

VARIANT 1

Full name:	Group:

Task:	1	2	3	4	Total
Score:					

1. (5 points)

Find the equations of directrices, the length of the latus rectum and coordinates of focus (or foci) of the following curves:

(a) $\frac{x^2}{27} - \frac{y^2}{48} = 3$

(b) $12x^2 - 4y^2 - 24x + 32y = 127$

2. (5 points)

Find the canonical equation of parabola if it is known that the equation of directrix $2x + y = -1$. Focus of the parabola has coordinates $(2, 1)$.

3. (3 points)

Find the equations of the tangent and normal lines to the curve defined by the equation $\frac{(x+3)^2}{4} + \frac{y^2}{9} = 1$ at the point with coordinates $(-1.4, 1.8)$.

4. (5 points)

Determine whether the statement is true or false. Explain your answer.

- (a) A hyperbola is the set of all points in the plane that are equidistant from a fixed line and a fixed point not on the line.
- (b) If an ellipse is not a circle, then the foci of an ellipse lie on the major axis of the ellipse.
- (c) The hyperbola $(y^2/a^2) - x^2 = 1$ has asymptotes the lines $y = \pm x/a$.

VARIANT 2

Full name:	Group:

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1. (5 points)

Find the equations of directrices, the length of the latus rectum and coordinates of focus (or foci) of the following curves:

(a) $4x^2 + 2y^2 = 16$

(b) $x^2 - 2xy + y^2 - 2x + 6y + 4 = 0$

2. (5 points)

Find the canonical equation of hyperbola if it is known that the angle between the asymptotes that contains a focus equals 30° and the distance from the vertex to the nearest directrix is equal to 3.

3. (3 points)

Find the equations of the tangent and normal lines to the curve defined by the equation $x^2 - 8xy + y^2 + 3x + y = 0$ at the point with coordinates $(0, -1)$.

4. (5 points)

Determine whether the statement is true or false. Explain your answer.

(a) Angle $\theta = \pi/3$ will eliminate the xy -term in $2x^2 + xy + 2y^2 + x - y = 0$

(b) The graph of the given equation is a parabola: $25x^2 - 14xy + 25y^2 - 288 = 0$

(c) The set of points in the plane, the sum of whose distances to two fixed points is a positive constant greater than the distance between the fixed points is an ellipse.

VARIANT 3

Full name:	Group:

Task:	1	2	3	4	Total
Score:					

1. (5 points)

Find the equations of dircetrices, the length of the latus rectum and coordinates of focus (or foci) of the following curves:

(a) $8x^2 + 2y^2 = 18$

(b) $x^2 + 4xy + y^2 + 2x - y = 0$

2. (5 points)

Find the canonical equation of hyperbola if it is known that the angle between the asymptotes that contains a focus equals 60° and the distance from the vertex to the nearest directrix is equal to $\frac{5}{2} - \frac{5\sqrt{3}}{4}$.

3. (3 points)

Find the equations of the tangent and normal lines to the the curve defined by the equation $-9x^2 - y^2 + 6xy - x + y = 0$ at the point with coordinates $(3, 7)$.

4. (5 points)

Determine whether the statement is true or false. Explain your answer.

(a) Angle $\theta = \pi/3$ will eliminate the xy-term in $x^2 + 2\sqrt{3}xy + 3y^2 - 2x + y = 1$

(b) The graph of the given equation is a parabola: $x^2 + 2\sqrt{3}xy + 3y^2 + 16\sqrt{3}x - 16y - 96 = 0$

(c) The set of points in the plane, the sum of whose distances to two fixed points is a positive constant greater than the distance between the fixed points is a parabola.