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MTH 111, Math. for the Architects, Exam I, Spring 2014

Ayman Badawi

(**Each question = 10 points, total points 100 points**)

QUESTION 1. Find an equation of the ellipse with the vertices $(4, 3), (1, 7)$, and $(-2, 3)$. Find the constant k. Find the foci. Make a rough sketch of such ellipse.

QUESTION 2. Find an equation of the hyperbola that is centered at $(2, 1)$ and with constant $k = 6$ such that (2, 6) is one of the foci. Find the second foci, find the vertices, and make a rough sketch of such hyperbola.

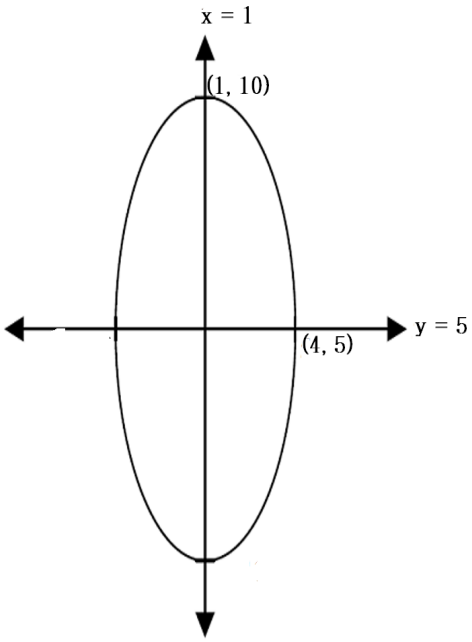
QUESTION 3. Given $x = 1$ is the directrix line of a parabola that passes through the point $(6, 5)$ and the line $y = 2$ passes through the vertex of the parabola. Find the vertex, the focus, and make a rough sketch of such parabola. Then find an equation of the parabola. [Hint: there are two such parabolas, just find one]

QUESTION 4. Find the directrix, the focus, and the vertex of the parabola $y = 0.5(x + 5)^2 + 4$

QUESTION 5. Find the foci, the constant k, and the vertices of the ellipse $(x + 2)^2/25 + (y - 3)^2/9 = 1$

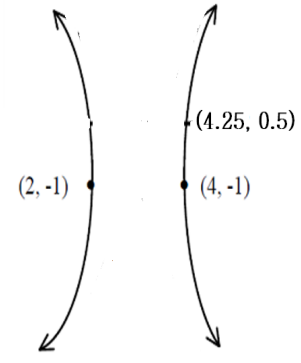
QUESTION 6. Find the center, the foci, the vertices of the hyperbola $x^2 - 2y^2 - 4y = 18$

QUESTION 7. Find the foci, and the equation of the below ellipse:



QUESTION 8.

Find the foci, and the equation of the below hyperbola:



QUESTION 9. Find an equation of the plane P that contains the line $L : x = t, y = 1 - t, z = 2t$ and the point $Q = (1, 0, 5)$ [note that the point Q does not lie on L]

QUESTION 10. a) Find the distance between the point $Q = (2, 2, 1)$ and the plane $x + 3y + 5z = 15$

b) The line $L_1 : x = 5t, y = 4 - t, z = 3 + t$ intersects the line $L_2 : x = 1 + 2s, y = 9 - 3s, z = 2s$ at a point Q. Find Q

Faculty information

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