

2003 Mount Rainier Math Invitational
Sixth Grade Individual Test

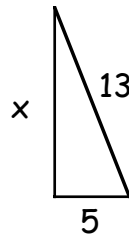
Written by Michelle Fong, Kate Iwamoto and Rachel Haller

Reduce all fractions and answers should be left in terms of π .

Questions 1-20 are worth 2 points each

1. Solve for x when $4x + 30 = 57$
2. At the General Store, oranges were on sale, four for \$1.50. If Terry bought 14 oranges from the General Store, how much did he pay?
3. What is the probability of drawing a red card and the King of Spades in a standard deck of cards without replacement?
4. What is the 10th number in the following sequence: 1, 2, 4, 7, 11, 16...?

5.

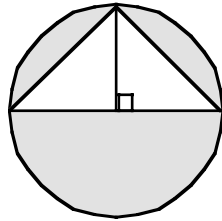


Find x in the right triangle above.

6. What is $62 - 6 \times 3 \div 2$?
7. There is 3 chocolate, 8 booger, 6 liver, 4 earwax, 10 vomit and 11 dirt flavored beans in a bag of Bernie Bott's Every Flavor Beans. What is the probability that you get a chocolate flavored bean on the first try?
8. What is the greatest common factor of 84, 51 and 66?
9. If you flip a coin 13 times, what is the probability that on the eighth flip, it will be tails?

(next page)

10. Kate gets 42 hours of sleep every week. How many hours of sleep does she get in one year? (Assume that there are 365 nights in a year.)
11. Find the area of the shaded region in the figure below. The diameter of the circle is 8 and the longest side of the triangle is the diameter.

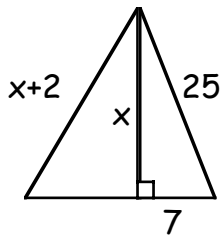


12. There are four kibbles for every one toggle, there are five toggles for every two bits, and three bits to every one tib. How many kibbles are in three tibs?
13. Farmer Daisy raises chickens and pigs. She counted 26 heads and 134 toes. If each pig has 4 toes and each chicken has 6 toes, how many pigs does Farmer Daisy have?
14. Rachel got 75, 85, 91, and 77 on four algebra tests. What does she need to get on her fifth test to have an average score of 84?
15. What is the slope of the line containing the points (2,3) and (7,8)?
16. How many diagonals does an octagon have? (Hint: A octagon has eight sides.)
17. What is $(543!)$ divided by $(541!)$?
18. Simplify: $(5x)^2 - 2x^2$
19. What is the probability of rolling a sum of 7 with 2 standard dice?
20. Jack and Sally are folding papers. Jack can fold 200 papers per hour and Sally can fold 30 every 10 minutes. In hours, how long will it take to fold 1,140 papers if they work together?

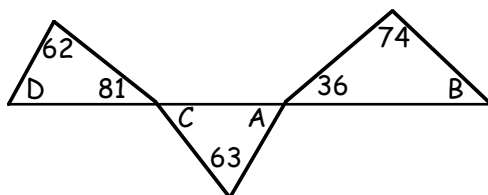
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Questions 21-30 are worth 3 points each

21. In how many ways can you arrange the letters in the word "BABBLE"?
22. Geico the Gecko gets tossed into a ditch during a car accident. Every day he crawls up 9 feet, every night he slides down 6 inches. If the ditch is 128 feet high, how many days will it take for him to get to the top?
23. If there are 13 people on a math team and if everyone shakes each other's hand once, how many handshakes take place?
24. What is the sum of the first 500 even numbers starting with 2?
25. Find the area of the triangle.



26. Kate buys a house for 100,000 dollars. The house increases in value 10% over the previous year. How much is it worth after 2 years?
27. How many cubic inches are in 12 cubic feet?
28. What is the slope of the line perpendicular to the line $y = 3x + 3$?
29. When you take the number of sides in a decagon, subtract the number of sides in a heptagon, add the number of sides in a triangle, subtract the number of sides in an octagon, and multiply this number by 6541, what is the result?
30. What is $A + B + C - D$? The figure is not to scale and all measures are in degrees.



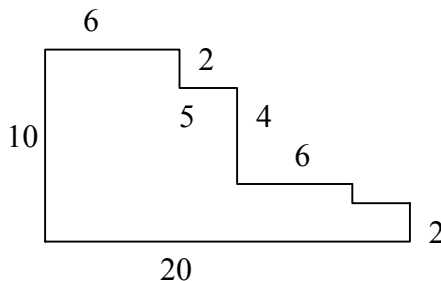
2003 Mount Rainier Math Invitational
Sixth Grade Team Geometry

Written by Randi Gleason

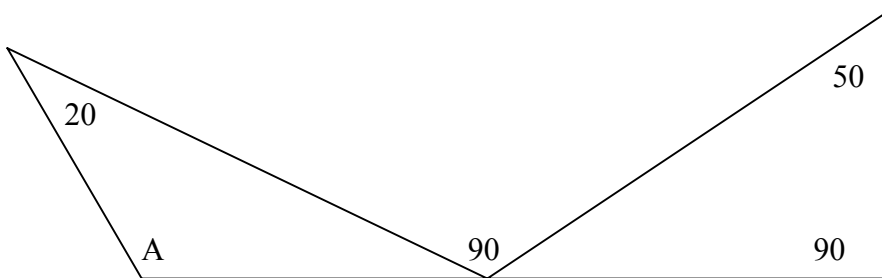
Leave answers in terms of π .

Questions 1-5 are worth 2 points each

1. Fred has a garden that is a 15-foot by 35-foot rectangle. He wants to build a fence around it 5 feet away from the edge. How many feet of fencing does Fred need?
2. What is the perimeter of this shape?



3. A right triangle has one acute angle of x and another of $2x+15$. What is x ?
4. What is the measure of angle A in degrees?

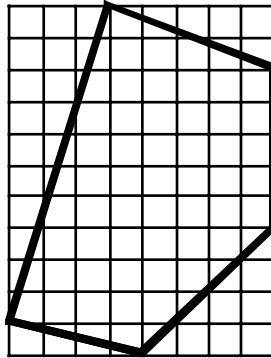


5. If a circle has circumference 12π , what is its area?

(turn over)

Questions 6-10 are worth 3 points each

6. How many more diagonals can be drawn in a regular hexagon than in a regular pentagon?
7. Bob keeps his chickens in a pen that is in the shape of a right triangle. One side has length 12 meters and the hypotenuse has a length of 13 meters. He buys Bill's chicken pen, which is a square with 6 meter long sides. How much total area do Bob's chickens now have?
8. What is the area of this shape? Each small square in the grid is a 1 by 1 square.



9. Percy the penguin and Ollie the Ostrich started walking at the same time. Both walked at 2 miles per hour. Percy walked around a hexagon with each side having a length of 4 miles. Ollie walked around a square with sides of 5 miles. How many minutes before Ollie did Percy finish?
10. A large cube, 10 inches on a side is painted, then cut into 1 by 1 by 1-inch cubes. How many of the small cubes are painted on at least one side?

2003 Mount Rainier Math Invitational
Sixth Grade Team Algebra

Written by Daniel Walton

Questions 1-5 are worth 2 points each

1. Angela and Ben both have apples. Angela has twice as many apples as Ben. Ben has seven fewer apples than Angela. How many apples do they have together?
2. Let $a @ b = a + b$, and let $a * b = a / b$. Find $(12 * (2 @ 4))$
3. Solve for x : $3x + 5 = 2$
4. Evaluate the expression when $w = 3$: $2w(w-3) - 3w + 10$
5. In Jurassic Park there are velociraptors (with 2 feet) and brontosauruses (with 4 feet). If there are a total of 30 heads and 96 feet, how many velociraptors are there?

Questions 6-10 are worth 3 points each

6. It takes Dave two hours to mow a lawn while it takes Ellen only one hour to mow the same lawn. How long will it take them to mow the lawn together (in minutes)?
7. Time has a giant jar of jelly bellies. On Monday, he gave a third of his jelly bellies to Jamal and kept the remaining jelly bellies. On Tuesday, he gave half of his remaining jelly bellies to Nancy and kept the rest. On Wednesday, he counted his jelly bellies and found that he only had 12 left. How many did he have on Monday, before he gave any away?
8. Find both solutions for x : $(x-2)^2 = 25$

(turn over)

9. At a tennis shop, a tennis racquet costs \$150, while a can of balls costs \$3. If Daniel buys twelve items, totaling \$477, and there are 4 balls in each can, how many tennis balls did he buy?

10. Dana hates bananas, but her mom sends them in her lunch anyway. Dana's mom put one banana in her lunch on weekdays and two on weekends. Every week, Dana eats a few bananas and throws the rest in the garbage. After four weeks there are 26 bananas in the garbage. On average, how many bananas does Dana eat a week?

2003 Mount Rainier Math Invitational
Sixth Grade Team Who Wants to be a Mathematician

Written by Eric Kim et al

Any wrong answer and you will lose any points past the last "safe zone" (after questions 4 and 8). You may use up to two Lifelines by putting "LL" as the answer for a question. There is no credit for that question but it does not count as a wrong answer. You will have 20 minutes for this test.

Questions 1-4 are worth 1 point each

1. How many prime numbers are between 4 and 6?
A) -5 B) 1 C) 250 D) 2000
2. What is the next number in the sequence: 0, 1, 3, 6, 10, 15, ___?
A) 19 B) 21 C) 25 D) 30
3. What is the perimeter of a square with area 1?
A) 1 B) 2 C) 4 D) 11
4. If there are four friends who all want to shake hands with each other exactly once, how many handshakes are going to occur?
A) 12 B) 4 C) 6 D) 10

Questions 5-8 are worth 2 points each

5. What is the probability of flipping a coin and getting heads, AND rolling a die and getting a 3?
A) $\frac{1}{12}$ B) $\frac{1}{2}$ C) $\frac{1}{3}$ D) 3
6. The whole numbers from 1 to 21 are written down on a piece of paper. How many times does the digit 1 appear on the paper?
A) 55 B) 13 C) 17 D) 12
7. Let's say today is Tuesday. What day will be it be in one year (365 days)?
A) Monday B) Tuesday C) Wednesday D) Saturday
8. Legolas the elf shot 5 arrows, then picked up 3 of those arrows he shot, and then shot 20 more arrows. If he has 5 arrows remaining, how many arrows did he start off with?
A) 25 B) 21 C) 20 D) 27

(turn over)

Questions 9-11 are worth 3 points each

9. I have 7 red socks, 4 blue socks, and a pair of green socks all jumbled up in a drawer. What is the maximum number of socks I must draw out to ensure that I have a pair of matching colored socks?
A) 4 B) 13 C) 12 D) 8
10. Crosspieces of lengths 2 feet and 3 feet are used to form the frame of a standard kite. What will be the area of the kite?
A) 5 B) 3 C) 6 D) 4
11. Find the sum of the following numbers: -8, -5, -2, 1, 4, ..., 19, 22.
A) 20 B) 42 C) 77 D) 78

Question 12 is worth 4 points

12. Two dice are rolled and one showed an even number and one showed an odd number. What is the probability that the sum is 7?
A) $\frac{1}{6}$ B) $\frac{1}{2}$ C) $\frac{2}{3}$ D) $\frac{1}{3}$

2003 Mount Rainier Math Invitational
Sixth Grade Team Pressure Round
Written by Kristina Haller

Reduce all fractions. You must turn in an answer to a problem at 3, 6, 9, 12 and 15 minutes. The first answer turned in is worth 3 points, the second 4 points, ..., and the fifth is worth 7 points.

1. In a talent show there were five acts. Jon the pogo stick jumper went on stage right after Eric the Britney Spears impersonator, who performed two acts before Matt the ninja, who went either before or after Daniel. Daniel the Banjo player was not the first or the last to perform. If Jerrad the baton twirler went last, who went first?
2. What is the product of all of the non-negative integers less than ten?
3. What is the product of the units digit of 2^{2003} and the units digit of 3^{2003} ?
4. What is $1/5 + 1/4 - 1/3$?
5. When two fair six-sided die are rolled, what is the probability that both numbers will be less than 3?