Matrices & Systems of Equations (8)
Conic Sections (10)

Selected Examples:

1. Find the vertex and focus for the parabola:

$$x^2 - 10x + 12y + 37 = 0$$

2. Find the vertices and foci for the ellipse:

$$\frac{(x-1)^2}{16} + \frac{(y+2)^2}{7} = 1$$

Practice:

Determinants (8)	1. Find the Determinant: $\begin{bmatrix} 3 & -8 \\ 12 & -4 \end{bmatrix}$	2. Find the determinant: $\begin{bmatrix} 1 & 4 & -2 \\ 3 & -1 & 1 \\ 5 & 2 & 7 \end{bmatrix}$
Area using Determinants (8)	3. Use determinants to find the area of triangle with vertices (0,3), (4, -1) and (-3,2) .	
Solving Systems (8) - **Gaussian Elimination** - **Gauss-Jordan Elimination** - **Using an Inverse Matrix** - **Cramer's Rule**	4. Solve the system of equations: $\begin{aligned} 2x &+3y &-4z &= 4 \\ x &-y &-5z &= 0 \\ -2x &+4y &+5z &= 9 \end{aligned}$	

Circle (10)	5. Find the center and radius: $x^2 + y^2 + 6x - 2y + 1 = 0$.
Parabola (10)	6. Find the vertex, focus, and directrix: $y^2 - 6y - 12x - 15 = 0$.
Ellipse (10)	7. Find the center, vertices, foci, and eccentricity: $\dfrac{(x+1)^2}{64} + \dfrac{(y-4)^2}{36} = 1$.
Hyperbola (10)	8. Find the center, vertices, foci, and asymptotes: $\dfrac{(y+2)^2}{4} + \dfrac{(x)^2}{12} = 1$.

Mixed Review	9. Vector **v** has initial point (-4, 5) and final point (9, 1). Write vector **v** in component form and in linear combination form.
	10. Convert to polar form: $\left(4, -4\sqrt{3}\right)$
	11. Find the area of a triangle with side lengths {8, 4, 10}.
	12. Use DeMoivre's Theorem to evaluate $\left(-2 + 2\sqrt{3}i\right)^3$ in standard form.
	13. Solve for x: $\ln(x) + \ln(2x + 8) = \ln(90)$
	14. State the domain: $y = \dfrac{3x}{\sqrt{3x+9}}$

Mixed Review

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1. State the vertical and horizontal asymptotes of $f(x) = \dfrac{3x^2 - 2x + 4}{x^2 - 8x + 15}$.

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2. Divide synthetically: $(x^4 + 2x^2 - x + 1) \div (x + 2)$

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3. Factor: $x^4 + 2x^3 + x^2 + 2x$

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4. Solve: $e^{4x+1} = 9$

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5. Convert to polar form: $(6, -6\sqrt{3})$

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6. Find the foci and eccentricity for the ellipse: $\dfrac{x^2}{28} + \dfrac{y^2}{64} = 1$.

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7. $\sin u = \dfrac{5}{14}$, $\tan u < 0$ find $\sin 2u$. (in simplest radical form)

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8. Use DeMoivre's Theorem to evaluate: $(3 - 3i)^3$

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9. Find the determinant: $\begin{bmatrix} 1 & 9 & -1 \\ -6 & 3 & 8 \\ 0 & 4 & 5 \end{bmatrix}$

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10. Evaluate: a) $\displaystyle\sum_{1}^{50} 48i - 3$ b) $\displaystyle\sum_{1}^{\infty} \left(\dfrac{3}{4}\right)^{i-1}$

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11. Find the area of a triangle with:
   a. Sides lengths {20, 25, 30}   b. Vertices: (5,6), (3, -4), (9, 1)

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12. Vector v has initial point (5, 7) and final point (-4, 9). Write v in:
   a. Component form
   b. Linear Combination Form
   c. Trigonometric Form

Mixed Review

1. State the amplitude, period and shifts of the graph of $y = 2\cos(6x - \pi) + 4$

2. Solve on $(0, 2\pi]$: $6\cos^2 x - 5\sin x - 2 = 0$

3. Evaluate: $\cos(135^o + 60^0)$. (in simplest radical form)

4. Solve: $\log(7 - x) - \log(3x + 2) = 1$

5. Find a formula, a_n, for an arithmetic sequence with a_4 = 3 and a_{15} = 47.

6. Lucy invests $900 at a rate of 1.5% compounded continuously. What is her balance after 15 years?

7. Find the composition f(g(x)): $f(x) = 3x^2 - 7$
$g(x) = \sqrt{2x + 1}$

8. State the Domain: $y = x^2 - 7x$

9. $f(x) = 4x^3 - 8x^2 - 25x + 50$ State the number of possible *positive real zeros* of f(x) and list all possible *rational zeros*.

10. Factor: $8x^3 + 1$

11. Solve: $2x^2 - 5x = x^2 + 1$

12. Find the inverse: $f(x) = 3x^2 - 7$

13. Solve the system:
$2x - y + z = -3$
$x + y + z = 4$
$3x - 2y + 5z = 1$

14. Write the equation of g(x), which is f(x)=x² shifted 3 units up and 5 units left.

15. Find the modulus and argument for the complex number z = -5 + 5i.