

MTH 111, Math for the Architects , Exam One

Ayman Badawi

QUESTION 1. (12 points) Find the focus, the vertex, and the directrix for the parabola $8y = 4x^2 + 8x + 20$. Let F be the focus of the given parabola. Given $A = (1, 4)$ lies on the parabola. Find $|AF|$. Draw a rough graph of the given parabola.

QUESTION 2. (12 points) Given $(3, 9)$ and $(3, -7)$ are the foci of a hyperbola and $K = 6$ is its constant. Write down the standard form equation of the hyperbola. Sketch a rough graph of the hyperbola.

QUESTION 3. (12 points) Find the foci, the center, and the constant K for the ellipse $9x^2 + 5y^2 + 20y - 25 = 0$. Sketch a rough graph of the ellipse.

QUESTION 4. (6 points) Does the line $y = x + 2$ intersect the hyperbola $y^2 - (x - 1)^2 = 3$? If yes, find the intersection points.

QUESTION 5. a) (10 points) Find the equation of the line that is perpendicular to the line $3y + 4x = 2$ and it passes through the point $(4, 1)$.

b) (5 points) Given $L : 2x + 3y = 13$ and $A = (4, 6)$ is a point not on the line L . Find the distance between A and L .

QUESTION 6. (i) (5 points) $\lim_{x \rightarrow -1} \frac{\sqrt{x+10}-3}{x^2-1}$

(ii) (5 points) $\lim_{x \rightarrow -2^+} \frac{x+3}{x^2-4}$

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