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QUESTION 1

How many solutions does the equation have?

$$\sqrt{2+x} - x = 0$$

- A. 3
- B. 2
- C. 1
- D. 0

Correct Answer: C

A solution to an equation is a value that when plugged in yields a true statement. Begin by isolating the square root and squaring both sides to eliminate it:

$$\sqrt{2+x} - x \rightarrow \sqrt{2+x} = x$$

$$(\sqrt{2+x})^2 = x^2 \rightarrow 2+x = x^2$$

Move all of the terms to one side and factor to solve for x:

$$x^2 - x - 2 = 0 \text{ --andgt; } (x + 1)(x - 2) = 0 \text{ --andgt; } x = -1, x = 2$$

Check for extraneous solutions by plugging both solutions into the original equation:

$$\sqrt{2+(-1)} - (-1) = 0$$

--andgt; $\sqrt{2+(-1)} - (-1) = 0$, so $x = -1$ is extraneous. --andgt; $0 = 0$, so $x = 2$ is a solution. The equation has only 1 solution.

QUESTION 2

Lead is non-biodegradable, soft, malleable, as well as heat and corrosion resistant and is environmentally omnipresent. Its known properties make it an ideal metal for automobiles, paint, smelting, ceramics, and plastics. Not many years ago, it was also utilized in the toy industry. Unfortunately, lead is toxic to humans. Humans neither need lead nor derive benefits from it. Although lead toxicity has been a global concern since the industrial revolution in the late 1800s, civilization has been unable to prevent or control it satisfactorily. Overall incidence of lead poisoning among American children has fallen from 4.4% in the early 1990s to 1.4% in 2004. In 2002, around 10 out of every 100,000 of adults had lead toxicity. Venous blood lead levels (BLLs) of 10 mcg/dL and 25 mcg/dL were considered toxic in children and adults, respectively. But, since any level of lead can cause toxicity, the CDC announced a new, lower reference value for children in June 2012: 5 mcg/dL. Infants and children absorb a higher fraction of lead than adults do when exposed, increasing their vulnerability. Approximately 450,000 American children have BLLs >5 mcg/dL. Consequently, lead poisoning is still a problem. Lead exposure can start with prenatal maternal-fetal transmission. Outside the womb, children may inhale (or eat) lead dust, often present in street debris, soil, and most frequently, aged house paint. Lead-based paint was phased out in the 1970s, lowering, but not eliminating, risk of exposure. Old pipes sometimes leach lead into drinking water. Lead hazards are disproportionately found in low-income housing. Adults rarely develop lead poisoning, but risk is increased for industrial workers who use or manufacture lead-based products. Health care providers use many tests to identify lead poisoning. In addition to the BLL, a blood smear may show basophilic stippling ribosomal clusters. Increased urinary aminolaevulinic acid concentrations are also reliable indicators. Plain film radiographs can reveal visible lead lines in patients' long bones. Astute clinicians sometimes diagnose lead poisoning after seeing a blue line along patients' gums (Burton's line) that forms when lead reacts with sulfur ions released by oral bacteria. Lead affects every organ system and causes an unpredictable variety of symptoms. The nervous system



is most sensitive (centrally in children, peripherally in adults), but lead affects hematopoietic, hepatic, and renal systems, producing serious disorders. Acute lead poisoning's classic symptoms include colic, encephalopathy, anemia, neuropathy, and Fanconi syndrome (abnormal glucose, phosphates, and amino acid excretion). Sometimes, classic signs and symptoms are absent, confusing the clinical picture.

What is NOT a test to detect lead poisoning?

- A. aminolaevulinic
- B. blood smear
- C. BLL
- D. radiographs

Correct Answer: A

This is not the name of a test or a method for detecting lead poisoning. It may be a word from the passage, but it does not answer the specific question posed. The other answer choices are all mentioned as tests for detecting lead poisoning.

QUESTION 3

A cross between red bean (RR) and a blue bean (UU) yields all purple beans. How many purple beans would result from a cross between two purple beans?

- A. 0.25 of the offspring
- B. 0.50 of the offspring
- C. 0.75 of the offspring
- D. all of the offspring

Correct Answer: B

Begin by crossing a red bean with a blue bean: RR × UU gives all RU, also known as incomplete

dominance. Next cross a purple bean with a purple bean: RU × RU yields 1 RR, 2 RU and 1 UU. Two out of the four offspring are purple beans.

This is the same as 0.50, or 50%.

QUESTION 4

For most Americans, the words "Alzheimer's disease" (AD) are often mispronounced purposefully or accidentally as "old timers' disease" and signify devastating memory loss and stigma. The information about AD often learned solely through the media may lead individuals to believe that AD is inevitable (it isn't), and possibly think that all AD patients receive poor care (there are many remarkably good AD units). Many individuals may envision a future burdened with more dementia patients and fewer societal resources to help support them (a real possibility). In general, pharmacists are well aware of what AD is and isn't. AD is complex and relentlessly progressive; it affects patients, loved ones, and caregivers adversely. Pharmacists can provide pertinent information about AD's myths, realities, and available



symptomatic treatments. AD's harbinger is language difficulties, which include aphasia (language disturbance), apraxia (inability to carry out motor functions), and agnosia (failure to recognize or identify objects). Consequently, those with AD will often create new words for items. They may call a pencil a "list writer," or a key a "door turner." Clinicians stage AD as mild, moderate, or severe depending on the patient's cognitive and memory impairment, communication problems, personality changes, behavior, and loss of control of bodily functions. People often dismiss mild AD as normal cognitive decline or senility—in other words, "normal" aging. For this reason, most people don't seek treatment and are diagnosed in the late-mild to early-moderate stage. In the severe stage, difficulty swallowing elevates the risk of aspiration pneumonia, which often marks the beginning of the downward spiral that ultimately ends with death; AD has no cure. A handful of pharmacologic treatments—acetylcholinesterase inhibitors and N-methyl-D-aspartate antagonists—alter the decline trajectory. These treatments slow disease progression, enhance cognitive function, delay cognitive decline, and decrease disruptive behaviors. Not all patients respond to these medications, but experts generally believe that those who do will show mild to moderate improvements for 6 months to a year. Although the drugs' effects are short-lived, they improve patients' quality of life and briefly enable independence. Determining when medications stop providing a therapeutic benefit and should be discontinued is challenging. Clinicians use various methods to monitor decline, including mental status tools, patient self-report, and loved ones' observations. Most clinicians continue drug treatment if the patient seems to tolerate the medication well, can afford it, and if there seems to be a benefit. With disease progression, specific behavioral symptoms including depression, agitation, hallucinations, and sleep disturbances become concerns. Antianxiety drugs, antipsychotics, and antidepressants are sometimes used to alleviate symptoms, but effective behavioral strategies are much preferred.

The final paragraph primarily serves to: A. Detail the transition from early stage Alzheimer's to the severe stages of the disease.

B. Outline the different treatment options available to patients.

C. Explain how patients decide which treatment to pursue.

D. Describe how health care professionals decide when to terminate treatment.

Correct Answer: D

In many cases, the purpose of a paragraph can be gleaned from the topic sentence of the paragraph. This is true for this case: "Determining when medications stop providing a therapeutic benefit and should be discontinued is challenging." Because the paragraph continues to describe the difficulties associated with termination of treatment.

QUESTION 5

One pipe can fill a tank in 30 minutes. The tank can be drained by an other pipe in 70 minutes. If both pipes are opened, how long will it take to fill the tank?

A. 21

B. 52.5

C. 36

D. 40.6

Correct Answer: B