

Algebra 2
CEOCE Study Guide

A144 Provided with logarithmic expressions, students will convert to exponential equivalents and visa versa. (MC, ER)

Students will write an exponential function in the form $y=ab^x$ and find a predicted outcome.
Given two exponential monomials, students will simplify the fraction using rules of exponents.

Write each equation is exponential form.

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

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

Write each equation in logarithmic form.

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

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

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

Simplify.

$$\frac{-12x^3y^7}{48x^2y^{10}}$$

$$-(7a^{-2}b^{-7})(3b)^{-2}$$

$$\left(\frac{xy^{-2}}{a^3b^{-2}}\right)^{-3}$$

$$\frac{-25x(x^3y^2)(-x)^5}{5(-y^3)^2(-x^3)}$$

$$\left(\frac{10x^{-2}y^{-5}z^{-10}}{30x^{-5}y^3z^{-4}}\right)^{-2}$$

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.

- a. 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.
- b. Suppose the number of cellular telephone subscribers continues to increase at the same rate. Estimate the number of U.S. subscribers in 2010.

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A243 Students will simplify radical expressions with a negative radicand, multiply two complex numbers, and rationalize a complex fraction. (MC)

Simplify.

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

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

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

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

$$\frac{2}{7 - 8i}$$

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

$$\frac{6 + 5i}{-2i}$$

$$\sqrt{-121s^8}$$

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

$$\sqrt{-36a^6b}$$

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.

A342 Students will prove the identity or inverse properties of a 2×2 matrix. (SR)

Determine if the following pairs of matrices are inverses of each other.

$$\begin{bmatrix} 3 & -2 \\ -1 & 1 \end{bmatrix} \text{ and } \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -1 \\ 4 & -2 \end{bmatrix} \text{ and } \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}$$

A343 Students will perform all four operations on functions/composition of functions/ both with numerical values and variable values. (MC, GR)

Given the area of a rectangular region as $ax^2 + bx + c$, students will factor to find the possible dimensions. (May be the difference of 2 squares, sum or difference of two cubes or factoring by grouping).

Students will solve quadratics with non-real roots and check solutions.

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

$$(f + g)$$

$$(g - f)$$

$$(f \cdot g)$$

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

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

Solve for x.

$$x^2 - 30 = 0$$

$$-4x^2 = 3$$

$$x^2 + 40 = -9$$

$$\frac{3}{4}x^2 + 12 = 0$$

Find the values of x and y that makes the equation $(2x + 5) + (1 - y)i = -2 + 4i$ true.

Given the following rectangular areas, state the factor pair that could represent the length and width.

$$a = x^2 - 225$$

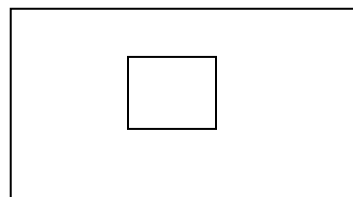
$$a = 12x^2 - 96x$$

$$a = x^2 - 12x - 13$$

$$a = x^2 + 49$$

$$a = x^3 + 8x^2 - 33x$$

$$a = x^9 - 729x^3$$



(See diagram above) A window of area 5 square units is located on a wall of area $3cd - 15c + d$. What is the area of the wall excluding the window?

D142 Given a linear or quadratic function, students will describe vertical or horizontal shifts, as well as, reflections over an axis, including perpendicular and parallel lines (up, down, wider, narrower). (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 an inequality to represent and interpret a given situation. (MC)
Students will write an equation to represent and interpret a given situation. Equations may be linear or quadratic in nature.

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.

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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.

D242 Students will evaluate 2x2 matrices by adding, subtracting, multiplication, and scalar multiplication. (MC)

What is the resultant of the following operation with matrices?

$$\begin{bmatrix} -2 & 1 & 3 \\ -9 & -7 & 4 \end{bmatrix} + \begin{bmatrix} -4 & -5 & 3 \\ 8 & 7 & -6 \end{bmatrix}$$

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

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

$$-7 \begin{bmatrix} 4 & -3 \\ 2 & 4 \end{bmatrix} + 2 \begin{bmatrix} 4 & 0 \\ 4 & -3 \end{bmatrix}$$

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

$$-2 \begin{bmatrix} 0 & 1 \\ 7 & 11 \end{bmatrix} - 4 \begin{bmatrix} 2 & 6 \\ -7 & -1 \end{bmatrix}$$

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

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

$$\begin{bmatrix} 2 & 0 \\ 11 & 0 \end{bmatrix} \cdot (-3) \begin{bmatrix} 6 & 0 \\ 0 & 2 \end{bmatrix}$$

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

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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