Algebra 2
Practice Exam

Final Exam
Review

Kennedy's Classroom Resources

Algebra 2
Practice Exam

Name _____

1. Simplify $\dfrac{3x+12}{x^2+8x+12} \cdot \dfrac{x^2-4}{x^2+x-12}$

   A. $\dfrac{3}{(x+6)(x-3)}$

   B. $\dfrac{3(x-2)}{(x+6)(x-3)}$

   C. $\dfrac{(x-2)}{(x-6)(x-3)}$

   D. $\dfrac{3(x-2)}{(x-6)(x-3)}$

2. Simplify $\sqrt[3]{8x^8} \cdot \sqrt[3]{135x^2}$

   A. $\sqrt[3]{1080x^{10}}$

   B. $5x^3\sqrt[3]{6x}$

   C. $6x^3\sqrt[3]{5x}$

   D. $216x\sqrt[3]{5x}$

3. $\dfrac{x-3}{16x+8} \div \dfrac{x^2-2x-3}{2x+1}$

   A. $\dfrac{1}{8(x+1)}$

   B. $\dfrac{1}{8(x-1)}$

   C. $\dfrac{3}{x+1}$

   D. $\dfrac{-1}{3(x+1)}$

4. Which of the following polynomials has zeros at -2 and $3 - i$?

   A. $x^3+4x^2-2x+20$

   B. $x^3+4x^2-2x-20$

   C. $x^3-4x^2-2x+20$

   D. $x^3-4x^2+2x+20$

5. If $p(x)=3x-1$ and $q(x)=2x^2-1$, what is $p(q(x))$?

   A. $6x^2-2$

   B. $6x^2-4$

   C. $18x^2-12x+1$

   D. $18x^2-12x-2$

6. What are the roots of the polynomial $x^3+14x^2+23x-110$?

   A. $x = 5$, $x = 2$, $x = -11$

   B. $x = -5$, $x = 2$, $x = -11$

   C. $x = -5$, $x = -2$, $x = 11$

   D. $x = 5$, $x = -2$, $x = 11$

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7. Since 1945, the population of China can be represented by the model $y = 205(1.02)^{t-1945}$ million people where *t* is the year. Using this model, which of the following is the predicted population of China in the year 2012?

A. 216.5 million

B. 325.2 million

C. 584.2 million

D. 772.6 million

8. What is the value of z in the following system:

$$3x + 5y - z = 15$$
$$x + 2y = 8$$
$$x - 3y + 2z = -9$$

A. -2

B. 2

C. 5

D. 4

9. The table below shows the number of people in millions that use public transportation to get to work.

Year (x)	**Population In millions (y)**
1940	.75
1950	.82
1960	.99
1970	1.10
1980	1.19
1990	1.25

If x = 0 represents the year 1940, which equation is the best-fit linear model for the data?

A. $y = .0106x - 19.8684$

B. $y = .0106x + .751$

C. $y = .106x + .751$

D. $y = .106x - 19.868$

10. Which of the following is the equation of a circle whose radius is 6 and has a center at (-2, -5)?

A. $(x-2)^2 + (y-5)^2 = 36$

B. $(x+2)^2 + (y+5)^2 = 6$

C. $(x+2)^2 + (y+5)^2 = 36$

D. $(x-2)^2 + (y-5)^2 = 6$

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11. What are the solution(s) to $-3|2x+4|+6=0$

A. $x = -1$

B. $x = -2, x = -3$

C. $x = -1, x = -3$

D. $\varnothing$

12. Which matrix equation should be used to find the intersection of the two equations

$$5x = 3 - 2y$$
$$y = -2x + 1$$

A. $\begin{bmatrix} 5 & 2 \\ 1 & 2 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 2 \\ 2 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$

C. $\begin{bmatrix} 5 \\ 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} 2 \\ 2 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$

D. $\begin{bmatrix} 5 \\ 2 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} 2 \\ 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$

13. Which circle has the smallest area?

A. $(x-3)^2 + y^2 = 12$

B. $x^2 + y^2 = 25$

C. $(x+2)^2 + (y+1)^2 = 8$

D. $(x+8)^2 + (y-5)^2 = 36$

14. The profit (P), in dollars, for a company is modeled by the function $P(x) = -250x^2 + 10{,}000x$, where x is the number of items produced. For what values of x will the company lose money?

A. $x > 40$

B. $0 \le x \le 40$

C. $x < 0$

D. $0 < x \le 40$

15. In which direction is the graph of $f(x) = \dfrac{5}{x+b}$ translated when b decreases?

A. right

B. left

C. down

D. up

16. Divide: $(4x^3 + 6x^2 - 14x + 5) \div (2x - 1)$

A. $2x^2 - 2x - 5$

B. $2x^2 + 2x - 5$

C. $2x^2 + 4x - 5$

D. $2x^2 - 4x - 5$

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17. A company that manufactures umbrellas estimates that the profit for selling a particular type is given by the equation:

$P = -250x^3 + 1{,}505x^2 - 300$, for $0 < x < 6$

where P is profit in tens of thousands of dollars and x is the advertising expense is tens of thousands of dollars. What does a y-intercept mean in the context of the problem?

A. the number of times the company spent zero dollars on advertising

B. the profit when the company spent zero dollars on advertising

C. the advertising expense when the company had the most profit

D. the advertising expense when the company's profit was zero dollars.

18. Which equation is equivalent to $\ln 5 + 4\ln x = 2\ln 5$?

A. $\ln 9x = \ln 10$

B. $\ln 20x = \ln 10$

C. $\ln 5x^4 = \ln 25$

D. $\ln 5x^4 = \ln 32$

19. By which matrix should both sides of the equation be multiplied by to solve for $\begin{bmatrix} x \\ y \end{bmatrix}$?

$$\begin{bmatrix} 7 & 4 \\ 5 & 3 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 7 \end{bmatrix}$$

A. $\begin{bmatrix} 7 & 10 \\ 5 & 7 \end{bmatrix}$

B. $\begin{bmatrix} 7 & 4 \\ 5 & 3 \end{bmatrix}$

C. $\begin{bmatrix} 3 & -4 \\ -5 & 7 \end{bmatrix}$

D. $\begin{bmatrix} 7 & -4 \\ -5 & 3 \end{bmatrix}$

20. Simplify: $\dfrac{\frac{1}{x} + \frac{1}{y}}{\frac{1}{x} - \frac{1}{y}}$

A. $\dfrac{y - x}{y + x}$

B. $\dfrac{y + x}{y - x}$

C. -1

D. 0

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21. Let *a* and *b* be real numbers. If $(a+bi)-(3-5i)=7-4i$, what are the values of *a* and *b*?

A. $a=10,\ b=-9$

B. $a=10,\ b=1$

C. $a=4,\ b=-9$

D. $a=4,\ b=1$

22. In which direction does the graph of $y=(x+2)^{\frac{1}{2}}+c$ shift as *c* increases?

A. right

B. left

C. up

D. down

23. If $f(x)=3x-2$ and $g(x)=x^3$, what is $f(g(2))$?

A. 64

B. 22

C. 16

D. 12

24. What is the value of *z* in the solution of this system?

$$x+2y-z=10$$
$$3x+z-1=y$$
$$x+z=2y-6$$

A. -2

B. 2

C. 3

D. -6

25. What is the domain of $f(x)=x^3+6x^2+5$?

A. $\{x\mid -6<x<5\}$

B. $\{x\mid -5<x<6\}$

C. $\{x\mid x\in\Re\}$

D. the empty set

26. The graph of $f(x)=x^2-4$ is translated to produce the graph of $g(x)=(x+2)^2-4$. In which direction was the graph of *f* translated?

A. left

B. right

C. up

D. down

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27. The population at a high school in Raleigh, NC is 2,000, and it has a growth rate of 2% per year. Which expression can be used to calculate the school's population x years from now?

A. $2{,}000x^2$

B. $2{,}000x^{1.02}$

C. $2{,}000(1.02)^x$

D. $2(2{,}000)^x$

28. Solve for x: $\dfrac{x+2}{x-4} = \dfrac{x}{2(x-4)}$

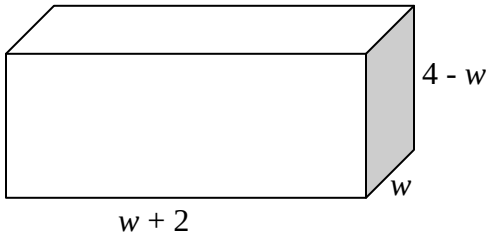
A. -4

B. $\dfrac{1}{4}$

C. -4 or 2

D. -2 or 4

29. The dimensions of this rectangular prism are given algebraically.



What is the ***approximate*** width (w) that will maximize the volume?

A. 2 units

B. $2\frac{1}{2}$ units

C. $2\frac{3}{4}$ units

D. 3 units

30. What is the equation of the circle that has center (-4, 2) and passes through (-1, 1)?

A. $(x-4)^2+(y+2)^2=10$

B. $(x+4)^2+(y-2)^2=10$

C. $(x-4)^2+(y+2)^2=\sqrt{10}$

D. $(x+4)^2+(y-2)^2=\sqrt{10}$

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31. A single microscopic organism divides into two organisms every 4 days. Using the formula $N(t) = N_0(2)^{\frac{t}{4}}$, where *t* is the time in days, *N(t)* is the number of organisms at *t* days, and N_0 is the number of organisms at $t = 0$, ***approximately*** how long would it take one organism to produce a population of 10,000 organisms?

A. 40 days

B. 53 days

C. 333 days

D. 400 days

32. Simplify:

$$\left(x^{\frac{2}{3}}\right)^4$$

A. $x^{\frac{8}{12}}$

B. $x^{\frac{16}{81}}$

C. $x^{\frac{16}{3}}$

D. $x^{\frac{8}{3}}$

33. Which binomial is a factor of $(x^3 + 4x^2 - 2x - 8)$?

A. $x - 4$

B. $x^2 + 2$

C. $x^2 - 2$

D. $x + 2$

34. The area of a rectangular window is $(2x^2 - 7x - 15)$. Both the length and the width are polynomials with integer coefficients. Which of the following could represent the length of the window?

A. $2x + 3$

B. $x + 3$

C. $x - 10$

D. $x + 5$

35. Solve: $2x - 5\sqrt{x} + 2 = 0$

A. $x = 0, x = 4$

B. $x = -\frac{1}{4}, x = 4$

C. $x = \frac{1}{4}, x = -4$

D. $x = \frac{1}{4}, x = 4$

36. What are the vertical asymptotes of the function $f(x) = \frac{4x - 3}{2x^2 - 15x - 8}$?

A. $x = 2$

B. $x = \frac{3}{4}, x = 2$

C. $x = -\frac{1}{2}, x = \frac{3}{4}, x = 2$

D. $x = -\frac{1}{2}, x = 8$

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37. What is the ***approximate*** value of the greatest zero of $x^3 - 2x^2 - 3x + 6$

A. $x = 2$

B. $x = 1.91$

C. $x = -1.73$

D. $x = 1.73$

38. Which equation represents the graph of $y = x^2$ translated 1 unit left and 2 units up?

A. $y = (x-1)^2 + 2$

B. $y = -(x-1)^2 - 2$

C. $y = (x+1)^2 + 2$

D. $y = -(x+1)^2 + 2$

39. Which is the solution of the equation $x + 3 = \frac{9}{x-3}$?

A. {0,6}

B. {0,–6}

C. $\{3\sqrt{2}\}$

D. $\{\pm 3\sqrt{2}\}$

40. When interest is compounded n times a year, the accumulated amount ***(A)*** after ***t*** years is given by the formula

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

where ***P*** is the initial principal and ***r*** is the annual rate of interest. ***Approximately*** how long will it take $3000 to double at an annual interest rate of 6.25% compounded monthly?

A. 13.65 years

B. 11.12 years

C. 1.14 years

D. 14 years

41. In the function $f(x) = a(x-4)^2$, where $a > 0$, what happens to the graph of *f* as the values of *a* decreases?

A. The graph shifts left.

B. The graph shifts down.

C. The graph widens.

D. The graph narrows.

42. Juavon has just started a job that pays a salary of $32,500. At the end of each year of work, he will get a 7% salary increase. What will his salary be after getting his fifth increase?

A. $42600

B. $45583

C. $48774

D. $46154

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43. Which is the inverse of the function $f(x) = x + 3$?

A. $f^{-1}(x) = 3 + x$

B. $f^{-1}(x) = \dfrac{1}{x-3}$

C. $f^{-1}(x) = \dfrac{1}{x+3}$

D. $f^{-1}(x) = x - 3$

44. What are the zeros of $f(x) = x^2 + 5x + 3$?

A. $\dfrac{-5 \pm \sqrt{13}}{2}$

B. $\dfrac{5 \pm \sqrt{13}}{2}$

C. $\dfrac{-5 \pm 2\sqrt{3}}{2}$

D. $\dfrac{5 \pm 2\sqrt{3}}{2}$

45. The table below shows the number of families living in the city of Sunnyvale from 1965 to 2000.

Year (after 1900)	**Number of Families** (thousand)
65	31.1
70	30.5
75	30.1
80	28.7
85	27.1
90	25.7
95	23.2
100	20.3

According to the best-fit quadratic model, approximately how many families will live in Sunnyvale in 2015?

A. 18,000

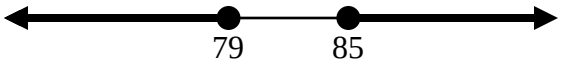
B. 16,000

C. 14,000

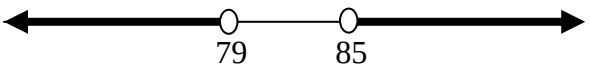
D. 10,000

46. A poll shows that it is likely that, with a margin of error of ±3 percentage points, 82% of those randomly selected from a population would vote for a particular candidate. This situation can be described by the inequality $|x - 82| \leq 3$. Which graph shows the percentage of voters (according to the inequality) who favor the candidate?

A.



B.



C.

D.

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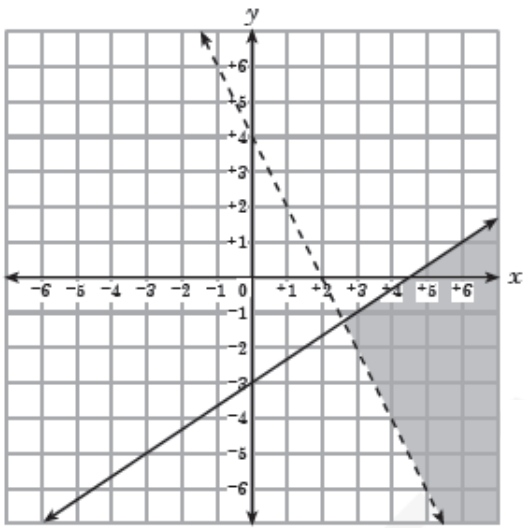
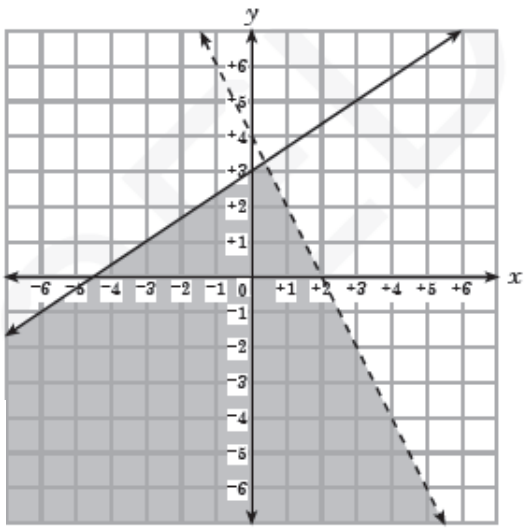
47. Which graph represents the system of inequalities below?

$$2x + y < 4$$
$$2x - 3y \geq 9$$

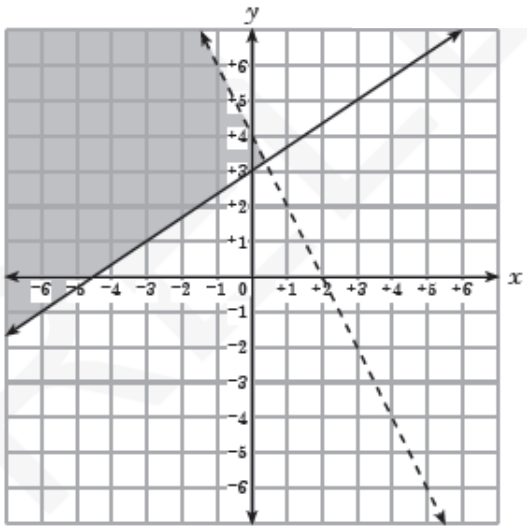
A



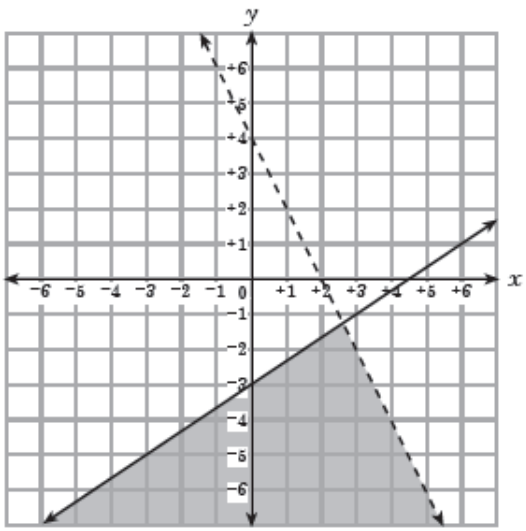
B



C



D



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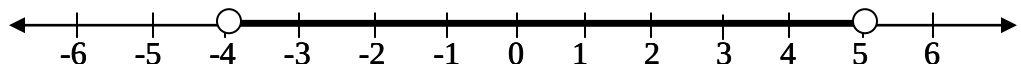
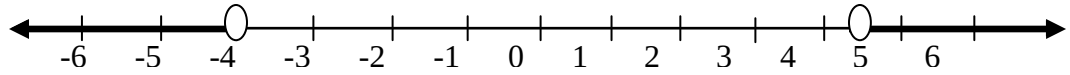
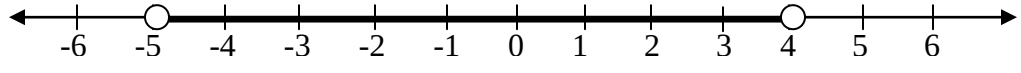
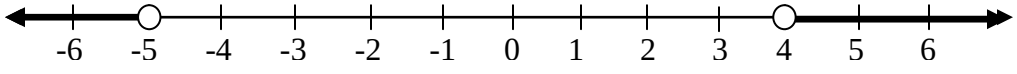
48. Which graph below represents the solution for the following inequality?

$$x^2 > x + 20$$

A. 

B. 

C. 

D. 

49. In 1980 Erica received $100 from her aunt and uncle for her 7th birthday. Her father deposited it into a savings account for her. Both Erica and her father forgot about the account and made no further withdrawals or deposits. The table below shows the account balance at the end of several years. (Let $x = 0$ be the year 1980.)

Year	Balance
1980	$100.00
1985	$116.16
1990	$134.94
1995	$156.74
2000	$182.08
2005	$211.50
2010	$245.68

Which of the following equation best models this data?

A. $y = 100(1.03)^x$

B. $y = .072x^2 + 2.67x + 100.52$

C. $y = 4.82x + 91.565$

D. $y = 4.82x - 9452.88$

50. Simplify the following:

$$i^{211} + i^{107}$$

A. $-2i$

B. 1

C. $2i$

D. $-i$

Algebra 2 Practice Test

Name: _____Date: _____

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Item	Correct Answer	Objective Number	Subskill	Thinking Skill
1	B	1.03	Operations of Polynomial Expressions	Applying
2	C	1.01	Operations with Radicals	Applying
3	A	1.03	Operations of Polynomial Expressions	Analyzing
4	C	2.06	Graphs of Polynomial Functions	Generating
5	B	2.01	Composite Functions	Analyzing
6	B	2.06	Graphs of Polynomial Functions	Analyzing
7	D	2.03	Modeling Exponential Functions	Analyzing
8	D	2.10	Solving Systems of Equations	Analyzing
9	B	2.04	Linear Data	Generating
10	C	2.09	Equations of Circles	Analyzing
11	C	2.08	Solving Absolute Value Equations and Inequalities	Applying
12	B	2.10	Solving Systems of Equations	Analyzing
13	C	2.09	Equations of Circles	Applying
14	A	2.02	Solving Quadratic Equations	Analyzing
15	A	2.05	Graphs of Rational Functions	Applying
16	C	1.03	Operations of Polynomial Expressions	Analyzing
17	B	2.06	Graphs of Polynomial Functions	Applying
18	D	1.01	Operations with Logarithms	Applying
19	C	1.04	Operations with Matrices	Applying
20	B	1.03	Operations of Rational Expressions	Generating
21	A	1.02	Operations with Complex Numbers	Generating
22	C	2.07	Graphing Square Root Functions	Generating
23	B	2.01	Composite Functions	Generating
24	A	2.10	Solving Systems of Equations	Applying
25	C	2.06	Graphs of Polynomial Functions	Applying
26	A	2.02	Graphs of Quadratic Functions	Applying
27	C	2.03	Modeling Exponential Functions	Applying
28	A	2.05	Solving Rational Equations	Applying
29	B	2.06	Solving Polynomial Equations	Applying
30	B	2.09	Equations of Circles	Applying
31	B	2.03	Modeling Exponential Functions	Applying
32	D	1.01	Operations with Rational Exponents	Analyzing
33	C	1.03	Operations of Polynomial Expressions	Applying
34	A	1.03	Operations of Polynomial Expressions	Analyzing
35	D	2.07	Solving Square Root Functions	Analyzing
36	D	2.05	Graphs of Rational Functions	Analyzing
37	D	2.06	Solving Polynomial Equations	Analyzing
38	C	2.02	Graphs of Quadratic Functions	Applying
39	D	2.05	Solving Rational Equations	Generating
40	B	2.03	Modeling Exponential Functions	Generating
41	C	2.02	Graphs of Quadratic Functions	Analyzing
42	B	2.03	Modeling Exponential Functions	Analyzing
43	D	2.01	Inverse Functions	Generating
44	A	2.02	Solving Quadratic Equations	Generating
45	D	2.04	Quadratic Data	Generating
46	D	2.08	Applications of Absolute Value Inequalities	Generating
47	D	2.10	Solving Systems of Inequalities	Analyzing
48	B	2.02	Solving Quadratic Inequalities	Analyzing
49	A	2.03	Modeling Exponential Functions	Analyzing
50	A	1.02	Operations with Complex Numbers	Applying