# Algebra 2 quick quiz 02132023

Question 1.

The expression $\sqrt[4]{81x^8y^6}$ is equivalent to

(1) $3x^2y^{\frac{3}{2}}$

(2) $3x^4y^2$

(3) $9x^2y^{\frac{3}{2}}$

(4) $9x^4y^2$

Question 2

Chet has \$1200 invested in a bank account modeled by the function $P(n) = 1200(1.002)^n$, where $P(n)$ is the value of his account, in dollars, after $n$ months. Chet's debt is modeled by the function $Q(n) = 100n$, where $Q(n)$ is the value of debt, in dollars, after $n$ months.

After $n$ months, which function represents Chet's net worth, $R(n)$?

(1) $R(n) = 1200(1.002)^n + 100n$

(2) $R(n) = 1200(1.002)^{12n} + 100n$

(3) $R(n) = 1200(1.002)^n - 100n$

(4) $R(n) = 1200(1.002)^{12n} - 100n$

Question 3.

Emmeline is working on one side of a polynomial identity proof used to form Pythagorean triples. Her work is shown below:

$$(5x)^2 + (5x^2 - 5)^2$$

Step 1: $25x^2 + (5x^2 - 5)^2$

Step 2: $25x^2 + 25x^2 + 25$

Step 3: $50x^2 + 25$

Step 4: $75x^2$

What statement is true regarding Emmeline's work?

(1) Emmeline's work is entirely correct.

(2) There is a mistake in step 2, only.

(3) There are mistakes in step 2 and step 4.

(4) There is a mistake in step 4, only.

Question 4.

Susan won \$2,000 and invested it into an account with an annual interest rate of 3.2%. If her investment were compounded monthly, which expression best represents the value of her investment after $t$ years?

(1) $2000(1.003)^{12t}$

(2) $2000(1.032)^{\frac{t}{12}}$

(3) $2064^{\frac{t}{12}}$

(4) $\frac{2000(1.032)^t}{12}$

Question 5.

Consider the end behavior description below.

- as $x \to -\infty, f(x) \to \infty$
- as $x \to \infty, f(x) \to -\infty$

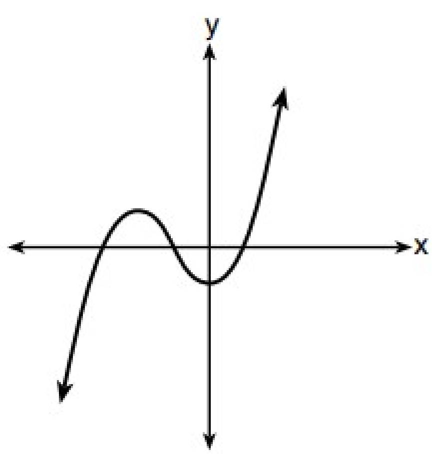
Which function satisfies the given conditions?

$f(x) = x^4 + 2x^2 + 1$

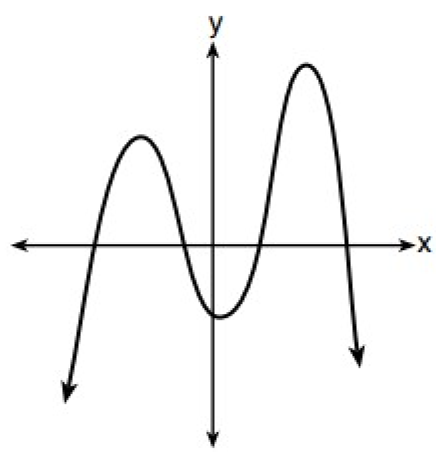
(1)

$f(x) = -x^3 + 2x - 6$

(3)




(2)




(4)

Question 6.

The expression $(x + a)^2 + 5(x + a) + 4$ is equivalent to

(1) $(a + 1)(a + 4)$

(2) $(x + 1)(x + 4)$

(3) $(x + a + 1)(x + a + 4)$

(4) $x^2 + a^2 + 5x + 5a + 4$

Question 7. Show your work on the back or on a separate sheet of paper.

Factor completely over the set of integers:

$$-2x^4 + x^3 + 18x^2 - 9x$$

Question 8. Show your work on the back or on a separate sheet of paper.

For $x \neq 0$ and $y \neq 0$, $\sqrt[3]{81x^{15}y^9} = 3^a x^5 y^3$. Determine the value of $a$.

Question 9. Show your work on the back or on a separate sheet of paper.

A Foucault pendulum can be used to demonstrate that the Earth rotates. The time, $t$, in seconds, that it takes for one swing or period of the pendulum can be modeled by the equation $t = 2\pi\sqrt{\frac{L}{g}}$ where $L$ is the length of the pendulum in meters and g is a constant of 9.81 m/s$^2$.

The first Foucault pendulum was constructed in 1851 and has a pendulum length of 67 m. Determine, to the *nearest tenth of a second*, the time it takes this pendulum to complete one swing.

Another Foucault pendulum at the United Nations building takes 9.6 seconds to complete one swing. Determine, to the *nearest tenth of a meter*, the length of this pendulum.

Question 10. Show your work on the back or on a separate sheet of paper.

Solve the system of equations algebraically:

$$x^2 + y^2 = 25$$
$$y + 5 = 2x$$

Bonus Question

Question 11. Show working on the back of the answer paper.

The population, in millions of people, of the United States can be represented by the recursive formula below, where $a_0$ represents the population in 1910 and $n$ represents the number of years since 1910.

$$a_0 = 92.2$$
$$a_n = 1.015a_{n-1}$$

Identify the percentage of the annual rate of growth from the equation $a_n = 1.015a_{n-1}$.

Write an exponential function, $P$, where $P(t)$ represents the United States population in millions of people, and $t$ is the number of years since 1910.

According to this model, determine algebraically the number of years it takes for the population of the United States to be approximately 300 million people. Round your answer to the *nearest year*.