 – If the unit’s digit is 0.

11 – If the difference of the sum of digits at odd positions and sum of digits at even positions in a number is 0 or 11.

12 – If the number is divisible by 3 and 4.

13 – If 4 times the last digit added to the remaining number is divisible by 13.

14 – If the number is divisible by 2 and 7.

**Factorials:**

0! = 1

1! = 1

2! = 2

3! = 6

4! = 24

5! = 120

6! = 720

7! = 5,040

8! = 40,320

9! = 362,880

10! = 3,628,800

**Powers of 2:** 20 = 1

21 = 2

22 = 4

23 = 8

24 = 16

25 =32

26 = 64

27 = 128

28 = 256

29 = 512

210 = 1024

**Formula for Triangular Numbers:**

0, 1, 3, 6, 10, 15, 21, 28, 36, 45, 55, 66, 78, 91, 105, 120

**Pasqual’s Triangle**

**Row 11y  Row Sum**

**0 110 1 1**

**1 111  1 1 2**

**2 112  1 2 1 4**

**3 113 1 3 3 1 8**

**4 114  1 4 6 4 1 16**

**5 115 1 5 10 10 5 1 32**

**Math Competition Facts to Remember**:

* Sum of 1st 100 numbers is 5050 (formula = n(n+1)/2))
* Difference of consecutive squares = 102 – 92 = 19
* Difference of non-consecutive squares is the product of the sum and difference of the bases. (S X D)

More Formulas to practice:

The distance Formula

Midpoint Formula

Angle Bisector Theorem

Heron’s Formula

**Formulas**

**Area of:**

* **Square with side y is A = y2**
* **Triangle is A = (bh)/2**
* **Trapezoid is A = 1/2h(b1 + b2)**
* **Circle with radius r is 2**
* **Circumference of a circle with radius r is**
* **Circumference of a circle with diameter d is**
* **Volume of a cube with side s is V = s3**
* **Volume of a sphere with radius r is V = 3 /3**
* **Volume of a cylinder is r2h**
* **Sum of interior angles of an N-sided polygon is**
* **Pythagorean Theorem = A2 + B2 = C2**
* **Quadratic Equation Standard form = ax2 + bx + c = 0**
* **Laws of cosines:**
  + **A2 = B2 + C2 – 2bc (cos A)**
  + **B2 = A2 + C2 – 2ac (cos B)**
  + **C2 = A2 + B2 – 2ab (cos C)**

**Fractions to Decimals**

**Benchmarks**

½’s; 1/3’s; 1/4’s; 1/5’s; 1/10’s

**Put to memory**

1/6 = 0.16; 5/6 = 0.83

1/7 = 0.142857; 2/7 = 0.285714

3/7 = 0.428571; 4/7 = 0.571428 5/7 = 0.714285; 6/7 = 0.857142

1/8 = 0.125; 3/8 = 0.375

5/8 = 0.625; 7/8 = 0.875

1/9= 0.1; 2/9 = 0.2; 3/9 = 0.3; 4/9 …

1/11= 0.09; 2/11= 0.18; 3/11= 0.27; 4/11 = 0.36; 5/11 =?

1/12 = 0.083; 5/12 = 0.416 ;

7/12 = 0.583; 11/12 = 0.916