**Directions: You have 60 minutes to complete the following 30 multiple-choice questions. Choices A through D are answer choices for every problem. Choice E) NOTA stands for “none of these answers”. Scoring is as follows: 5 points for a correct answer, 1 point if left unanswered, and 0 points for an incorrect response. Figures are not necessarily drawn to scale. Good luck!**

1) Pi Day celebrates the mathematical constant pi, which represents the ratio of a circle's circumference to its diameter. What day of the year is Pi Day celebrated on in the United States?

**A) March 14 B) March 15 C) July 4 D) July 22 E) NOTA**

2) Justin is brain-dead after he spent all of yesterday doing math. He can't figure out how to solve this problem: "If the circumference of a circle is π, then what is the area of the circle?"

Help him out by solving this confounding problem for him.

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

3) Mr. Friedlander decides to give his class an "easy as pi" pop quiz. He asks his class to list out the first 6 digits of pi after the decimal point and find the sum of those 6 digits. What is that sum?

**A) 18 B) 20 C) 22 D) 23 E) NOTA**

4) Izzy brings cups with him to school so that he can celebrate Pi Day by throwing a party with his friends. The cups are all identical and cylindrical-shaped with a diameter of 4 in. and a height of 5 in. Find the volume each cup can hold in cubic inches. Large hint : The volume of a cylinder is V = πr2h.

**A) 5π B)  C) 40π D) 80π E) NOTA**

5) A triangle has side lengths of 2 and 3. How many possible side lengths are there for the last side?

**A) 1 B) 3 C) 4 D) infinite E) NOTA**

6) What is the definition of pi?

**A) circumference divided by diameter B) diameter divided by circumference**

**C) circumference divided by radius B) radius divided by circumference**

**E)NOTA**

7) Grace is setting aside an area for the pie selling booth. The booth itself is in the shape of a rectangle that has dimensions 6 ft. by 8 ft. The booth also needs additional space such that there is a 2 feet clearing from all points on the edges of the booth. How much area in square feet must Grace set aside for the booth?

**A) 56 + 4π B) 104 C) 104 + 4π D) 120 E) NOTA**

8) The volunteers at the pie selling booth discover that they do not have enough supplies at the booth. Michael volunteers to bike over to the nearest grocery store. He is one-third of the way there when he realizes that he forgot something and must go back and get it. He then makes the round trip to the store and back. If Michael bikes at 8 mi./hr and the store is 4 miles away, how long, in minutes, does Michael spend biking around?

**A) 40 B) 60 C) 70 D) 80 E) NOTA**

9) Farrah is making a banner for the pie selling booth. The banner is in the shape of a rhombus with an area of 60 square inches. However, she feels that the banner is too small for the booth and decides to increase the dimensions of the banner by 50%. What is the area of the new banner in square inches?

**A) 90 B) 120 C) 135 D) 240 E) NOTA**

10) Find the supplement of the complement of the supplement of the supplement of 47o.

**A) 43° B) 47° C) 133° D) 137° E) NOTA**

11) Joyce and Cici are making decorative figures for the pie booth.

They take two identical circles each with a radius of 3 in. and cut

a quarter-circle out of each of them. They then attach the

remaining part of the circle onto two of the corners of a square

with a side length of 8 in. as in the figure shown. Compute the

perimeter in inches of one of these figures.

**A) 18 + 9π B) 20 + 12π C) 32 + 12π D)  E) NOTA**

12) The equation for the graph of a circle on a Cartesian plane is  , where the center of the circle is at point  and the radius of the circle has length  . If the equation of a circle is  , find the value of  .

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

13) Which of the following statements is logically equivalent to the following statement:

"If Nicholas eats too many cookies, then he will get a stomachache."

**A) "If Nicholas gets a stomachache, then he ate too many cookies."**

**B) "If Nicholas eats too many cookies, then he will turn into the Cookie Monster."**

**C) "If Nicholas does not eat too many cookies, then he will not get a stomachache."**

**D) "If Nicholas did not get a stomachache, then he did not eat too many cookies."**

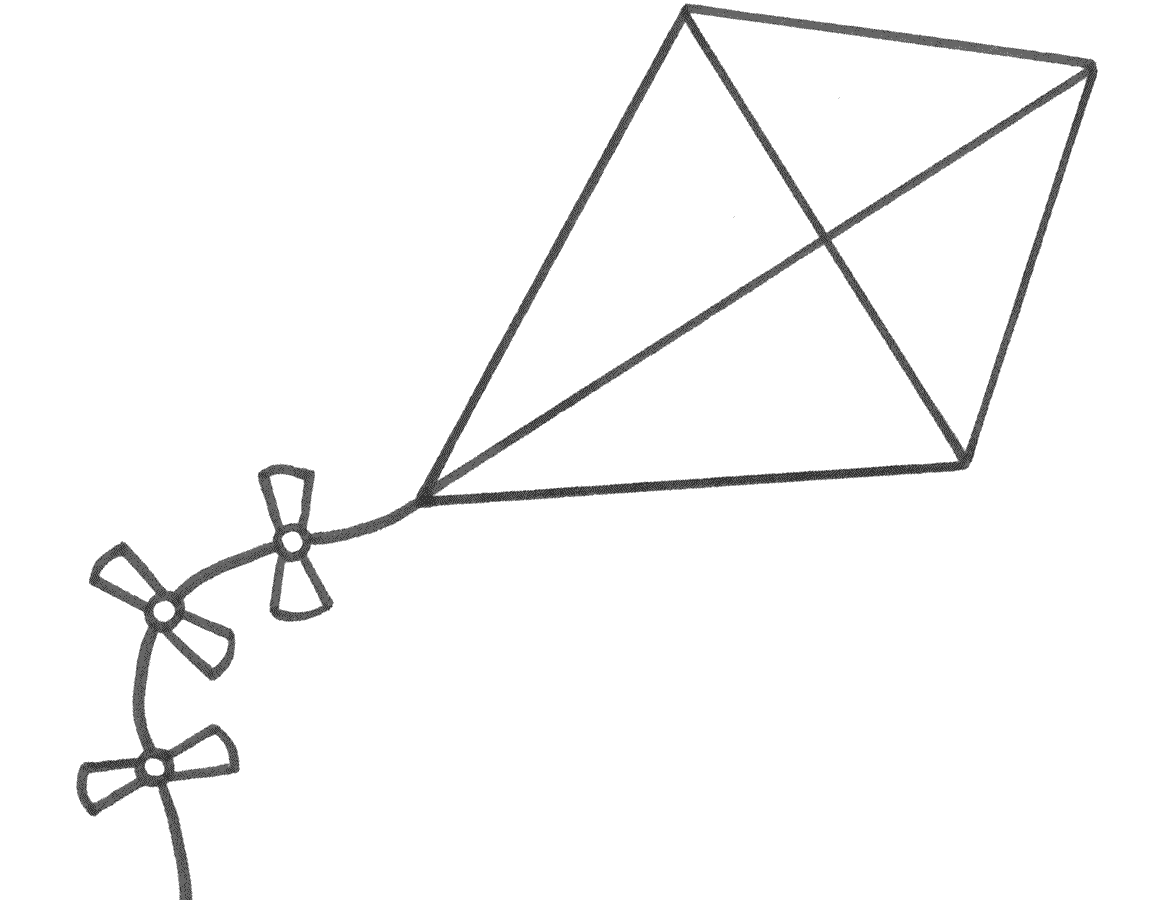
**E) NOTA**

14) Jeffery is bored in class and decides to throw a discus with a radius of 1 in. onto a 8 in. by 10 in. sheet of paper. Assuming Jeffery randomly throws the discus and manages to land at least the center of the discus on the paper, what is the probability the discus lands completely inside the paper?

**A) 0 B)  C)  D)  E) NOTA**

15) A triangle has an angle of 38o. If the angle measures are in an arithmetic progression, what is the largest angle in the triangle?

**A) 60° B) 71° C) 82° D) 142° E) NOTA**

16) It's a nice day outside, so Jessie and Doreen decide to fly a kite. To unwind the string, they unwind the spool, which has a radius of inches, 150 times (Assume the width of the string is negligible). Once the kite is flying, the kite flies 20 ft. higher than the spool. What is the ground distance in feet to the kite from Jessie and Doreen (Assume the spool's distance from the ground is negligible)?

20

x

**A) 15 B) 20 C) 180 D)  E) NOTA**

17) Nith is trying to solve a problem in order to receive a free piece of pie. The problem reads: "A circle has an equal numerical value for its area and circumference. What is the radius of this circle?"

What answer will earn Nith a free piece of pie?

**A) 2 B) 3 C) π D) 4 E) NOTA**

18) Of course, no Pi Day is complete without a Pi Off (a pi digit recitation contest). Nilay, Arya, Sarah, and Sampath decide to compete against each other in a Pi Off contest. Arya manages to win the contest with Sampath finishing in second, Sarah in third, and Nilay in last place. After the contest, they notice that Sarah recited twice as many digits as Nilay did, Sampath recited 120 more digits than Sarah, and Arya recited 45 more digits than Sampath. They also notice that the sum of the number of digits they recited equals the sum of the measures of the interior angles in a decagon. Compute the sum of the number of digits Arya and Sampath recited.

**A) 495 B) 825 C) 945 D) 1440 E) NOTA**

19) If  and , what is the angle measure of in degrees? Use the picture below to help you. Lines  and  are parallel.

**A) 22 B) 29 C) 36 D) 58 E) NOTA**

A

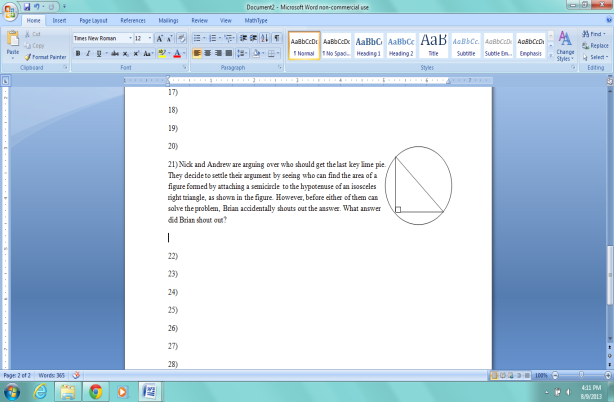
F

B

C

E

D



20) Isosceles trapezoid  circumscribes a circle and intersects the

circle at points  as shown in the diagram. If AE = 3

and ED = 12, find the area of the inscribed circle.

**A) 12π B)  C) **

**D)  E) NOTA**

21) Nick and Andrew are arguing over who should get the last key lime pie.

They decide to settle their argument by seeing who can find the area of a

figure formed by attaching a semicircle to the hypotenuse of an isosceles

right triangle, as shown in the figure. The length of each leg is .

However, before either of them can solve the problem, Brian accidentally

shouts out the answer. What answer did Brian shout out?

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

22) Nick and Andrew decide to settle their argument with another math problem. They are given a triangle  with and . They are then asked to find the supplement of the complement of the supplement of the exterior angle of . Unfortunately, both Nick and Andrew got the problem wrong. Help them out and show them the answer to this problem.

**A) 134° B) 136° C) 147° D) 226° E) NOTA**

23) Because Nick and Andrew were unable to settle their argument by solving math problems, they decide to have a cardboard sword duel out in the streets. They agree to duel at 12:15. Find the smaller angle formed by an analog clock at 12:15.

**A) 75° B) 82.5° C) 90° D) 277.5° E) NOTA**

24) Although the two dueled valiantly, Nick ultimately won the showdown against Andrew. However, Nick decides to share the pie with Andrew by giving him of of the pie, which is in the shape of a cylinder. If the entire pie has a depth of 2 in. and a radius that is 3 times the depth, then how much of the pie, in cubic inches, did Andrew get?

**A) 3π B) 6π C) 9π D) 18π E) NOTA**

25) A semicircle and a quarter-circle have the same perimeter. What is the ratio of the radius of the quarter circle to the radius of the semicircle?

**A)  B)  C) 1 D) 2 E) NOTA**

26) Quadrilateral  is inscribed in a circle. If  , then compute the measure of  in degrees.

**A) 75° B) 90° C) 105° D) 120° E) NOTA**

27) Nathan is trying to solve a math problem so he plots a right triangle  such that  is at  and  is at . If  is a right angle and  is located on the y-axis, find the ordinate of point .

**A) 0 B) 6 C)  D) 11 E) NOTA**

28) Jason buys an oddly shaped pie that has a hexagonal shape. He notices that one angle is  larger than the smallest angle of the hexagon, another angle is three times the measure of the smallest angle, and the remaining three angles are all twice as large as the smallest angle. Compute the measure of the largest angle.

**A) 65° B) 70° C) 130° D) 216° E) NOTA**

29) Colleen notices that the outer rim on the surface of a circular pie is 1 inch wide all around. If the pie's surface has an area of  square inches, compute the area of the outer rim of the pie in square inches.

**A) 4 B) 2π C) 9π D) 16π E) NOTA**

30) Here's one last question about everyone's favorite number, pi. Which of the following describe what kind of number pi is?

I) Nonreal II) Irrational III) Natural

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