

- 1. Which expression is equivalent to $\frac{2x+6}{x^2+2x-24} \cdot \frac{x^2+2x-24}{x^2-7x+12}?$ $A = \frac{2}{x-4}$ $B = \frac{2(x+3)}{x-3}$ $C = \frac{2(x+3)}{(x-4)(x-3)}$ $D = \frac{2(x+3)}{(x+4)(x-3)}$ 2. Which expression is equivalent to $x+3 = x^2+2x-3$
 - $\frac{x+3}{6x-3} \div \frac{x^2+2x-3}{2x-1}?$ A 3(x-1)B $\frac{x-1}{3}$ C $\frac{3}{x-1}$
 - $D = \frac{1}{3(x-1)}$

- 3. Multiply: $\sqrt[3]{12x^2} \cdot \sqrt[3]{126x^2}$ A $6x(\sqrt[3]{7x})$ B $6x(\sqrt[3]{21x})$
 - C $6x^2(\sqrt[3]{42})$
 - $\mathbf{D} \quad \mathbf{6}\mathbf{x}^2\left(\sqrt[3]{\mathbf{63}}\right)$
- 4. Which polynomial function has as zeros 3 and 4 + i?
 - A $f(x) = x^3 11x^2 + 41x 51$
 - B $f(x) = x^3 5x^2 7x + 51$
 - C $f(x) = x^3 + 5x^2 7x 51$
 - D $f(x) = x^3 + 11x^2 + 41x + 51$
- 5. If h(x) = 2x and $g(x) = 3x^2 + 1$, what is h(g(x))?
 - A $6x^2 + 1$
 - B $6x^2 + 2$
 - C $12x^2 + 1$
 - D $12x^2 + 2$

- 6. What are the zeros of the polynomial $p(x) = x^3 2x^2 23x + 60?$
 - A $\{-15, -2, 2\}$
 - $B \qquad \left\{ ^{-}5,\,3,\,4\right\}$
 - C $\{2, 3, 10\}$
 - D {1, 2, 30}
- 7. In 1950, a U.S. population model was $y = 151 \cdot (1.013)^{t-1950}$ million people, where **prop**

15. In which direction is the graph

of
$$f(x) = \frac{5}{x \ b}$$

18. Divide:

Α

- $(6x^3 11x^2 47x 20) \div (2x + 1)$
- B $3x^2 + 7x 20$

 $3x^2 - 7x - 20$

- C $3x^2 4x 20$
- D $3x^2 + 4x 20$
- 19. By which matrix should both sidesof the equation be multiplied to solve

5 9

for	$\frac{x}{y}$?	
	$\begin{array}{cccc} 3 & 1 & x \\ 5 & 2 & y \end{array}$	=
A	3 1 5 2	
В	3 5 5 9	
C	2 ⁻ 1 -5 3	
D	2 ⁻⁵ -1 3	

- 20. Which equation is equivalent to $\ln 7 + 3 \ln x = 5 \ln 2$?
 - A $\ln 7x^3 = \ln 25$
 - $B \qquad \ln 7x^3 = \ln 32$
 - $C \qquad \ln 10x = \ln 10$
 - D $\ln 21x = \ln 10$

21. Simplify:
$$\frac{\frac{1}{y} - \frac{1}{x}}{\frac{1}{y} + \frac{1}{x}}$$
A $\frac{x - y}{x + y}$
B $\frac{x + y}{x - y}$
C 0
D -1



26. What is the domain of $f(x) = {}^{-2}x^3 + x^2 + 1?$

A the set of all real numbers





31. Which graph represents the system of inequalities below?

$$2x - 3y \ge 9$$
$$4x + 2y < 8$$



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



- What is the approximate width (*w*) that will maximize the volume?
- A 1 unit
- B $1\frac{1}{2}$ units
- C $1\frac{3}{4}$ units
- D 2 units

33. A single microscopic organism divides into two organisms every 3 days. Use the formula $N(t) = N_0(2)^{\frac{t}{3}}$, 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.

35. Simplify:

$$(x^{\frac{3}{4}})^{3}$$

A $x^{\frac{27}{64}}$
B $x^{\frac{9}{4}}$
C $x^{\frac{9}{12}}$
D $x^{\frac{15}{4}}$

- 36. The area of a rectangular window is $(4x^2 - 21x - 18)$. Both the length and the width are polynomials with integer coefficients. Which of the following could represent the length of the window?
 - A 4x+6
 - B 4x+3
 - C x+6
 - D *x*+3

37. Which binomial is a factor of

$$(x^3 - x^2 + 3x - 3)$$
?
A $x - 3$
B $x + 1$
C $x^2 - 1$
D $x^2 + 3$

- 38. If 5 tractors can plow a field in4 hours, how many hours will it take3 tractors to plow the field?
 - $\begin{array}{cc} A & 6\frac{2}{3} \\ B & 6\frac{1}{2} \end{array}$
 - C $5\frac{2}{3}$
 - D $5\frac{1}{2}$

= 041. What are the vertical asymptotes of the function $f(x) = \frac{4x^2 - 100}{2x^2 + x - 15}$? A x = -5, x = 5B x = -5, x = 4, x = 5C $x = -3, x = \frac{5}{2}$ D $x = -3, x = \frac{5}{2}, x = \frac{20}{3}$ imate value of the $x = x^3 - 6x^2 - x + 3$?

- 39. Solve: $3x 7\sqrt{x} + 2 = 0$
 - A $x = \frac{1}{9}, x = 4$
 - B $x = \frac{1}{3}, x = 4$
 - C $x = \frac{1}{9}, x = \frac{-1}{3}$
 - D $x = \frac{1}{3}, x = \frac{1}{9}$
- 40. What is the approximate value of the greatest zero of $f(x) = x^3 6x^2 x + 3$?
 - A ⁻0.75
 - B 2.84
 - C 6.08
 - D 6.31

42. A poll shows that it is likely that, with a margin of error of ±2 percentage points, 78% of those randomly selected from a population would vote for a particular candidate. This situation can be described by the inequality $|x - 78| \le 2$. Which graph shows the percentage of voters (according to the inequality) who favor the candidate?

A

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

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

where P is the initial principal and r is the annual rate of interest. Approximately how long will it take \$2,000 to double at an annual interest rate of 5.25% compounded monthly?

- A 13.98 years
- B 13.71 years
- C 13.23 years
- D 13.08 years
- 46. Alan has just started a job that pays a salary of \$21,500. At the end of each year of work, he will get a 5% salary increase. What will his salary be after getting his fifth increase?
 - A \$22,631
 - B \$24,889
 - C \$26,133
 - D \$27,440

- 47. In the function $f(x) = a(x-4)^2$, where a > 0, what happens to the graph of f as the value of a increases?
 - A The graph narrows.
 - B The graph widens.
 - C The graph shifts up.
 - D The graph shifts right.
- 48. Which is the inverse of the function f(x) = x 9?
 - $A \qquad f^{-1}(x) = \frac{1}{x+9}$
 - $\mathbf{B} \quad f^{-1}(x) = x + 9$
 - $\mathbf{C} \qquad f^{-1}(x) = 9 x$
 - D $f^{-1}(x) = \frac{1}{x-9}$

49. What are the zeros of $f(x) = x^2 + 7x + 5$?



51. What is the solution set of the system below?

$$x = 2y
 x - y^2 = -2y
 A {(0, 0)}$$

 $\mathbf{B} \quad \left\{ (\) \right\}$

North Carolina Test of Algebra II Form K RELEASED Fall 2009 Answer Key

Item Number	Correct Answer	Goal
1	С	1 – Number and Operations
2	D	1 – Number and Operations
3	А	1 – Number and Operations
4	А	1 – Number and Operations
5	В	2 – Algebra
6	В	2 – Algebra
7	D	2 – Algebra
8	В	2 – Algebra
9	С	2 – Algebra
10	В	2 – Algebra
11	С	2 – Algebra
12	D	2 – Algebra
13	С	2 – Algebra
14	D	2 – Algebra
15	А	2 – Algebra
16	D	2 – Algebra
17	С	2 – Algebra
18	А	1 – Number and Operations
19	С	1 – Number and Operations
20	В	1 – Number and Operations
21	Α	1 – Number and Operations
22	D	1 – Number and Operations
23	С	2 – Algebra
24	D	2 – Algebra
25	С	2 – Algebra
26	А	2 – Algebra
27	В	2 – Algebra
28	С	2 – Algebra
29	В	2 – Algebra
30	В	2 – Algebra
31	D	2 – Algebra
32	С	2 – Algebra
33	D	2 – Algebra
34	А	2 – Algebra
35	В	1 – Number and Operations
36	В	1 – Number and Operations
37	D	1 – Number and Operations
38	A	1 – Number and Operations
39	Α	2 – Algebra
40	С	2 – Algebra
41	С	2 – Algebra
42	D	2 – Algebra

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43	В	2 – Algebra
44	А	2 – Algebra
45	С	2 – Algebra
46	D	2 – Algebra
47	А	2 – Algebra
48	В	2 – Algebra
49	D	2 – Algebra
50	А	2 – Algebra

North Carolina Test of Algebra II Form K RELEASED Fall 2009 Raw to Scale Score Conversion

Raw Score	Scale Score
0	127
1	127
2	128
3	128
4	129
5	129
6	130
7	131
8	131
9	132
10	133
11	134
12	135
13	136
14	137
15	138
16	139
17	140
18	141
19	143
20	144
21	145
22	146
23	147
24	148
25	149
26	150
27	150
28	151
29	152
30	153
31	154
32	154
33	155
34	156
35	157
36	158
37	158
38	159
39	160
40	161
41	162

North Carolina Test of Algebra II Form K RELEASED Fall 2009 Raw to Scale Score Conversion

42	163
43	164
44	165
45	166
46	167
47	169
48	170
49	172
50	175
51	177