

The 26th Annual Connecticut Community Colleges Math Contest

Directions for Student Participants

Please read these directions carefully before starting the test!

1. Only students currently enrolled in the community college system are eligible to participate.
2. Do not begin the test until instructed by the test monitor.
3. You have two hours to complete all of the questions. Some questions are worth 1 point, some are 2 points, and some are 3 points.
4. You are allowed to use calculators. No books, notes, or other aids are allowed. You may not share calculators during the test.
5. You will be provided with scrap paper and graph paper, on which you can do all of your work.
6. All answers **MUST** be recorded on the answer sheet provided. Answers that are not whole numbers **MUST** be given as reduced fractions, **NOT** decimal, unless otherwise indicated.
7. All answers must be complete, legible, and with the proper units or labels (for example: inches, pounds, dollars, miles per hour, etc.) No partial credit is given.
8. Please record all answers with a ball point pen.
9. Please sign the answer sheet, and initial the test question sheet with a ball point pen.
10. Please return all test papers to the test monitor before leaving (which you can do once you are done).

Sincerely, the Contest Committee

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April 2016

One Point Questions

- 1) Compute: $\frac{13^2-13}{13} + 13^0$
- 2) Auburn's football team scored 9 more than twice as many points as Alabama. Auburn won by 23 points. How many points did Auburn score?
- 3) If P and Q are integers and $\frac{1}{P} + \frac{1}{Q} = \frac{7}{12}$ what is a possible sum of $P + Q$?
- 4) If $xy = 28$ and $x + y = 7$, find the sum of the reciprocals of x and y .
- 5) What is the smallest prime number less than 65 whose unit digit is 1 greater than its tens digit.
- 6) If $\left(\frac{1}{2}\right)\left(\frac{2}{3}\right)\left(\frac{3}{4}\right)\cdots\left(\frac{12}{13}\right) = \frac{1}{N}$, What is N ?

Two Point Questions

- 7) Given $f(x) = x^2 + 1$ Find the slope-intercept equation of the line between the points: $(1, f(1))$ and $(3, f(3))$.
- 8) Find x if $(\sqrt[5]{8})(\sqrt[3]{16}) = 2^x$
- 9) Two positive numbers A and B have a product of 300. The ratio of the positive difference of their squares to the square of their positive difference is 7 to 1. Compute $A + B$.
- 10) x and y are positive integers and x is $x\%$ of y . What does $y =$?
- 11) $\frac{1}{3}$ of the people at a party are women, $\frac{1}{4}$ are girls, $\frac{1}{6}$ are men, and 6 are boys. How many people are at this party?
- 12) There are three different teams; the Frogs, the Rats, and the Tigers; from three different cities; Cheshire, Madison, and Lyme; who play three different sports; dodgeball, wiffleball, and freeze tag. The dodgeball team is not the Tigers. The Frogs from Madison do not play freeze tag and neither does the team from Cheshire. The Rats from Lyme do not play dodgeball. What sport do the Tigers play?
- 13) If there are 14 Dykstras to 2 Hollins, 4 Bells to a Kruk, and 12 Hollins to a Kruk, how many Bells will you have if you have 42 Dykstras?
- 14) $F(x) = \frac{1}{x}$ and $G(x) = x^2$ Compute $F(G(0.2))$

Three Point Questions

- 15) Solve the equation:

$$x\sqrt{3} = \sqrt{20x + 7}$$

- 16) Colombia's premier league soccer teams earn 3 points for a win, 1 point for a draw, and 0 points for a loss. Over the course of a 38 game season, your favorite team finished with 72 points and had 12 more wins than draws. How many wins did the team have over the season?
- 17) A ladder leans against a house, with its bottom 15 feet from the house. When the bottom of the ladder is pulled 9 feet further away from the house, the top slides down 13 feet. How long is the ladder?
- 18) If you get 20 more points on your final exam than you did on your second quiz and the average of your two quizzes is 75, then you will have an 80 average for the math course. Each quiz is worth 25% of the grade and the final is worth 50%. What did you get on your first quiz?
- 19) I leave my front door, run on a level road for some distance, then run to the top of a hill and return home by the same route. I run 8 mph on level ground, 6 mph uphill, and 12 mph downhill. If my total trip took 2 hours, how far did I run?
- 20) Solve the following system:

$$x \geq y$$

$$x^3 + y^3 = 7$$

$$x + y = 1$$