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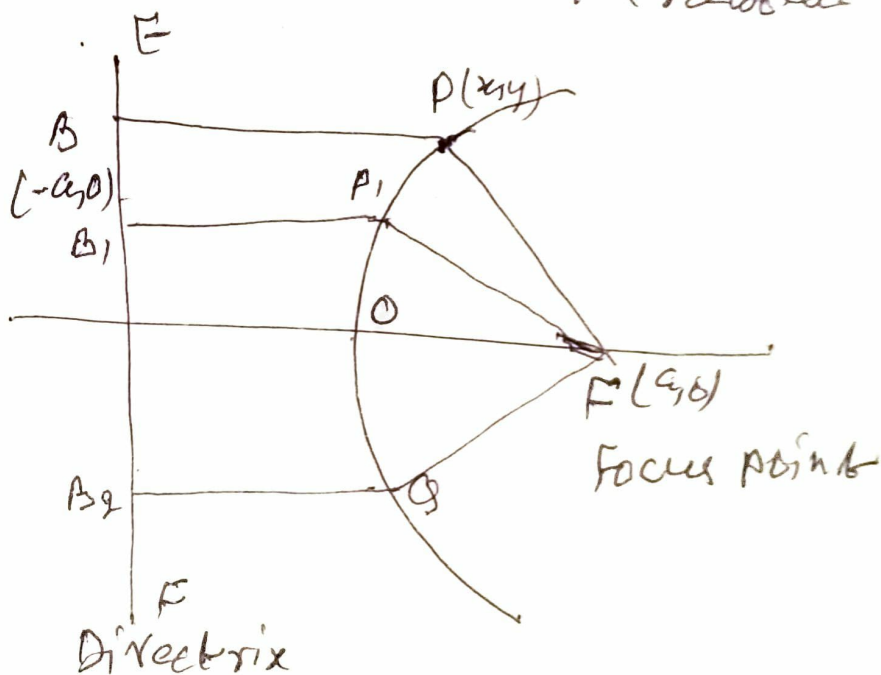
D:- Mathematics

Topic - Parabola

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Marwari collage, Darbhanga

① Definition of Parabola : A set of all points which are equidistant from a fixed line and from a fixed point is called a parabola.



NOTE ① Fixed line EF represents directrix of a parabola

② Fixed point (F) is called focus of a parabola

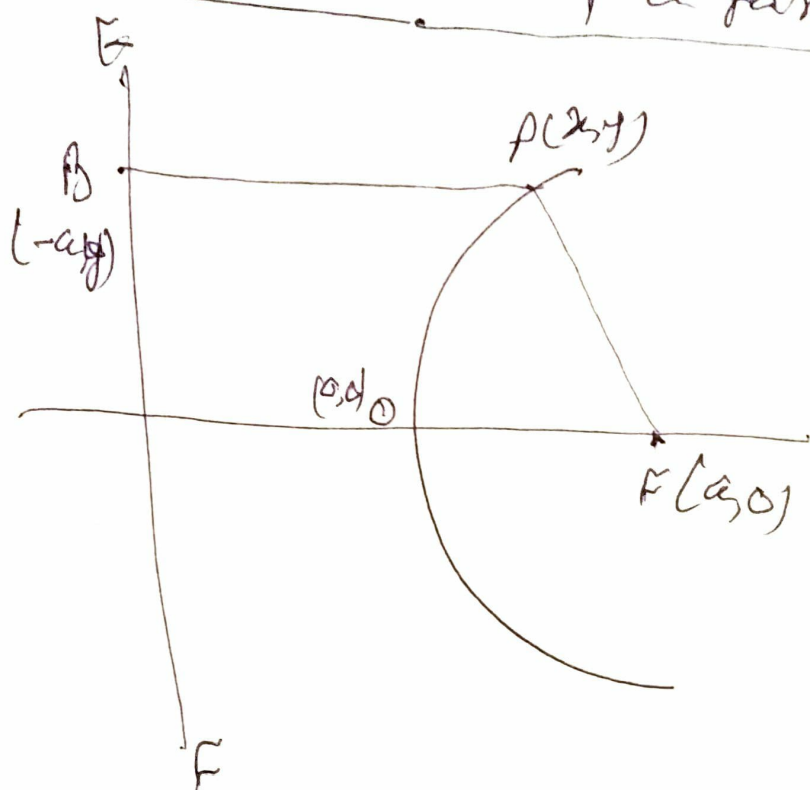
③ According to definition of parabola

$$PB = PF$$

$$P_1B_1 = P_1F$$

$$B_2Q = QF$$

Q) To find equation of a parabola



Let a point $P(x,y)$ is situated on a parabola. EF is its directrix. $F(a,0)$ denotes focus of a parabola. Now according to definition of parabola,
 $PB = PF$

$$\Rightarrow \sqrt{(x+a)^2 + (y-y)^2} = \sqrt{(a-x)^2 + (0-y)^2}$$

$$\Rightarrow (x+a)^2 + 0^2 = (a-x)^2 + y^2$$

$$\Rightarrow x^2 + 2ax + a^2 + 0^2 = a^2 - 2ax + x^2 + y^2$$

$$\Rightarrow x^2 + 2x^2 + y^2 - x^2 - x^2 - y^2 = -2ax - 2ax$$

$\Rightarrow$