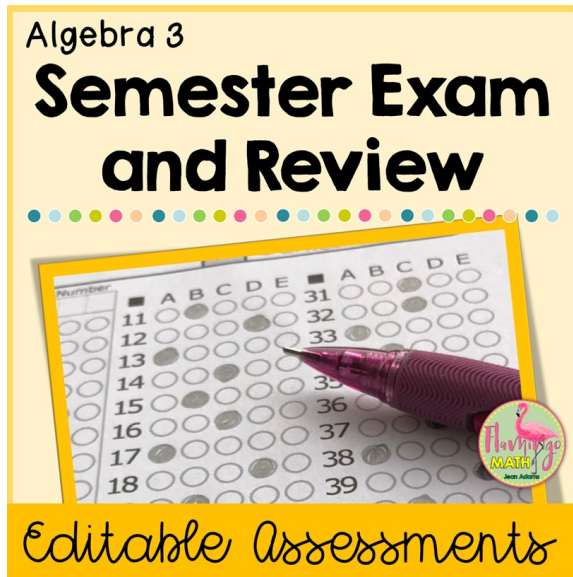




Algebra 3 Semester Exam & Review

This is a comprehensive review packet and a fully-editable multiple choice semester exam for Algebra 3 students.

What is included in this resource?

- ☐ Semester Exam Review questions with answer key for students
- ☐ Two-Part (20 questions each) Multiple Choice Exam with bubble sheet
- ☐ A fully-editable PowerPoint® document for your assessment needs.

What units are assessed in this exam?

- ☐ Unit 1-Linear Relations and Functions
- ☐ Unit 2-Solving Systems of Linear Equations
- ☐ Unit 3-Nature of Graphs
- ☐ Unit 4-Polynomial, Radical, and Rational Functions



Question Stems:

Concepts on Calculator Inactive Questions:

1.	Translation of a point
2.	Solve linear equation
3.	Finding an inverse function
4.	Evaluate a piecewise function
5.	Domain of a rational function
6.	Translate a verbal expression to an algebraic equation
7.	Find zeros of a quadratic function
8.	Write standard form of an equation given slope and a point
9.	Evaluate an absolute value function.
10.	Graph a piecewise function
11.	Find a composition of a function
12.	Determine the size of a matrix
13.	Solve for variables in a matrix equation
14.	Find determinant of a 2×2 matrix
15.	Synthetic division
16.	List possible rational zeros of a function
17.	Find real roots of a cubic function
18.	Graph a rational function
19.	Solve a matrix equation
20.	Matrix operations.

Concepts on Calculator Active Questions:

21.	Solve by completing the square
22.	Solve a quadratic with a calculator to three decimal places
23.	Solve a real-world cost problem
24.	Boyle's Gas Law application problem
25.	Find maximum revenue for a real-world application
26.	Solve system by elimination
27.	Solve system of three equations with three variables
28.	Find the inverse of a 2×2 matrix
29.	Multiply two matrices
30.	Find determinant of a 3×3 matrix with calculator
31.	Find a value, k , for linear system to contain infinite solutions
32.	Write vertex form of a quadratic in standard form
33.	Graph a system of linear inequalities
34.	Given roots, write a polynomial function in standard form
35.	Analyze characteristics of two functions
36.	Find maximum revenue from a real-world scenario
37.	Solve a cost function for real-world scenario
38.	Predict population given model
39.	Find extrema and zeros of cubic polynomial to nearest hundredth
40.	Graph a rational function with a slant asymptote

Support Items

Algebra 3 Semester 1 Exam

Name _____ Date _____

Calculator INACTIVE Questions: 1 - 20

1.	☐ A	☐ B	☐ C	☐ D
2.	☐ A	☐ B	☐ C	☐ D
3.	☐ A	☐ B	☐ C	☐ D
4.	☐ A	☐ B	☐ C	☐ D
5.	☐ A	☐ B	☐ C	☐ D
6.	☐ A	☐ B	☐ C	☐ D
7.	☐ A	☐ B	☐ C	☐ D
8.	☐ A	☐ B	☐ C	☐ D
9.	☐ A	☐ B	☐ C	☐ D
10.	☐ A	☐ B	☐ C	☐ D

11. (A) (B) (C) (D)

12. (A) (B) (C) (D)

13. (A) (B) (C) (D)

14. (A) (B) (C) (D)

15. (A) (B) (C) (D)

16. (A) (B) (C) (D)

17. (A) (B) (C)

18. (A)

19. (A)

(B)

C2' Que.

2.	(B)
26.	(B)
27.	(B)
28.	(A)
29.	(A)
30.	(A)

31. 3^2

(C)

(C)

(C)

(C) (D)

(C) (D)

(D)

(B)

(3) (C) (D)

40. (A) (B) (C) (D)

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Multiple Choice Assessments

Algebra 3 Semester Exam

1. The point $(-2, 7)$ is on the graph of f . If g is a translation of f so that $g(x) = (x - 3) - 4$, what are the coordinates of the translated point?

[A] $(-5, 3)$ [B] $(-5, 11)$
[C] $(1, 3)$ [D] $(3, -4)$

2. Find the solution to the following equation: $4x - 7(3x + 6) = 4x - 9$

[A] $\frac{7}{11}$ [B] $-\frac{11}{7}$
[C] $-\frac{33}{13}$ [D] $-\frac{17}{13}$

3. Find the inverse of $f(x) = \frac{x^2 + 1}{4}$

[A] $f^{-1}(x) = \frac{1}{4}x$ [B] $f^{-1}(x) = \frac{1}{4}x^2 + 1$
[C] $f^{-1}(x) = \frac{1}{4}x^2 + 1$ [D] $f^{-1}(x) = \frac{1}{4}x^2 + 1$

5. Find the domain of the function: $f(x) = \frac{1}{x^2 - 4}$

[A] $(-\infty, -2) \cup (2, \infty)$ [B] $(-\infty, 1) \cup (1, 2) \cup (2, \infty)$
[C] $(-\infty, -2) \cup (1, \infty)$ [D] $(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

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11. Identify the graph $h(x) = \begin{cases} 2x - 1, & x \leq 1 \\ (x - 2)^2 + 1, & x > 1 \end{cases}$

[A]



[D]

12. Given the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$, which of the following cannot equal the number of rows of the matrix?

[A] 3 [B] 60
[C] 9 [D] 18

13. Find the values of the variables. $\begin{bmatrix} 8 & -x^2 \\ 7y & 5 \end{bmatrix} = \begin{bmatrix} 2z & -81 \\ 21 & 5 \end{bmatrix}$

[A] $x = 9, y = 3, z = 4$ [B] $x = -9$ or $9, y = 3, z = 4$
[C] $x = -81$ or $81, y = 3, z = 4$ [D] $x = 9, y = -3, z = -4$

14. Evaluate the determinant of the matrix: $\begin{bmatrix} 4 & -1 \\ 9 & 2 \end{bmatrix}$

[A] 17 [B] 1
[C] -1 [D] -17

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Multiple Choice Assessments

Algebra 3 Semester Exam

21. Solve by completing the square: $x^2 + 4x = 2$

- [A] $x = 2 \pm \sqrt{6}$ [B] $x = -2 \pm 2\sqrt{6}$
 [C] $x = -2 \pm \sqrt{6}$ [D] $x = -4 \pm \sqrt{6}$

22. Solve to three decimal place accuracy: $3x^2 - 0.485x - 1.2 = 0$

- [A] $\{-0.557, 0.718\}$ [B] $\{-0.718, 0.557\}$
 [C] $\{-0.547, 0.708\}$ [D] $\{-1.671, 2.154\}$

23. The daily cost to produce x backpacks, in dollars, C , is given by $C(x) = x^2 - 120x + 4200$. How many backpacks are produced?

- [A] 40 [B] 6
 [C] 90 [D] 100

24. Match the units to the quantities.
 [A] Hg [B] 7.21 cm Hg
 [C] 100 Hg [D] 100 cm Hg

25. Find the number of units that produce a maximum profit.

- [A] 22,500 [B] 10,000
 [C] 15,000 [D] 4500

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Algebra 3 Semester Exam

30. Find the determinant: $\begin{vmatrix} 0 & -1 & 2 \\ 3 & 5 & 0 \\ 1 & -1 & 3 \end{vmatrix}$

- [A] -25 [B] 25
 [C] 7 [D] -7

31. The system of equations has infinitely many solutions.

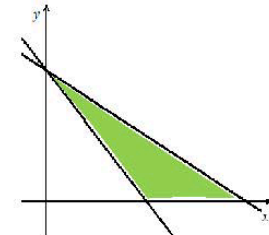
- [A] $x + y = 1$ [B] $x + y = 2$
 [C] $x + y = 3$ [D] $x + y = 4$

32. Find the vertex of the parabola $y = x^2 + 16x + 64$.

- [A] $(-8, 0)$ [B] $(-8, 16)$
 [C] $(8, 0)$ [D] $(8, 16)$

33. Match the graphs to the correct system of inequalities.

- [A] $\begin{cases} x + y \geq 4 \\ x + 2y \leq 8 \\ y \geq 0 \end{cases}$
 [B] $\begin{cases} x + y \leq 4 \\ x + 2y \geq 8 \\ y \geq 0 \end{cases}$
 [C] $\begin{cases} x - y \geq 4 \\ 2x + y \geq 8 \\ y \geq 0 \end{cases}$
 [D] $\begin{cases} x + y \leq 4 \\ 2x - y \leq 8 \\ y \geq 0 \end{cases}$



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Review

Semester Exam Review

Name: _____

Date: _____ Period: _____

Show all work for credit. Box answers.

Write an equation of the line using the following information:

1. A line parallel to $3x - 4y = -5$ that passes through the point $(2, -1)$.

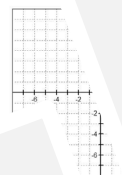
2. A line passing through $(0, -3)$ and perpendicular to $5y - 15 = 10x$.

Answer each of the following. If $f(x) = x^2 - 3x + 2$ and $g(x) = 3x - 4$

3. $f(x) - g(x)$

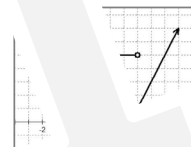
4. f'

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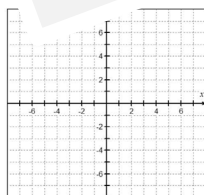


7. Graph the

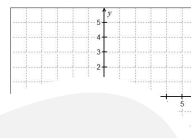
$$f(x) = \begin{cases} x > 2 \\ \leq x \leq 2 \\ 2 \end{cases}$$

ction:

$$\begin{cases} x > 2 \\ \leq x \leq 2 \\ 2 \end{cases}$$



8. Solve by graphing. $\begin{cases} 2x + y = -1 \\ x - y = -5 \end{cases}$



by elimination.

9. Solve by substitution.

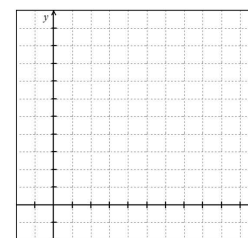
11. S

$$\text{ethod. } \begin{cases} 2x - 3y = \\ 2x + 3y = \end{cases}$$

ven con.

$$\begin{aligned} &\geq 8 \\ &\geq -3 \\ &= 4x + 3y \end{aligned}$$

ject



13. Evaluate $3 \begin{bmatrix} 2 & 7 \\ 9 & -1 \end{bmatrix} + 2 \begin{bmatrix} 4 & -2 \\ 6 & 3 \end{bmatrix}$

14. Find AB

$$A = \begin{bmatrix} 3 & -1 \\ 5 & 2 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 3 \\ 1 & -1 \end{bmatrix}$$

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Review

15. Find the inverse of the matrix using a calculator.

$$A = \begin{bmatrix} 1 & 1 & 0 \\ 3 & 1 & 2 \\ -1 & 1 & -1 \end{bmatrix}$$

16. Solve $A + X = 2B$ for X

$$A = \begin{bmatrix} 2 & -1 \\ -3 & 4 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 0 \\ -1 & 3 \end{bmatrix}$$

Use the graphs of f and g , shown at right, to evaluate the following.

23. $f(4) - g(4)$

24. $(g \circ f)(-2)$

25. $(g \circ g)(2)$



Find the domain and range of the function, give your answers in interval notation.

17. $y = \frac{x+4}{x^2+x-20}$

18.

Determine the intervals where the function is increasing or decreasing.

19. $f(x) = x^3 - 3x^2 + 2x$

Determine the intervals where the function is even or odd.

21. $g(x)$

ther.

22.

28. Find the quotient using synthetic division $3x + 1 \div (x + 2)$

Find a third zero of the function with real coefficients. If the zeros are $x = 3i$ and $x = -3i$, find the third zero.

30. If $3i$ is a zero of f , find the remaining zeros $f(x) = x^4 + x^3 + 3x^2 + 9x - 54$

31. Given that $(2x - 1)$ is a factor of the polynomial, $2x^3 + x^2 - 25x + 12$, find the other factors.

using factors?

Use a graphing calculator to answer the following question. Round to the nearest hundredth.

following question

32. Find the area of the region bounded by the curves $y = x^2$ and $y = x$ from $x = 0$ to $x = 1$.

33. Find the revenue and zeros of the function $R(x) = -0.0001x^4 + 0.001x^3 - 0.002x^2 + 0.003x$.

34. A manufacturer's cost function is given by $C(x) = 0.0001x^4 - 0.001x^3 + 0.002x^2 - 0.003x$, where x is the number of units produced. Find the cost of producing 100 units.

35. A manufacturer's revenue function is given by $R(x) = 0.0001x^4 - 0.001x^3 + 0.002x^2 - 0.003x$, where x is the number of units sold. Find the revenue from selling 100 units.

36. Write an equation for the translation of $y = \frac{2}{x}$ that has the asymptotes $x = 5$ and $y = -3$.

37. Describe the vertical asymptote(s) and hole(s) for the graph of $y = \frac{(x-2)(x+5)}{(x+5)(x+4)}$.

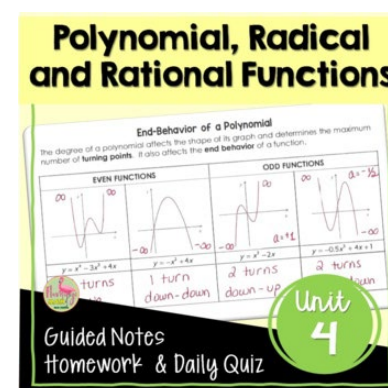
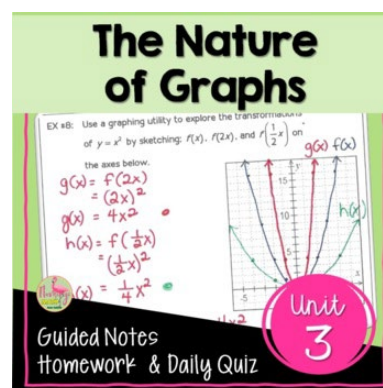
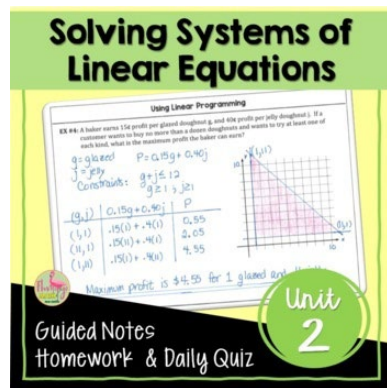
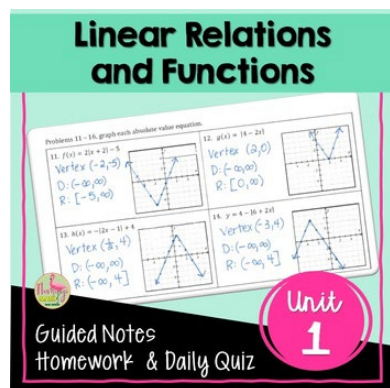
38. Solve the equation. Check the solution. $\frac{6}{x^2-9} - \frac{1}{x-3} = 1$



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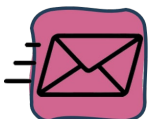
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