1. Trigonometric Function.

① $\sin A = a/c$ $\cos A = b/c$ $\tan A = a/b$ $\cot A = b/a$.
$\csc A = c/a$ $\sec A = c/b$.

② $\tan A = \sin A / \cos A$.

③ $\sin^2 A + \cos^2 A = 1$ $1 + \tan^2 A = \csc^2 A$ $1 + \cot^2 A = \sec^2 A$.

④ $\sin(\frac{\pi}{2} - A) = \cos A$. $\sin(\frac{\pi}{2} + A) = \cos A$.
$\cos(\frac{\pi}{2} - A) = \sin A$. $\cos(\frac{\pi}{2} + A) = -\sin A$.
$\sin(\pi - A) = \sin A$. $\sin(\pi + A) = -\sin A$
$\cos(\pi - A) = -\cos A$. $\cos(\pi + A) = -\cos A$.

⑤ $\sin(-A) = -\sin A$. $\cos(-A) = \cos A$.

⑥ $\sin 2A = 2\sin A \cdot \cos A$. $\cos 2A = \cos^2 A - \sin^2 A$

For all triangels: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

2. Area

① circle $= \pi r^2$

② sphere $= 4\pi r^2$

③ hollow cylinder : $2\pi rh$

④ Ellipse $= \pi \cdot ab$

⑤ Triangle $= \frac{1}{2} b \cdot h$.

⑥ Rhombus $= b \cdot h$.

⑦ equilateral triangle:

$A = \frac{\sqrt{3}}{4} a^2$

⑧ lateral area of cone

$A = 1/2 \cdot C \cdot L$

3. Volume

① Sphere $= \frac{4}{3}\pi r^3$

② Cylinder $= \pi r^2 h$

③ Right circular Cone $= \frac{h}{3} \cdot \pi r^2$

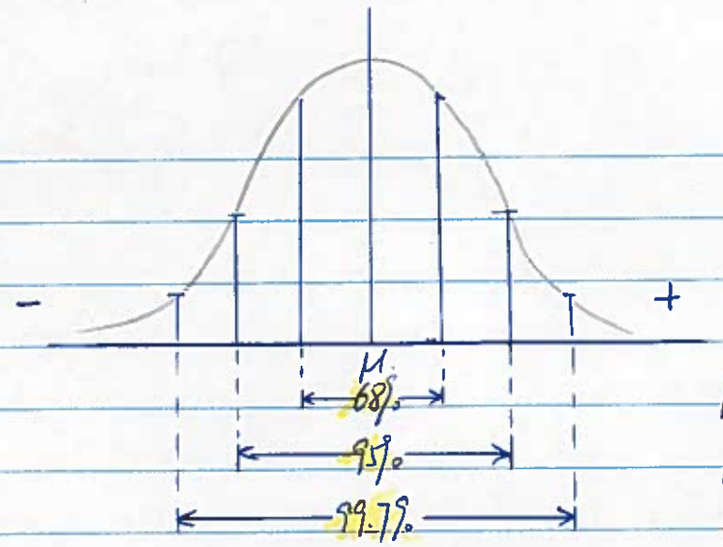
4. Statistics:

① Mean $= \Sigma x_i / n = \mu$

② Variance $\sigma^2 = \Sigma (x_i - \mu)^2 / n$

③ Standard Deviation $= \sigma = \sqrt{[\Sigma (x_i - \mu)^2 / n]}$

④ Empirical Rule of Standard Normal distribution



$\mu \pm 1\sigma$ 68%
$\mu \pm 2\sigma$ 95%
$\mu \pm 3\sigma$ 99.7%

5. ① 从n物中取r个. 不计顺序

$$C(n,r) = \frac{n!}{(n-r)! \cdot r!}$$

② 从n个物Bo中取r个. order matters:

$$P(n,r) = \frac{n!}{(n-r)!}$$

③ # of ways that n things can be ordered when a of them一样. b of them一样. c of them一样 eg. 排序 TENNESSEE.

$$\frac{n!}{a! \cdot b! \cdot c! \cdots}$$

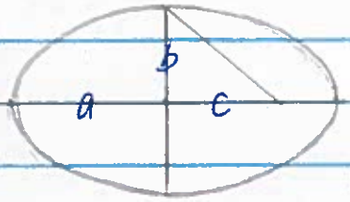
6. ① $\log_b x = n \longrightarrow b^n = x$

② $\log^{(A \cdot B)} = \log^A + \log^B$

$\log^{(A/B)} = \log^A - \log^B$

$\log^{A^n} = n \log^A$

7. Ellipse:



$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

$c^2 = a^2 - b^2$ center@ (h, k): $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

8. Distance from $P_1(x_1, y_1)$ to $P_2(x_2, y_2)$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Midpoint of P_1, P_2 $M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

9. Polygon: Area $= \frac{1}{2} N \cdot \sin\left(\frac{360°}{N}\right) \cdot S^2$ N: 边数, S: 中心到角顶

内角和 $= (N-2) \times 180°$

diagonals 对角线数 $= \frac{1}{2} N \cdot (N-3)$

10. 1 quarter $0.25 · 1 inch = 2.54 cm.
1 dime $0.1 · 1 foot = 12 inches = 1/3 yard.
1 nickle $0.05 · 1 mile = 1.6 km = 1760 yards.
1 penny $0.01 · 1 yard = 36 inches.

11. $ax^2 + bx + c = 0$. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

12. exponent 指数
numerator 分子
denominator 分母
reciprocal 倒数
coefficient 系数

1 kg = 2.2 Lb.
1 gallon = 3.785 L.