PRESENTATION ON $\LaTeX$ DOCUMENT

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Course - B.Sc Mathematics(H)

College Roll No - MAT/19/106


LATEX
/documentclass
/usepackage
/end
/begin

1. MAKE THE FOLLOWING EQUATIONS

- $3^3 + 4^3 + 5^3 = 6^3$

  40
- $\sqrt{100} = 10$
- $(a+b)^3 = a^3 + b^3 + 3a^2b + 3ab^2$
- $$\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$$
- $\frac{\pi}{4} = \frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \cdots$
- $\cos\theta = \sin(90^\circ - \theta)$
- $e^{\iota\theta} = \cos\theta + \iota\sin\theta$

- $\lim_{\theta \to 0} \frac{\sin \theta}{\theta} = 1$
- $\lim_{x \to \infty} \frac{\pi(x)}{x / \log x}$
- $\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$

2. TYPESET THE FOLLOWING SENTENCES

- Positive numbers a, b, and c are the side lengths of a traingle if and only if $a + b = c$, $b + c > a$ and $c + a > b$
- The area of a triangle with side lengths a, b, c is given by *Heron's formula :*
  $A = \sqrt{s(s-a)(s-b)(s-c)}$,
  where s is the semiperimeter $(a + b + c)/2$

- The volume of a regular tetrahedron of edge length 1 is $\sqrt{2}/12$
- The quadratic equation $ax^2 + bx + c = 0$ has roots

$$r_1, r_2 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- The *derivative* of a function f denoted by f' , is defined by $f' = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$
- A real-valued function f is *convex* on a interval I if

$$f(\lambda x + (1-\lambda)y) \leq \lambda f(x) + (1-\lambda)f(y)$$

for all $x,y \in I$ and $0 \leq \lambda \leq 1$

- The general solution to the differential equation

$$y'' - 3y' + 2y = 0$$

is

$$y = C_1 e^x + C_2 e^2 x$$

- The *Fermat* number F_n is defined as
$$F_n = 2^{2^n}, n \geq 0$$

3. EQUATIONS TO NOTICE THE LARGE DELIMATERS

- $$\frac{d}{dx}\left(\frac{x}{x+1}\right) = \frac{1}{(x+1)^2}$$
- $$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = e$$
- $$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$$
- $$R_\theta = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$$

- $$\begin{vmatrix} i & j & k \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = \begin{vmatrix} a_2 & a_3 \\ b_2 & b_3 \end{vmatrix} i - \begin{vmatrix} a_1 & a_2 \\ b_1 & b_3 \end{vmatrix} j + \begin{vmatrix} a_1 & a_2 \\ b_1 & b_2 \end{vmatrix} k$$

- $$\left[\begin{array}{cc} a_{11} & a_{12} \\ a_{21} & a_{22} \end{array} \right] \left[\begin{array}{cc} b_{11} & b_{12} \\ b_{21} & b_{22} \end{array} \right] = \left[\begin{array}{cc} a_{11}b_{11} + a_{12}b_{21} & a_{11}b_{12} + a_{12}b_{22} \\ a_{21}b_{11} + a_{22}b_{21} & a_{21}b_{12} + a_{22}b_{22} \end{array} \right]$$

- $$f(x) = \begin{cases} -x^2, & x < 0 \\ x^2, & 0 \leq x \leq 2 \\ 4, & x > 2 \end{cases}$$

4. MULTILINE EQUATION

*EXAMPLE*1.

$$
\begin{aligned}
1+2 &= 3 \\
5+5+6 &= 7+8 \\
9+10+11+12 &= 13+14+15 \\
16+17+18+19+20 &= 21+22+23+24 \\
5+26+27+28+29+30 &= 31+32+33+34+35
\end{aligned}
$$

*EXAMPLE*2.

$$
\begin{aligned}
(a+b)^2 &= (a+b)(a+b) \\
&= (a+b)a + (a+b)b \\
&= a(a+b) + b(a+b) \\
&= a^2 + ab + ba + b^2 \\
&= a^2 + ab + ab + b^2 \\
&= a^2 + 2ab + b^2
\end{aligned}
$$

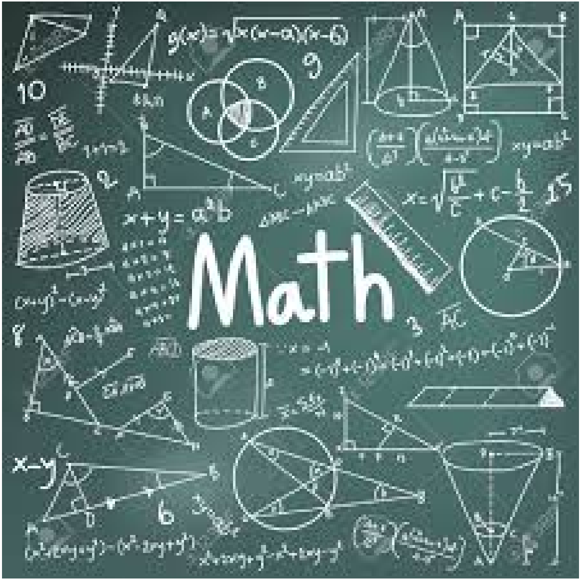
*EXAMPLE*3.

$$\begin{aligned}
\tan(\alpha+\beta+\gamma) &= \frac{tan(\alpha+\beta)+\tan(\gamma)}{1-\tan(\alpha+\beta)\tan\gamma} \\
&= \frac{\frac{\tan\alpha+\tan\beta}{1+tan\alpha\tan\beta}+\tan\gamma}{1-(\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta})\tan\gamma} \\
&= \frac{\tan\alpha+\tan\beta+(1-\tan\alpha\tan\beta)\tan\gamma}{1-\tan\alpha\tan\beta-(\tan\alpha+\tan\beta)\tan\gamma} \\
&= \frac{\tan\alpha+\tan\beta+\tan\gamma-\tan\ \tan\beta\tan\gamma}{1-\tan\alpha\tan\beta-\tan\alpha\tan\gamma-\beta\tan\gamma}
\end{aligned}$$

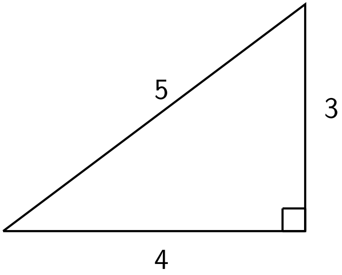
*EXAMPLE*4.

$$\begin{aligned}
\prod_p \left(1 - \frac{1}{p^2}\right) &= \prod_p \frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \cdots} \\
&= \left(\prod_p \left(\frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \cdots}\right)\right)^{-1} \\
&= \left(1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} \cdots\right)^{-1} \\
&= \frac{6}{\pi^2}
\end{aligned}$$

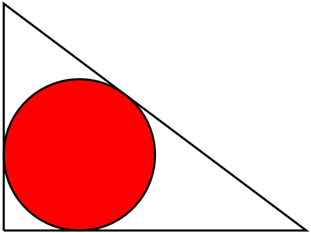
Question 8. Add a mathematical picture



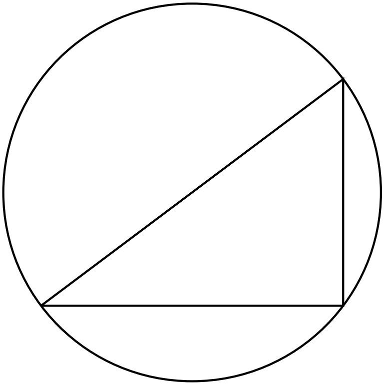
Question 9.



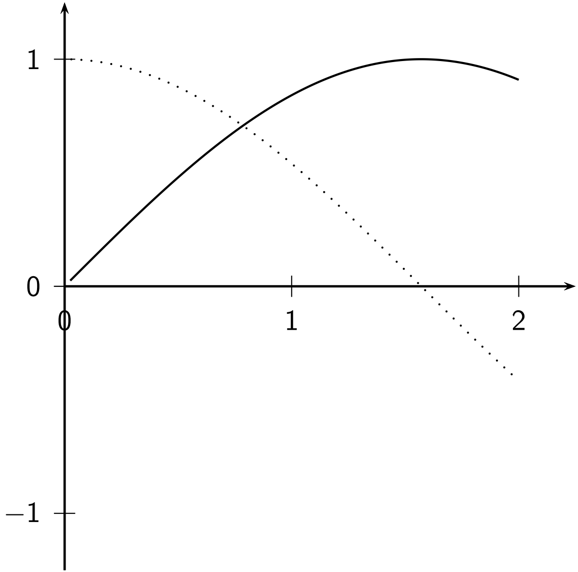
Question 10.



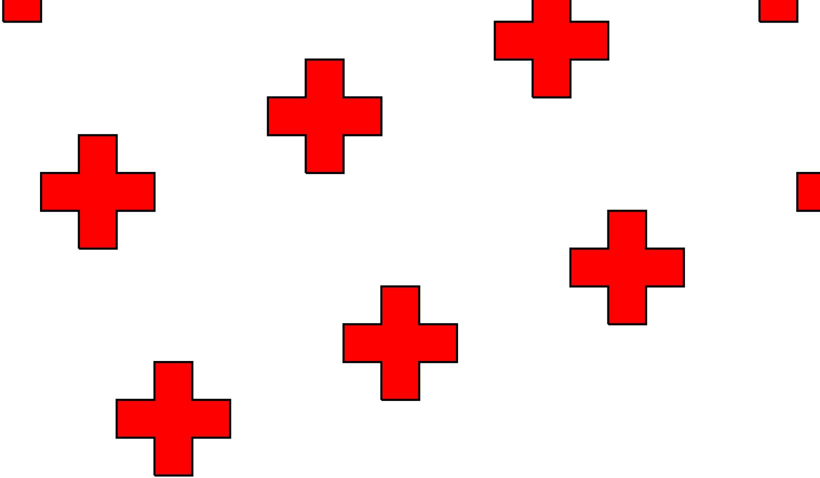
Figure



Graph



Pattern




Thank you!