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## Question: 1

Which of the following is a solution to  $4x-3y < -20$ ?

- A. (4, -5)
- B. (2, 2)
- C. (-4, 8)
- D. (0, 1)

**Answer: C**

Explanation:

In this question only one equation is given where as variables are two. Therefore we can solve it by back testing method. Use the options given and find the value of  $(4x-3y)$  in each case.

For (4, -5)  $4x-3y = 31$

For (2, 2)  $4x-3y = 2$

For (-4, 8)  $4x-3y = -40$

For (0, 1)  $4x-3y = -3$

From the above calculation we can see that condition  $4x-3y < -20$  is true only for (-4, 8).

## Question: 2

$\int \sec^2 x \, dx$  is equal to

- A.  $\cot x + c$
- B.  $\cos x + c$
- C.  $\sin x + c$
- D.  $\tan x + c$

**Answer: D**

Explanation:

**Correct Answer: (D)**  $\tan x + C$

We know that  $\int \sec^2 x \, dx = \tan x + C$

## Question: 3

$\sim p \vee q$  is logically equivalent to

A.

$$p \vee \sim q$$

B.

$$p \Rightarrow q$$

C.  $p \cup q$

D.  $p * q$

**Answer: B**

Explanation:

The truth tables for  $p \Rightarrow q$  and  $\sim p \vee q$  are the same. Therefore, the logical statements are equivalent.

### Question: 4

Sum of all interior angles of a polygon with (N) sides is equal to:

A.  $N * 180^\circ$

B.  $(N-1) * 180^\circ$

C.  $(N-2) * 180^\circ$

D.  $(N-3) * 180^\circ$

**Answer: C**

Explanation:

Sum of all interior angles of a polygon =  $(N-2) * 180^\circ$

Below are two angles. Which of the following is true about these angles?

Column A   Column B

### Question: 5

Angle 1 is a right angle   Angle 2 is a right angle

A. The quantity in Column A is greater.

B. The quantity in Column B is greater.

C. The two quantities are equal.

D. The relationship cannot be determined from the information given.

**Answer: C**

Explanation:

To determine the relationship between the angles in Column A and Column B, we need to understand the definitions and properties of different types of angles, specifically focusing on right angles for this example.

Right angles are defined as angles that exactly measure 90 degrees. They are one of the fundamental types of angles in geometry, often symbolized by a small square placed at the vertex of the angle. This representation is a universal indicator of a 90-degree angle. Other types of angles include acute angles (less than 90 degrees), obtuse angles (more than 90 degrees but less than 180 degrees), straight angles (exactly 180 degrees), and reflex angles (more than 180 degrees but less than 360 degrees).

Given that both Column A and Column B mention that Angle 1 and Angle 2 are right angles, respectively, we understand that both angles must measure exactly 90 degrees. This is based on the definition of right angles. Therefore, if both angles are right angles, they both have the same degree measurement.

To address the question of which statement is true about these angles: 1. "The quantity in Column A is greater." This statement would be incorrect because both angles measure the same (90 degrees). 2.

"The quantity in Column B is greater." Similarly, this statement is also incorrect for the same reason. 3.

"The two quantities are equal." This statement is correct. Since both angles are defined as right angles, they both must measure exactly 90 degrees, making them equal in measure. 4. "The relationship cannot be determined from the information given." This statement is incorrect because enough information is indeed provided to determine the relationship: both angles are explicitly stated to be right angles.

Therefore, the correct answer to the question, based on the provided definitions and properties of right angles, is that "The two quantities are equal." This conclusion aligns with the geometric principles that define right angles as always having a measure of exactly 90 degrees.

Two vegetables and two fruits are required for each school lunch menu. The two vegetables today are beans and carrots while the two fruits are apples and pears. These fruits and vegetables are distributed in the meal as: appetizer, entrée, side dish, and dessert. Each food has only one part of the meal. The following are true:

1. Beans are not the appetizer.
2. The side dish is not a fruit.
3. The entrée is not a vegetable.
4. Pears are the dessert.

## Question: 6

Which food is the appetizer?

- A. beans
- B. pears
- C. carrots
- D. Cannot be determined from the information given

**Answer: C**

Explanation:

Beans can be eliminated right away as a result of statement 1. The side dish must be a vegetable since statement 2 says it is not a fruit. Beans and carrots cannot be the entree since statement 3 says the entree is not a vegetable. They also cannot be dessert since statement 4 says that pears are the dessert.

We can deduce that:

The entree is either beans or carrots.

The appetizer is either carrots or apples.

The entree must be apples. (pears are the dessert and the entree is not a vegetable.)

Therefore, the appetizer is carrots, since we have already deduced that the appetizer must be beans or carrots, and beans are not the appetizer according to the first statement.

### Question: 7

Below are fractions that need to be added. Which is true about these fractions?

Column A	Column B
$\frac{1}{5} + \frac{3}{5}$	$\frac{2}{5} + \frac{3}{5}$

- A. The quantity in Column A is greater.
- B. The quantity in Column B is greater.
- C. The two quantities are equal.
- D. The relationship cannot be determined from the information given.

**Answer: B**

Explanation:

To determine which column has the greater sum, we need to add the fractions listed in each column. When adding fractions that have the same denominator, we simply add the numerators together and keep the denominator unchanged.

In Column A, the fractions to be added are  $\frac{1}{5}$  and  $\frac{3}{5}$ . Adding the numerators, we get  $1 + 3 = 4$ .

Therefore, the sum of the fractions in Column A is  $\frac{4}{5}$ .

In Column B, the fractions to be added are  $\frac{2}{5}$  and  $\frac{3}{5}$ . Adding the numerators here, we have  $2 + 3 = 5$ .

Thus, the sum of the fractions in Column B is  $\frac{5}{5}$ , which simplifies to 1.

Comparing the results,  $\frac{4}{5}$  in Column A and 1 (or  $\frac{5}{5}$ ) in Column B, it is evident that 1 is greater than  $\frac{4}{5}$ . Hence, the quantity in Column B is greater. Therefore, the correct answer is that the quantity in Column B is greater.

Understanding the rules of adding fractions is essential. When fractions have the same denominator, simply add the numerators to find the sum. This understanding assists in quickly determining which sum is larger when comparing two sets of added fractions.

### Question: 8

Directions: In the sentence below, select the best choice for the underlined portion.

Emiliano Zapata stood for the concepts of Justice, Land and Liberty.

- A. Emiliano Zapata stand for the concepts of Justice, Land and Liberty.
- B. Emiliano Zapata stood for the concepts of Justice, Land and Liberty.
- C. Emiliano Zapata stood for the concepts of Justices, the Land and Libertys.
- D. Emiliano Zapata stands for the concepts of Justice, Lands and Libertys.

**Answer: B**

#### Explanation:

In this sentence correction question, you are asked to choose the correct grammatical and historical representation of what Emiliano Zapata, a prominent figure in Mexican history, symbolized in his advocacy. The sentence options presented assess your understanding of correct verb tenses, singular and plural noun usage, and article application in English grammar. **\*\*Option Analysis:\*\*** 1. "Emiliano Zapata stand for the concepts of Justice, Land and Liberty." - Incorrect: The verb "stand" is in the present tense, which should be used for ongoing or habitual actions. However, since Emiliano Zapata is a historical figure and the actions referred to are in the past, the past tense "stood" is appropriate. 2. "Emiliano Zapata stood for the concepts of Justice, Land and Liberty." - Correct: This option correctly uses the past tense "stood" to refer to Zapata's past actions and beliefs. It also correctly uses the singular forms of the nouns without articles, which is appropriate as these concepts are treated as abstract nouns here. 3. "Emiliano Zapata stood for the concepts of Justices, the Land and Libertys." - Incorrect: The use of "Justices" and "Libertys" is grammatically incorrect as they are improperly pluralized; "Justice" and "Liberty" should remain singular to reflect the general concepts Zapata fought for. The article "the" before "Land" is unnecessary and inconsistent with the other concepts listed. 4. "Emiliano Zapata stands for the concepts of Justice, Lands and Libertys." - Incorrect: Similar to the first option, "stands" is inappropriately used in the present tense. Additionally, "Lands" and "Libertys" are incorrect plural forms. The concepts should be singular to accurately reflect the historical and ideological context. **\*\*Explanation of the Correct Answer:\*\*** Emiliano Zapata, a key leader during the Mexican Revolution, championed the principles encapsulated in the slogans: "Justicia" (Justice), "Tierra" (Land), and "Libertad" (Liberty). These concepts form the core of his advocacy for agrarian reform and social justice, aiming to secure land rights and freedom for the impoverished peasants in Mexico. In English, these concepts are typically expressed in singular form when referring to them in a philosophical or ideological sense, as is done here. No articles are used before these concepts because they are treated as abstract nouns representing overarching ideals rather than specific, countable entities. Thus, "Emiliano Zapata stood for the concepts of Justice, Land, and Liberty" is the grammatically and historically accurate statement.

### Question: 9

(1)80a

With typical marketing hyperbole, Mikel Jollett's article, "The Miracle of Ice," about a new surgical technique involving induced hypothermia, is summed, presumably by the editor, with "the only catch: it kills you before it saves you. (2)"

This could be applied to most of the things in our lives that nearly 'kill' us; the slings and arrows of fortune we are all heir to. (3) They either kill us, or we have a new life. (4) But I digress. (5)

Yes, there is a surgeon having great success using induced-hypothermia when operating on the brains of stroke victims. (6) This is the story of a new-OLD procedure that involves cooling the body, but this is for hours, not minutes; and a surgeon gutsy enough to use his common sense and go with something that works. (7) I'm not mentioning his name for a reason. (8) He's the SUNG hero, but there's an UNSung hero in this story. (9)

80b

20 years ago, induced hypothermia was used only as a last resort, when there was nothing to lose, like surgery on a stopped heart. (10) The body would be chilled by a combination of techniques, to 18 degrees C (64 F); scary, as there are potentially lethal side-effects such as frostbite, shock, pneumonia, and death. (11)

How did we discover the use of this procedure? (12)

It was thanks to Raul Busto, a research assistant at the University of Miami, way back in 1987.

The wonder of this story is that Jollett found this piece of information when researching the article, and thought to include it. (13)

Raul didn't get to write an article in the prestigious JAMA about his discovery. (14) He didn't get invited to address the national convention of brain surgeons. (15) He didn't get promoted to head of the department or have a chair named for him at a medical center. (16) I don't know the facts, but he probably didn't even get a raise or bonus. (17)

We can assume what about Mikel Jollett?

- A. Is a good writer.
- B. Has a PhD.
- C. Enjoys doing medical research.
- D. Researched the topic of induced hypothermia thoroughly.

**Answer: D**

Explanation:

Researched the topic thoroughly is the correct answer because the implication that the information that Raul Busto discovered in the lab was not well known or well circulated, so it was fortuitous and a testament to Jollett's thorough research that he found it. A, B, C and D are incorrect because whether Jollett is a good writer, has a PhD, is in medical school or enjoys doing medical research is not discussed in the passage.

### Question: 10

Directions: In the sentence below, select the best choice for the underlined portion.

Light therapy can benefit people who suffer from Seasonal Affective Disorder, it substitutes for sunlight and helps to regulate the body clock.

- A. who suffer from Seasonal Affective Disorder, it substitutes
- B. who suffer from Seasonal Affective Disorder, they substitute
- C. who suffer from Seasonal Affective Disorder, therefore, it substitutes
- D. who suffer from Seasonal Affective Disorder; it substitutes

**Answer: D**

Explanation:

The sentence in question is: "Light therapy can benefit people who suffer from Seasonal Affective Disorder, it substitutes for sunlight and helps to regulate the body clock." The issue with this sentence as it stands is a grammatical error known as a comma splice. A comma splice occurs when two independent clauses (each able to stand alone as a sentence) are incorrectly joined by just a comma. In the sentence provided, there are two independent clauses: 1. "Light therapy can benefit people who suffer from Seasonal Affective Disorder" 2. "It substitutes for sunlight and helps to regulate the body clock." To correct a comma splice, one can use a period, a semicolon, or a comma followed by a coordinating conjunction (such as and, but, or, nor, for, so, yet). Here is a breakdown of the choices

provided and why the semicolon is the correct punctuation in this case: 1. **"who suffer from Seasonal Affective Disorder, it substitutes"** - This choice retains the comma, thus preserving the comma splice error. Incorrect. 2. **"who suffer from Seasonal Affective Disorder; it substitutes"** - This choice uses a semicolon to separate the two independent clauses. The semicolon is appropriate here because it clearly separates the clauses while indicating that they are closely related in theme. Correct. 3. **"who suffer from Seasonal Affective Disorder, they substitute"** - This option changes the subject of the second clause from "it" to "they," which could introduce ambiguity or confusion about the subject (does "they" refer to people or therapy?). It also retains the comma, so the comma splice issue remains. Incorrect. 4. **"who suffer from Seasonal Affective Disorder, therefore, it substitutes"** - This choice attempts to use "therefore" as a conjunction to connect the clauses. However, "therefore" is a conjunctive adverb, not a coordinating conjunction, and should be preceded by a semicolon and followed by a comma when used to connect two independent clauses. The placement and use of commas here still results in a comma splice. Incorrect. 5. **"who suffer from Seasonal Affective Disorder, thereby substituting"** - This revision attempts to correct the issue by turning the second independent clause into a participial phrase that modifies the first clause. However, the phrase "thereby substituting" awkwardly dangles without clearly referring back to "Light therapy." This restructuring changes the meaning slightly and could be seen as less direct or clear. Incorrect. Thus, the correct choice is **"who suffer from Seasonal Affective Disorder; it substitutes,"** which uses a semicolon correctly to link two closely related independent clauses without the grammatical error of a comma splice.



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