

Algebra 2 Honors
CEOCE Study Guide

A144 Students will convert between exponential and logarithmic equations (includes negative exponents and rational bases). (MC, ER)
Students will solve real world problems involving exponential functions.

Write each equation in exponential form.

$$\log_4 32 = \frac{5}{2}$$

$$\log_6 \frac{1}{216} = -3$$

Write each equation in logarithmic form.

$$\left(\frac{1}{7}\right)^3 = \frac{1}{343}$$

$$8^{-2} = \frac{1}{64}$$

$$8^{\frac{2}{3}} = (x - 2)$$

In December of 1990, there were 5,283,000 cellular telephone subscribers in the United States. By December of 2000, this number had risen to 109,478,000.

- Write an exponential function of the form $y = ab^x$ that could be used to model the number of cellular telephone subscribers y in the U.S. Write the function in terms of x , the number of years since 1990.
- Suppose the number of cellular telephone subscribers continues to increase at the same rate. Estimate the number of U.S. subscribers in 2010.

A243 Students will simplify complex numbers, including multiplication, radicals and rationalizing denominators. (MC)

Simplify.

$$(4 + 2i) + (6 - 4i)$$

$$(2 + i)(3 - i)$$

$$(5 - 3i)(-1 - i)$$

$$(4 - i)(3 - 4i)(2 + i)$$

$$\frac{2}{7 - 8i} \quad \frac{2 - 4i}{1 + 3i}$$

$$\frac{6 + 5i}{-2i} \quad \sqrt{-121s^8}$$

$$\sqrt{-64a^3b^4} \quad \sqrt{-36a^6b}$$

The impedance in one part of a series circuit is $1 + 3j$ ohms and the impedance in another part of the circuit is $7 - 5j$ ohms. Add these complex numbers to find the total impedance in the circuit.

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A342 Students can identify examples of the additive and multiplicative identity and inverse properties in concrete and abstract settings (zero products properties). (MC, SR)

Name each of the properties illustrated below.

$$3(2x - 4) = 6x - 12$$

$$3 + 6 = 6 + 3$$

$$5 + 0 = 5$$

$$3 \times 0 = 0$$

$$-3 + 3 = 0$$

$$4 \times 1 = 4$$

$$(5 \times 3) \times 4 = 5 \times (3 \times 4)$$

$$(1/3) \times 3 = 1$$

$$2 + (3 + 4) = (2 + 3) + 4$$

$$5 \times 2 = 2 \times 5$$

Solve for x . $x^4 - 2x^3 = 8x^2$

A343 Students will perform all four operations on functions / composition of functions up to 3 functions. (MC)

Students will simplify and convert between scientific and standard forms.

Students will add, subtract, and multiply polynomials.

Students will add or subtract rational expressions.

Students will find LCD.

For $f(x) = 4x^2 - 4$ and $g(x) = x + 1$ find the following.

$$(f + g)$$

$$(g - f)$$

$$(f \cdot g)$$

$$\frac{f}{g}$$

For $f(x) = x^2 + 1$, $g(x) = 3x - 5$, $h(x) = x + 2$ find $(f \circ (g \circ h))$.

Simplify $\frac{2x10^5}{8x10^7}$ using standard form and scientific notation.

Simplify. $\frac{x-1}{x^2+5x+4} - \frac{2}{x^2-x-2} + \frac{10}{x^2+2x-8}$

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D142 Students will determine the effect on the graph where a value in an equation is changed (includes reflections, slides, and translations). (MC)

Given: $y = 3(x - 4)^2 + 1$

- State the vertex
- Give the y-intercept
- Sketch the graph
- What happens to the graph if the -4 is changed to 3 ?
- What happens to the graph if the 1 is changed to 4 ?
- What happens to the graph if the 3 is changed to -2 ?

Given: $y = 4x - 3$, state what happens to the graph if:

- The 4 is changed to a $-\frac{1}{4}$
- The 4 is changed to 6
- The -3 is changed to

D241 Students will write inequalities or expressions to solve real world problems. (MC)

Bunny is in a bowling tournament and needs an average of 160 pins for each of 5 games. In her first four games she got scores of 162, 173, 155, and 180. Write and solve an inequality to represent what she needs to bowl in her 5th game in order to score the needed average.

Floyd is hauling boxes of computers up to the second floor of a building using the elevator. The elevator has a maximum capacity of 1000 pounds. If Floyd weighs 180 pounds and each computer weighs 44 pounds, write and solve an inequality that will tell how many computers Floyd can safely transport per trip.

The surface of Bailey Reservoir is at an elevation of 112 ft. During the current drought, the water level is dropping at a rate of 2 inches per day. If this trend continues, write an equation that gives the elevation in feet of the surface of Bailey Reservoir.

Sky Production Company manufactures MP3 players. The company will make \$200,000 profit if it manufactures 100,000 units, and \$1,500,000 profit if it manufactures 600,000 units. Write an equation that gives the profit P when n units are manufactured.

As a sales person, Sally Lewis is paid a daily salary plus commission. When her sales are \$300, she makes \$75. When her sales are \$1000, she makes \$275. Write a linear equation to model this situation.

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D242 Students will add, subtract and multiply matrices including scalar multiplication (multiple operations). (MC, GR)
Students will solve and verify solution sets of radical equations.
Students will check for extraneous roots.
Students will solve systems of equations including real world problems and exponential notations.

What is the resultant of the following operation with matrices?

$$\begin{bmatrix} -2 & 1 & 3 \\ -9 & -7 & 4 \end{bmatrix} + \begin{bmatrix} -4 & -5 & 3 \\ 8 & 7 & -6 \end{bmatrix} \qquad \begin{bmatrix} 1 & -6 \\ 8 & 13 \\ -25 & 0 \end{bmatrix} + \begin{bmatrix} 2 & 17 & 6 \\ 9 & 4 & 1 \end{bmatrix}$$

$$5 \begin{bmatrix} 7 & 8 \\ 3 & 11 \end{bmatrix} + (-3) \begin{bmatrix} -2 & 1 \\ 0 & -4 \end{bmatrix} \qquad -7 \begin{bmatrix} 4 & -3 \\ 2 & 4 \end{bmatrix} + 2 \begin{bmatrix} 4 & 0 \\ 4 & -3 \end{bmatrix}$$

$$6 \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} - (-3) \begin{bmatrix} 11 & -8 \\ -7 & 13 \end{bmatrix} \qquad -2 \begin{bmatrix} 0 & 1 \\ 7 & 11 \end{bmatrix} - 4 \begin{bmatrix} 2 & 6 \\ -7 & -1 \end{bmatrix}$$

$$-5 \begin{bmatrix} 7 & -1 \\ -3 & 0 \end{bmatrix} \cdot \begin{bmatrix} 6 & 8 \\ 11 & 1 \end{bmatrix} \qquad 6 \begin{bmatrix} 2 & 7 \\ 5 & -3 \end{bmatrix} \cdot \begin{bmatrix} 0 & 1 \\ 4 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 0 \\ 11 & 0 \end{bmatrix} \cdot (-3) \begin{bmatrix} 6 & 0 \\ 0 & 2 \end{bmatrix} \qquad \begin{bmatrix} 3 & -9 \\ -1 & 4 \end{bmatrix} \cdot (-1) \begin{bmatrix} 7 & -2 \\ -2 & 6 \end{bmatrix}$$

Simplify and check for extraneous solutions.

$$\sqrt{3x+2} + 6 = 0$$

$$\sqrt{9x-11} = x+1$$

Martin High School scored 37 points in a football game. Six points are awarded for each touchdown. After scoring a touchdown, the team can earn one additional point for the extra kick or two additional points for a 2-point conversion. The team scored 5 times during the game. All kicks and 2-point conversions were good. How many 2-point conversions were made during the game?

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Last year the volleyball team paid \$5 per pair of socks and \$17 per pair for shorts on a total purchase of \$315. This year they spent \$342 to buy the same number of pairs of socks and shorts because the socks now cost \$6 a pair and the shorts cost \$18. Write a system of two equations that represents the number of pairs of socks and shorts bought each year and determine the number of pairs of socks and shorts the team bought each year.

Solve for a, b, and c.

$$a + b + 2c = 18$$

$$a + 3c = 28$$

$$a - b = 6$$

Solve for x, y, z

$$2x + y - z = 2$$

$$3x + 2y + 3z = 17$$

$$5x - y + 2z = 15$$

Solve for x. $25^{2x} = 125^{x+2}$

Key Terminology

| | | |
|-------------------|----------------|-----------------------|
| Resultant | Voltage | Current (electricity) |
| Impedance | Ohms | Amps |
| At most | At least | Current (river) |
| Translate (graph) | Service charge | Fahrenheit |
| Celsius | Kelvin | |

Web Resources

www.cengage.com/math/aufmann

www.mathworld.wolfram.com

www.brightstorm.com

www.mathforum.org/dr.math

www.mathbits.com

www.pbcc.edu/x4159.xml

www.collegeboard.com