2002 Mount Rainier Math Invitational
Fifth Grade Individual Test

written by Jerrad Neff, Alan Mak and Paul Morales

Reduce all fractions and answers may be left in terms of π or use 3.14 for π.

Questions 1-20 are worth 2 points each

1. What is 12 x 11 x 10 x 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 x 0?

2. If Bob can mow his lawn in one hour, and John can also mow the same lawn in one hour, how long will it take both of them working together?

3. The area of a rectangle is 51. The width is 3, what is its length?

4. In a right triangle, the two legs (shorter sides) are 3 and 4 units. What is the length of the last side?

5. A train leaves a station going 45 mph. Assuming the track is straight, how far will the train be from the station in 180 minutes?

6. What is 11^2?

7. What is (3000–1000) / 2 + 1002?

8. What is the chance of getting 2 heads when you flip 2 fair coins?

9. A 144-gallon pool is leaking at the rate of 1 gallon per hour. How many days will it take to empty?

10. $3x + 4 = 10$: What does x equal?

11. What is the maximum amount of times that 5 lines can intersect?

12. How many diagonals are in a regular hexagon? (A 6-sided figure.)

13. What is 13 – 12 + 11 – 10 + 9 – 8 + 7 – 6 + 5 – 4 + 3 – 2 + 1?

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14. What is $^{1}/_{2}$ x $^{2}/_{3}$ x $^{3}/_{4}$?

15. A certain type of bacteria doubles every 2 days. Starting with one bacteria, how many would be there in 8 days?

16. Reduce: (3-2x1+3)/(5-2x3+9)

17. How many tiles 12x12 inches are needed to cover a floor 6x6 feet?

18. One Widget is worth five Hoohas. 2 Hoohas are worth 3 Dohickeys. How many Widgets are 30 Dohickeys worth?

19 Joe has a collection of Pogs. He gives half to Bill. Then he gives half of the remaining Pogs to Bobby. He now has 5 left. How many Pogs did Joe have to begin with?

20. $x + y + z = 10$. $x = 3$ and $y = 4$. What does z equal?

Questions 21-30 are worth 3 points each

21. There are 2 green marbles and 3 blue marbles in a jar. If drawn randomly, what are the chances that a green marble is drawn?

22. Tammy was alone on a train. 22 people then got on. Then 3 people got off. 16 more got off, and finally 28 got on. How many were then on the train including her?

23. What is 6! ? (6! means 6x5x ... x1)

24. If you blinked every second, how many times would you blink in two hours?

25. How many feet are in 13 miles?

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26. If $1^1/_2$ hens can lay $1^1/_2$ eggs in $1^1/_2$ days, how long will it take 3 hens to lay 12 eggs?

27. Bobby and Billy each have some change. Bobby says: “If I gave you a quarter, we would have the same amount of money.” Billy says: “But if I gave you a quarter, you would have five times as much as me!” How much money does Bobby Have?

28. Car A leaves point O going east at 45 mph. Car B leaves point O at the same time going west at 15 mph. How far apart will they be in 2 hours?

29. How many cubic feet are in a box 24x12x6 inches?

30. A snail can move 3cm in 1 minute, how many km per hour is that?

2002 Mount Rainier Math Invitational
Fifth Grade Team Algebra Test

written by Michael Bigelow and Josh Day

Reduce all fractions and answers may be left in terms of π or use 3.14 for π.

Questions 1-5 are worth 2 points each

1. If w=7, x=10, y=3, and z=2, what is wx+xy+wz?

2. Sam has $5. He buys 3 candy bars at 50 cents each. With the money he has left, how many 25-cent gumdrops can he buy?

3. What is 8x-10 when x=6?

4. Find q if 4q+15=31.

5. A farmer in Nebraska has only perfectly normal tigers and snakes. On his farm, there are 20 heads and 16 legs. How many snakes are there?

Questions 6-10 are worth 3 points each

6. What is the sum of all of the numbers from 11 to 100 (including 11 and 100)?

7. Every year, the population of elves in the lost woods doubles. If there are 100 elves in the lost woods now, how many will there be in 10 years? Remember, no one ever dies in the lost woods and no one can find the way out.

8. If 3 spheres weigh the same as 1 cylinder, and 2 cylinders weigh the same as 1 cube, how many spheres weigh the same as 3 cubes?

9. A kazinga that runs at 14 MPH is set to race against a wampus that galumphs at 16 MPH, starting at 3:00 in the afternoon. How far ahead will the wampus be after four hours of racing?

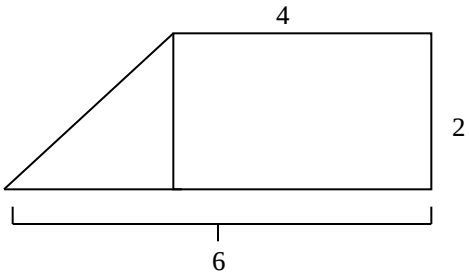
10. Solve: $y = {}^{-5}/_{4}\,x + 3$ when x=10.

2002 Mount Rainier Math Invitational
Fifth Grade Team Geometry Test
written by Jon Hughes

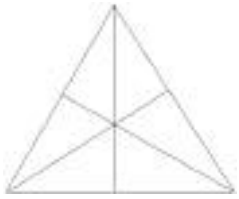
Reduce all fractions and answers may be left in terms of π or use 3.14 for π.

Questions 1-5 are worth 2 points each

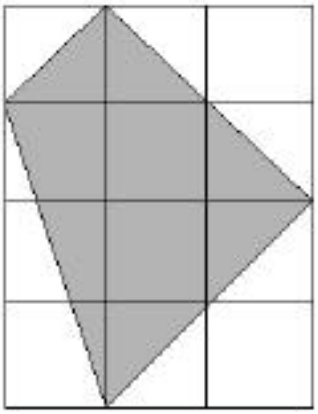
1. What is the area of this figure?



2. How many triangles are in this figure?



3. If each of the twelve squares in the figure have an area of four square inches, what is the number of square inches in the area of the shaded region?



4. An airplane was flying at a constant speed toward Sea-Tac Airport and arrived at 6:15 PM. How many miles per hour was the plane flying at, if it was 1,002 miles away at 4:45 PM?

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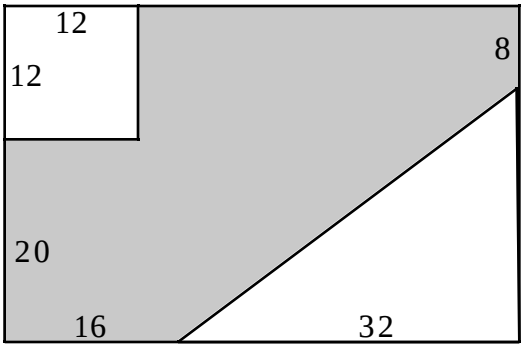
5. George is six-feet tall. If he casts a 1-yard shadow, and a nearby tree casts a 5-yard shadow, how many feet are in the height of the tree?

Questions 6-10 are worth 3 points each

6. What is the area of the shaded region?

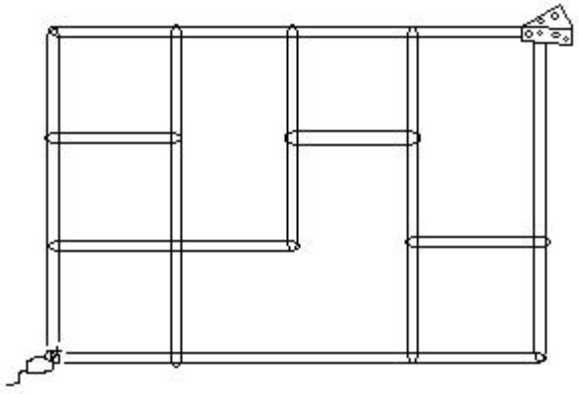


7. George was hungry, so he bought a pizza and ate some of it. Then, his sister took a third of the remaining pizza, leaving 40π square inches of pizza. What fraction (in lowest terms) of the pizza did George eat at the beginning, if the pizza originally had a radius of 10 inches?

8. If a cat is walking on the top of a six-foot tall fence for four yards and comes to a stop, turns right 90°, and walks for five more feet, how many feet is the cat from its starting point?

9. If certain floor tiles are rectangles and have a side of 8 inches and a side of 9 inches, how many square feet are in the area of a floor that has 10 tiles on one side and 20 tiles on the other side.

10. If a mouse (lower left corner) wanted to get his cheese (upper right), but could only travel east or north through the maze of tunnels, how many different paths could the mouse take to get his cheese? (Considering he can only travel up or to the right.)



2002 Mount Rainier Math Invitational
Fifth Grade Team Pressure Round

written by Dana Wen

Reduce all fractions and answers may be left in terms of π or use 3.14 for π. 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. What is the greatest common factor of 18 and 24?

2. Chris can drink 4 cans of pop in 20 minutes. Scott can drink 8 cans in 30 minutes. Trav can drink 3 cans in 10 minutes. If all three continue drinking at the same rate, how many cans would they drink in an hour?

3. Evaluate: $3(x + y) - (2x - 5y)$ if $x = 2$ and $y = 4$.

4. At the grocery store, mushy pickles cost 10¢ each and squishy pickles cost 5¢ each. Harry spent 65¢ and bought 8 pickles. How many squishy pickles did he buy?

5. Squanto owns a penguin farm. He sold $^1/_2$ of his penguins to Pocahontas. Then he sold $^1/_4$ of his remaining penguins to John Smith. After that, he had 18 penguins left. How many penguins did he start with?

2002 Mount Rainier Math Invitational
Fifth Grade Team Who Wants to be a Mathematician

written by Ryan Mak

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.

Questions 1-4 are worth 1 point each

1. What is 3+5+67?
   (A) 8 (B) 75 (C) 21 (D) 3567

2. Reduce the Fraction $^{2}/_{12}$ too lowest terms.
   (A) $^{1}/_{6}$ (B) $^{3}/_{4}$ (C) $^{1}/_{12}$ (D) $^{2}/_{12}$

3. Find the sum of all the even prime numbers.
   (A) infinite (B) 0 (C) 2 (D) 4015

4. Jon is seasick. He throws up every five minutes. How many times does Jon throw up in an hour?
   (A) 12 (B) 60 (C) 10 (D) 5

Questions 5-8 are worth 2 points each

5. What is probability of flipping a fair coin and getting a heads if the last two flips were tails?
   (A) 0 (B) $^{1}/_{2}$ (C) $^{1}/_{3}$ (D) 1

6. Eric is reading the book <u>Great Expectations</u>. Today is Sunday. He reads 43 pages per day. Including today what day will he finish the 531-page book?
   (A) Friday (B) Sunday (C) Saturday (D) Monday

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7. One expo equals 13 shinutaes. A Cyurry equals 2 expos. A Cyurry equals 7 blobs. A brahmagupta equals 1 Cyurry. If I have 4 brahmaguptas how many shinutaes do I have?

(A) 91 (B) 13 (C) 104 (D) 728

8. If $x=^{1}/_{3}$ and y=7 and z=147 Evaluate (z/y)+9x.

(A) 24 (B) 12 (C) 22 (D) 20

Questions 9-11 are worth 3 points each

9. How many ways can I arrange the letters of the word "success"?

(A) 120 (B) 720 (C) 240 (D) 420

10. Kristina has 2 blue socks, 5 green socks, 9 orange socks, 3 black socks, 12 red socks, 4 yellow socks, and 7 striped socks in a drawer. What is the least amount of socks she has to take out of the drawer if she is to be guaranteed a matching pair?

(A) 8 (B) 42 (C) 26 (D) 90720

11. Evaluate (A-B+C)/D.

Where A= the number of stars on the current American Flag.
Where B= the number of stripes on the current American Flag.
Where C= smallest odd prime number.
Where D=the probability of getting two heads on two coin flips.

(A) 20 (B) 160 (C) 38 (D) 200

Question 12 is worth 4 points

12. Tom is a smart feller. He is standing near a pole with a new distance measurer and it tells him that his feet are 13 feet from the top of the pole. Tom knows the pole is 12 feet tall, so assuming that the pole is perpendicular to the ground, how far are Tom's feet from the base of the pole?

(A) 8 feet (B) 25 feet (C) 1 foot (D) 5 feet