Algebra 2 quick quiz 03062023

Question 1.

A sociologist reviews randomly selected surveillance videos from a public park over a period of several years and records the amount of time people spent on a smartphone. The statistical procedure the sociologist used is called

(1) a census

(3) an observational study

(2) an experiment

(4) a sample survey

Question 2.

Which statement(s) are true for all real numbers?

$$\text{I} \quad (x - y)^2 = x^2 + y^2$$
$$\text{II} \quad (x + y)^3 = x^3 + 3xy + y^3$$

(1) I, only

(3) I and II
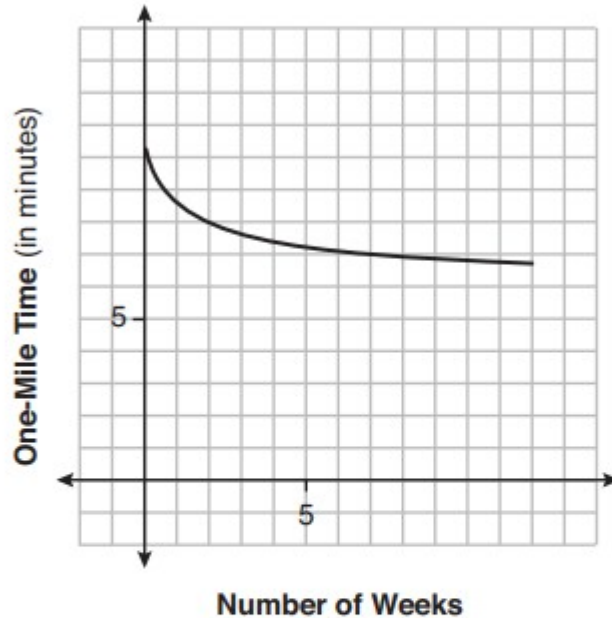
(2) II, only

(4) neither I nor II

Question 3.

What is the solution set of the following system of equations?

$$y = 3x + 6$$
$$y = (x + 4)^2 - 10$$

(1) $\{(-5,-9)\}$

(3) $\{(0,6),(-5,-9)\}$

(2) $\{(5,21)\}$

(4) $\{(0,6),(5,21)\}$

Question 4.

Irma initially ran one mile in over ten minutes. She then began a training program to reduce her one-mile time. She recorded her one-mile time once a week for twelve consecutive weeks, as modeled in the graph below.

Which statement regarding Irma's one-mile training program is correct?

(1) Her one-mile speed increased as the number of weeks increased.

(2) Her one-mile speed decreased as the number of weeks increased.

(3) If the trend continues, she will run under a six-minute mile by week thirteen.

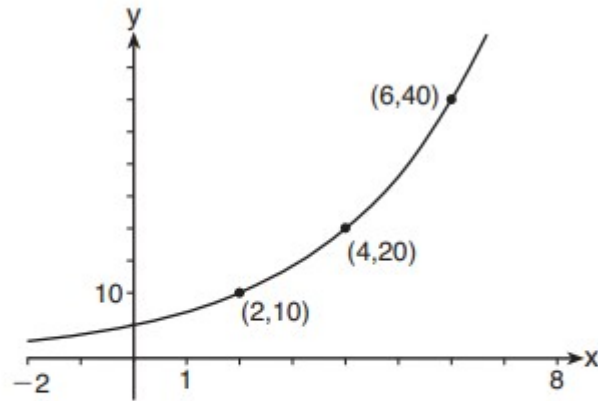(4) She reduced her one-mile time the most between weeks ten and twelve.

Question 5.

A 7-year lease for office space states that the annual rent is $85,000 for the first year and will increase by 6% each additional year of the lease. What will the total rent expense be for the entire 7-year lease?

(1) $42,809.63   (3) $595,000.00

(2) $90,425.53   (4) $713,476.20

Question 6.

The graph of $y = f(x)$ is shown below.

Which expression defines $f(x)$?

(1) $2x$

(2) $5(2^x)$

(3) $5\left(2^{\frac{x}{2}}\right)$

(4) $5(2^{2x})$

Question 7.

Given $P(x) = x^3 - 3x^2 - 2x + 4$, which statement is true?

(1) $(x - 1)$ is a factor because $P(-1) = 2$.
(2) $(x + 1)$ is a factor because $P(-1) = 2$.
(3) $(x + 1)$ is a factor because $P(1) = 0$.
(4) $(x - 1)$ is a factor because $P(1) = 0$.

Question 8.

For $x \geq 0$, which equation is *false*?

(1) $\left(x^{\frac{3}{2}}\right)^2 = \sqrt[4]{x^3}$

(2) $\left(x^3\right)^{\frac{1}{4}} = \sqrt[4]{x^3}$

(3) $\left(x^{\frac{3}{2}}\right)^{\frac{1}{2}} = \sqrt[4]{x^3}$

(4) $\left(x^{\frac{2}{3}}\right)^2 = \sqrt[3]{x^4}$

Question 9.

What is the inverse of the function $y = 4x + 5$?

(1) $x = \frac{1}{4}y - \frac{5}{4}$

(3) $y = 4x - 5$

(2) $y = \frac{1}{4}x - \frac{5}{4}$

(4) $y = \frac{1}{4x + 5}$

Question 10.

Which situation could be modeled using a geometric sequence?

(1) A cell phone company charges $30.00 per month for 2 gigabytes of data and $12.50 for each additional gigabyte of data.

(2) The temperature in your car is 79°. You lower the temperature of your air conditioning by 2° every 3 minutes in order to find a comfortable temperature.

(3) David's parents have set a limit of 50 minutes per week that he may play online games during the school year. However, they will increase his time by 5% per week for the next ten weeks.

(4) Sarah has $100.00 in her piggy bank and saves an additional $15.00 each week.

Bonus Question

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

The amount of a radioactive element left after a certain number of hours can be determined by the function $A\left(t\right) = A_0(1 - p)^t$ where A_0 is the initial amount of the element, t is the time in hours, and $0 < p < 1$.

Part A

What is the meaning of $1 - p$ in terms of the context?

Part B

After 2 hours, 36% of a certain element remains. If a sample has an initial amount of 100 grams, how many hours will it take until only 1 gram remains? Provide an answer supported by valid mathematical reasoning and/or calculations.

Enter your answer and your support in the space provided.