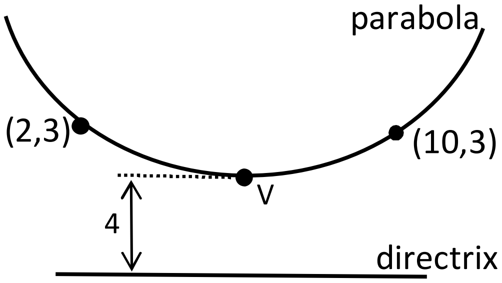
كلية الهندسة - جامعة الزقازيق	مادة الرياضيات (١-ب)	التاريخ ٢٠١٦/٤/١٦
الفرقة الاعدادية امتحان نصف الترم	الدرجة للتحليلية: 20	الزمن ٣٧ دقيقة
الاسم خماسى:	رقم الفصل:	رقم الجلوس:

Q. 1



Ans.

$$x_{vertex} = \frac{10+2}{2} = 6$$

$V(6, k), \quad p = 4$

$(x-6)^2 = 16(y-k)$

Use point (10,3)

$(10-6)^2 = 16(3-k)$

K=2

Vertex: $V(6,2)$

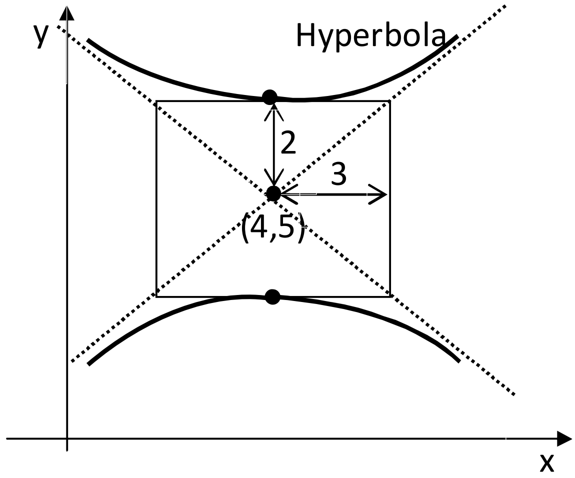
Equation: $(x-6)^2 = 16(y-2)$

Directrix: $y = -2$

Focus : $F(6,6)$

3 Marks

Q. 2



Ans.

$c^2 = 9 + 4 = 13$

Vertices: V(4,7), V'=(4,3)

Equation: $\frac{(y-5)^2}{4} - \frac{(x-4)^2}{9} = 1$

Asymptotes: $(y-5) = \pm\frac{2}{3}(x-4)$

3 Marks

Foci: F(4,5+$\sqrt{13}$), F'=(4,5-$\sqrt{13}$)

Q. 3

Find the point on the ellipse, $\frac{x^2}{9} + \frac{y^2}{4} = 1$ that is nearest to the line $y = 2x + 4$.

5 Marks

Ans.

m =2, a=3, b=2

$$k^2 = a^2m^2 + b^2 = 9 * 4 + 4 = 40$$

Point of tangency (nearest point): $\left(\frac{-a^2m}{k}, \frac{b^2}{k}\right) = \left(\frac{-18}{\pm\sqrt{40}}, \frac{4}{\pm\sqrt{40}}\right)$

We have to check which point ($\pm$) is nearest (No marks for this step)

Q.4 For $\vec{F} = x^2yz\ \vec{i} + xyz^2\ \vec{j} + xyz\ \vec{k}$, prove that: $div(curl\ \vec{F}) = 0$ **3 Marks**

Ans.

$= (xz$

$div(curl\ \vec{F}$

Q. 5 What is the value of **K** that make the following two planes orthogonal: $\rho : 2x + 9y + \boldsymbol{k}\, z + 15 = 0,\ \ \sigma\text{:}\ \ 3x - 3y + 7z + 11 = 0$ **2 Marks**

Ans.

Q. 6 Find the equation of the line l passing through point (2,1,3) and is parallel to the two planes, ρ: 3x+4y+z-8=0 and σ: 2x+y-10z-4=0 **4 Marks**

Ans.

D.R. of line $l = \begin{vmatrix} i & j & k \\ 3 & 4 & 1 \\ 2 & 1 & -10 \end{vmatrix} = -41i + 32j - 5k$

Equation of l: $\frac{x-2}{-41} = \frac{y-1}{32} = \frac{z-3}{-5}$