

## 1. (2 points)

Vedant's head is in the shape of a large cone. Find the area of the base of his head if the diameter of the base is 34 centimeters. Use  $\pi = 3.14$  and round your answer to the nearest tenths place.

## 2. (2 points)

How many unique positive integers can be represented as a product of two distinct members of the set  $\{1, 2, 3, 4, 5, 6, 7, 8\}$ ?

## 3. (2 points)

Justin is a mountain climbing prodigy who is climbing up an inclined mountain. He must travel 100 miles to reach the top of the mountain. Every day he climbs up 4 miles in the day time. Exhausted, he then rests during the night time. At night, while Justin is asleep, a group of mountain goats drag him down the mountain for 2 miles. The mountain goats continue their mischievous behavior every night until Justin reaches the top. At the rate he is going, how many days will it take Justin to reach the top of the mountain?

## 4. (3 points)

Starting with 0, add 2 for every true statement and subtract 1 for every false statement.

1. All sides of a scalene triangle have the same length.
2. -2 is an integer.
3.  $\frac{4}{9} > \frac{9}{27}$
4.  $\pi$  can be correctly written as a fraction.
5.  $7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 4050$
6.  $121 \div 11 = 11$

What is the final answer?

## 5. (3 points)

Dylan is extremely good at every sport he has ever played in his life. Dylan has played on the soccer team, the football team, and the baseball team. He holds the school record in all these sports. In soccer, he has scored the most goals in a season: 17. In football, he has the most touchdowns scored in a game: 13. In baseball, he has the most home runs in a game: a whopping 21. Solve the following equations based on Dylans records: (D = Baseball Record, E = Football Record, F = Soccer Record)

$$A = (F \times E) - (D \times E) + (D \times F)$$

$$B = D \left( \frac{F - E}{2} \right)$$

Compute:  $(A+B) \left( \left( \frac{3}{5} + \frac{8}{20} \right) - \left( \frac{6 \cdot 6}{36} \right) \right)$

## 6. (3 points)

While playing cricket, Rohan envisions himself scoring either a 6 or 4 points from every ball. In how many possible ways can Rohan scores a total of 20 points by hitting either a 6 or 4 on every ball? (Scoring 6 points and then 4 points is different from scoring 4 points and then 6 points.)

## 7. (3 points)

Prabhas, Shreyas, Farzan, and Mihir are playing Golf with Friends. Their scores for the first 4 holes are below:

HOLE	Hole 1	Hole 2	Hole 3	Hole 4
PAR	2	8	6	4
Shreyas	4	6	2	4
Prabhas	3	6	9	2
Farzan	7	10	10	13
Mihir	4	10	9	7

What is the difference of the sum of the mean, median, and mode of Farzan's scores and Shreyass scores?

## 8. (4 points)

Anurag followed a schedule that allowed him to stay in bed for 21 full days (24 hours per day). Each day he ate breakfast, lunch, and dinner, allocating 50 minutes for each meal. He slept for three times the amount of time spent eating, and played video games for the rest of the time left in the day. Following his schedule, how many total hours did Anurag spend playing video games?

## 9. (4 points)

Let:

$A = 21714$  divided by 462

$B =$  the 1st year after 1763 that is a palindrome (A palindrome is a number that reads the same forwards and backwards such as 1441)?

$C =$  the value of  $47 \times 462$ ?

Solve  $\frac{C}{A} + B$

## 10. (4 points)

Sanjita is a billionaire and likes to go on shopping sprees. In her recent order of 20,000 iPhone X's, 5% are defective. What is the ratio of the number of non-defective iPhone X's to the number of defective iPhone X's?

## 11. (4 points)

Akash was eager to watch the new Marvel movie, "Spider-Man: Far From Home," so he bought opening night tickets. His mother, however, refused to let him go unless he computed the following expressions:

$$A = 14 + (8 \times 18) + 10$$

$$B = (38 + 43) \times \left(\frac{64}{4}\right)$$

$$C = 6923 + (45 \times 62)$$

Solve for  $A - B + C$

## 12. (5 points)

Let:

$A =$  the sum of the numerical values of the area and perimeter of a square with side length of 5.

$B =$  the cost of Farzan's prized stash of chips:  $2 + 0 + 1 + 9 + 2^0 + 1^9 + 2 \times 0 \times 1 \times 9$

For Farzan's birthday, he received a laptop from his friends. When they went to the store to buy this laptop, it was \$250. Mihir used a coupon which applied a 20% discount. After the discount, there was a sales tax of 20% on the item. What is the final cost of the laptop?

$C =$  the final cost of the laptop

Compute  $A + B + C$

## 13. (5 points)

Tanvi the hippo like eating apples. On Monday, she ate 101 pounds of apples. On Tuesday, she ate 24 more pounds of apples than she did on the Monday. Tanvi was apple-fasting on Wednesday so she could only eat 20 pounds of oranges. On Thursday, she ate 35 pounds of apples less than she ate on the Tuesday. On Friday, she ate 15 pounds of apples more than what she ate on Tuesday. Given she only ate one fruit on a given day, how many pounds of apples did she eat during the school-week?

## 14. (5 points)

Dylan and Shreyas are racing to see who can complete more of their AP Computer Science course online. Assume there are 9 lessons per module, and there are 20 modules. They both start on Saturday at 12:00 P.M. and Dylan does  $\frac{1}{2}$  of a lesson every hour working nonstop. Shreyas does  $\frac{1}{6}$  of a lesson every 30 minutes while working without

stopping as well. When they stop on the following Saturday at 12:00 P.M., they check to compare their progress. What fraction of the course has Dylan completed that Shreyas hasnt completed yet?

15. **(5 points)**

There is nothing in this world that Karthik loves more than exponents. Make Karthik happy by finding the product of the digits when the following expression is simplified into an integer.

$$2^{10} + 21^0 + 10^2$$