

Algebra 2 quick quiz 03022023

Question 1.

After examining the functions $f(x) = \ln(x + 2)$ and $g(x) = e^{x-1}$ over the interval $(-2,3]$, Lexi determined that the correct number of solutions to the equation $f(x) = g(x)$ is

- (1) 1
- (2) 2
- (3) 3
- (4) 0

Question 2.

Evan graphed a cubic function, $f(x) = ax^3 + bx^2 + cx + d$, and determined the roots of $f(x)$ to be ± 1 and 2. What is the value of b , if $a = 1$?

- (1) 1
- (2) 2
- (3) -1
- (4) -2

Question 3.

The equation $t = \frac{1}{0.0105} \ln\left(\frac{A}{5000}\right)$ relates time, t , in years, to the amount of money, A , earned by a \$5000 investment. Which statement accurately describes the relationship between the average rates of change of t on the intervals $[6000, 8000]$ and $[9000, 12,000]$?

- (1) A comparison cannot be made because the intervals are different sizes.
- (2) The average rate of change is equal for both intervals.
- (3) The average rate of change is larger for the interval $[6000, 8000]$.
- (4) The average rate of change is larger for the interval $[9000, 12,000]$.

Question 4.

What is the inverse of $f(x) = \frac{x}{x+2}$, where $x \neq -2$?

(1) $f^{-1}(x) = \frac{2x}{x-1}$

(3) $f^{-1}(x) = \frac{x}{x-2}$

(2) $f^{-1}(x) = \frac{-2x}{x-1}$

(4) $f^{-1}(x) = \frac{-x}{x-2}$

Question 5.

A study of black bears in the Adirondacks reveals that their population can be represented by the function $P(t) = 3500(1.025)^t$, where t is the number of years since the study began. Which function is correctly rewritten to reveal the monthly growth rate of the black bear population?

(1) $P(t) = 3500(1.00206)^{12t}$

(3) $P(t) = 3500(1.34489)^{12t}$

(2) $P(t) = 3500(1.00206)^{\frac{t}{12}}$

(4) $P(t) = 3500(1.34489)^{\frac{t}{12}}$

Question 6. Please show your work on a separate sheet of paper.

At Andrew Jackson High School, students are only allowed to enroll in AP U.S. History if they have already taken AP World History or AP European History. Out of 825 incoming seniors, 165 took AP World History, 66 took AP European History, and 33 took both. Given this information, determine the probability a randomly selected incoming senior is allowed to enroll in AP U.S. History.

Question 7. Please show your work on a separate sheet of paper.

Explain what a rational exponent, such as $9^{\frac{5}{2}}$ means. Use this explanation to evaluate $9^{\frac{5}{2}}$.

Question 8. Please show your work on a separate sheet of paper.

$$-\frac{1}{2}i^3(\sqrt{-9} - 4) - 3i^2 \text{ in simplest } a + bi \text{ form.}$$

Question 9. Please show your work on a separate sheet of paper.

Determine for which polynomial(s) $(x + 2)$ is a factor. Explain your answer.

$$P(x) = x^4 - 3x^3 - 16x - 12$$

$$Q(x) = x^3 - 3x^2 - 16x - 12$$

Question 10. Please show your work on a separate sheet of paper.

On July 21, 2016, the water level in Puget Sound, WA reached a high of 10.1 ft at 6 a.m. and a low of -2 ft at 12:30 p.m. Across the country in Long Island, NY, Shinnecock Bay's water level reached a high of 2.5 ft at 10:42 p.m. and a low of -0.1 ft at 5:31 a.m.

The water levels of both locations are affected by the tides and can be modeled by sinusoidal functions. Determine the difference in amplitudes, in feet, for these two locations.

Bonus Question

Question 11. Please show your work on a separate sheet of paper.

A person's lung capacity can be modeled by the function $C(t) = 250\sin\left(\frac{2\pi}{5}t\right) + 2450$, where $C(t)$ represents the volume in mL present in the lungs after t seconds. State the maximum value of this function over one full cycle, and explain what this value represents.