**INSTRUCTIONS : Choose the letter of the correct answer. In all cases, E) NOTA means “none of these answers”.**

**AREA & VOLUME**

1. The Krusty Krab is adding a new window to its restaurant and is going to be a square with a semicircle attached on top. The length of one side of the square is 6 ft, what is the area of the new window?

**A) 36 + 9π B) 24 + 9π C) 24 + D) 36 + E) NOTA**

2. Spongebob has dimensions 5 in. by 8 in. by 3 in. and can hold half of his volume of water. In addition, he loses a sixth of his volume of water every 2 minutes. How many cubic inches of water are remaining in him after 8 minutes, if at minute zero, Spongebob contains no water?

**A) B) C) 36 D) 24 E) NOTA**

3. A little known fact is that the ugly barnacle was in the exact shape of a frustum! Find the volume of the ugly barnacle if its top radius was 2 cm, bottom diameter was 10 cm, and it had a height of 6 cm.

**A) 39π B) 78π C) 150π D) 216π E) NOTA**

4. Townsend is the smallest and nimblest of Plankton’s henchmen, so he is sent on a super secret spy mission to steal the Krabby Patty Secret Formula. But to his surprise, the code to Mr. Krabs’s safe is a math question! What is the sum of the surface area and volume of a tetrahedron with side length 4?

**A)  B)  C)  D) **

**E) NOTA**

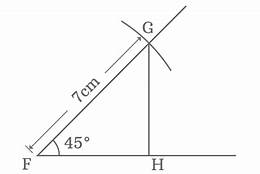
5. Squidward’s clarinet is in the shape of a perfect right cylinder with radius 4 inches and height 16 in.. While Squidward was practicing while taking a bubble bath, Spongebob suddenly appeared out of the drain and scared him, making him drop his clarinet. If the clarinet landed so that it was completely horizontal, and the water reached a height of 2 in. from the bottom of the clarinet, what is the volume of water displaced, in cubic inches?

**A) 48π B)  C)  D)  E) NOTA**

6. While Pearl’s favorite band might be Boys Who Cry, Andrew’s favorite band is Anime Girls Who Eat Pool Noodles. If Andrew is eating a pool noodle with an inner radius of 2 cm, a large radius of 5 cm, and a height of 10 cm, what is the surface area of his pool noodle, in cubic centimeters?

**A) 50 B) 150 C) 182 D) 190 E) NOTA**

**TRIGONOMETRY + TRIANGLES**

7. Weenie Hut Jr. has a new policy, and now Alex and David must answer a math question to get in. What is the length of side GH?

**A)  B) **

**C)  D) **

**E) NOTA**

8. Izzy and Emma playing with one of the fishing lines that Patrick got caught on. If the line has length 12 inches, what is the maximum area of a triangle that can be formed with this fishing line, in square inches?

**A)  B)  C)  D)  E) NOTA**

9. At Goo Lagoon, Larry the Lobster is surfing on the bay’s sine waves, on the equation y=sin(x). What cannot be a height that Larry is at?

**A) -1 B) 0 C) 0.6 D) 1.2 E) NOTA**

10. Doodlebob got partially erased by Amy and is now shaped like a triangle. Speaking of triangles, which one of these is a triangle’s center of mass?

**A) orthocenter B) incenter C) cirumcenter D) centroid E) NOTA**

11. In right triangle ABC, the measure of ∠A is 90°, AB = 3, and BC = x. If sinC = k, then, in terms of k, AC =

**A)  B)  C)  D) **

**E) NOTA**

12. Every morning, before dealing with Plankton, Karen eats a hologram patty and does a simple math problem to wake herself up. Help Karen with her math problem (even though she’s a computer) and convert 540 radians to degrees.

**A) 3° B) 6° C) 90° D) 180° E) NOTA**

**NUMBER FUN**

13. The head of Spongebob’s spatula is actually in the shape of a convex nonagon. If the interior angles of the nonagon follow an arithmetic sequence, what is the measure of the 5th angle in the sequence?

**A) 90 B) 115 C) 140 D) 160 E) NOTA**

14. Before arriving at Bikini Bottom, Sandy majored in pure mathematics at the University of Texas. There she learned that Knuth’s up arrow notation is defined as follows:

a↑b = a^b

a↑↑b = a↑(a↑(a↑…))), with a b number of a’s

a↑↑↑b = a↑↑(a↑↑(a↑↑…)), with a b number of a’s

and so on.

Using this knowledge, what is the value of 2↑↑↑↑↑2?

**A) 4 B) 1024 C) 4096 D) 3.40 • E) NOTA**

15. If three numbers a, b, and c form an arithmetic sequence in that order, the sum of the numbers is 21, and the product of the numbers is 315, what is the greatest number in the sequence?

**A) 5 B) 7 C) 9 D) 11 E) NOTA**

16. Brandon is filling out an application to live in Squidville. However, he wants to know how many people currently live there. If the population of Squidville is equal to the number of terms of the expansion of , how many people live in Squidville?

**A) 15 B) 24 C) 84 D) 720 E) NOTA**

17. In a Cartesian plane, Patrick Star creates a triangle with vertices A (-2, 1), B (2, 5), and C (3, 2). If the triangle is reflected across the y-axis, then dilated by 1.5 from the origin, and finally shifted to the right 4 units, what is the resulting coordinate of B?

**A) (1, 7.5) B) (1, 5) C) (-7, 5) D) (-7, 9) E) NOTA**

18. How many distinct 9-letter arrangements can be made from the letters in the word *SPONGEBOB*?

**A) 40,320 B) 60,480 C) 90,720 D) 362,880 E) NOTA**

**APPLICATIONS**

19. The Krusty Krab Pizza, is the Pizza, the Pizza for you and me! If Spongebob is cutting one of these circular pizzas, and he is only allowed to make 6 straight cuts, what is the maximum number of pizza slices that he can create?

**A) 12 B) 16 C) 18 D) 22 E) NOTA**

20. Spongebob’s Burger Car is travelling down the highway, with its wheels rotating at 5 radians per second. If his wheels have a radius of 2 feet, what is Spongebob’s speed, in miles per hour?

**A) B)**  **C) D) E) NOTA**

21. Brandon is sitting in Mrs. Puff’s class watching the analog wall clock because he is bored and already knows how to drive. Suddenly, the voice of Alex comes into his head. “What is the acute angle between the hour and minute hands on the clock right now?”. If the time is currently 3:26:25, what is the answer to Alex’s question in degrees?

**A) 53 B) C) 66 D) E) NOTA**

22. Spongebob is once again participating in the Fry Cook Olympics and will run two laps around the donut track. If on his first lap, he runs at x miles per hour, how fast does he have to run the second lap, in miles per hour, to make his total average speed over both laps to be 2x?

**A)  B) x C) 2x D) 3x E) NOTA**

23. In Bikini Bottom, sound travels at a speed of 23 cyclops/second. If 3 cyclops are equal to 4 pails, and 92 pails are equal to 7 barnacles, how many seconds will it take for Patrick Star to hear the echo from him yelling at a wall (that does echo sound) that is 56 barnacles away?

**A) 24 B) 30 C) 36 D) 56 E) NOTA**

24. Plankton is building a paper airplane so that he can fly undetected through the Krusty Krab to steal the formula. If he uses a 4 in. by 8 in. sheet of paper, and he folds it so that the top right corner touches the bottom left one, how long is the crease that he makes, in inches?

**A)  B)  C)  D) 12 E) NOTA**

**LOGIC**

25. Given the conditional statement, “If today is Friday, then Mr. Krabs will sell 100 krabby patties.”

Which of the following is true?

I. The converse of this statement is, “If today is not Friday, then Mr. Krabs will not sell 100 krabby patties.”

II. The inverse of this statement is, “If Mr. Krabs sells 100 krabby patties, then today is Friday.”

III. The contrapositive of this statement is, “If Mr. Krabs does not sell 100 krabby patties, then today is not Friday.”

**A) I only B) II only C) III only D) I & II E) NOTA**

26. p: Spongebob lives in a pineapple under the sea. (true)

q: Squidward enjoys being neighbors with Spongebob and Patrick Star. (false)

Which of the following compound statements are false?

I. ~p V ~q II. ~p V q III. p Λ q IV. ~p Λ q

**A) I & IV only B) II & III only C) II, III, IV only**

**D) I, II, III, IV E) NOTA**

27. Spongebob, Patrick, Sandy, Mermaid Man and Barnacle Boy are eating a dozen krabby patties. After eating, there was one krabby patty left, and they decided to leave it for Squidward but someone ate it! Squidward knows that each of these 5 people are each telling one truth and one lie:

Spongebob: It wasn't Barnacle Boy. It was Patrick.

Patrick: It wasn't Sandy. It wasn't Barnacle Boy.

Sandy: It was Barnacle Boy. It wasn't Spongebob.

Mermaid Man: It was Sandy. It was Patrick.

Barnacle Boy: It was Mermaid Man. It wasn't Spongebob.

Who ate the last Krabby Patty?

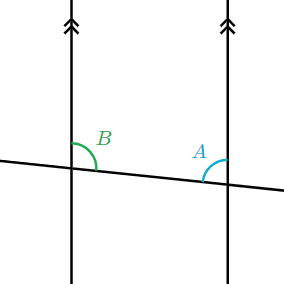
**A. Mermaid Man B. Patrick C. Sandy D. Spongebob E. NOTA**

28. It’s a sunny day out so Spongebob and Patrick decide to go fly their kite. The kite is in the shape of a rhombus with a perimeter of 60 cm and one diagonal has a length of 18 cm. Find the area of the kite.

**A) 270 cm2 B) 264 cm2 C) 240 cm2 D) 216 cm2 E) NOTA**

29. To make sure no one takes his secret Krabby Patty recipe, Mr. Krabs locks it away in a safe. The code to open it is the geometric mean of 8, 10, and 51.2, what is the code?

**A) 16 B) 24 C) 2048 D) 4096 E) NOTA**



30.

If ∠A = 7x + 33 and ∠B = 3x + 77, find the measure of ∠A.

**A) 78 B) 82 C) 98 D) 110 E) NOTA**