

19TH ANNUAL STUDENT MATH CONTEST QUESTIONS: 2009
CONNECTICUT COMMUNITY COLLEGES

EACH OF THE FOLLOWING PROBLEMS, 1 THROUGH 6, ARE
WORTH ONE (1) POINT.

1. THE RATIO OF THE RADII OF TWO CIRCLES IS 2 TO 1. WHAT IS THE RATIO OF THE LARGER AREA TO THE SMALLER AREA?
2. JETER HIT 9 LESS THAN TWICE AS MANY HOME RUNS AS PEDROIA. PEDROIA HIT 8 FEWER HOME RUNS THAN JETER. HOW MANY HOME RUNS DID JETER HIT?
3. IF $A(B - C) = 37$, FIND A IF B IS 1 MORE THAN C.
4. MEG COMPLETED 30% OF HER WORKOUT ON HER TREADMILL, WITH 35 MINUTES REMAINING ON THE TIME KEEPER. HOW MUCH TIME HAD SHE ALREADY SPENT ON THE TREADMILL?
5. A MULTIPLE OF 11 I BE. NOT ODD, BUT EVEN YOU SEE. MY DIGITS A PAIR, WHEN MULTIPLIED THERE, MAKE A CUBE AND A SQUARE OUT OF ME! WHO AM I?
6. X IS A POSITIVE INTEGER LESS THAN 100. FOR HOW MANY VALUES OF X WILL

$$\sqrt{1 + 2 + 3 + 4 + X} \text{ BE AN INTEGER?}$$

EACH OF THE FOLLOWING PROBLEMS, 7 THROUGH 14, ARE
WORTH TWO (2) POINTS.

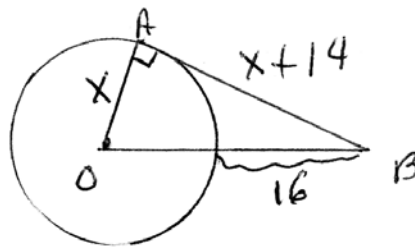
7. STARTING AT THE TOWN OF EULER AND TRAVELLING 40 MILES TO THE TOWN OF PYTHAGORAS, RALPH TRAVELS AT THE RATE OF 2 MILES EVERY 15 MINUTES. RETURNING FROM PYTHAGORAS TO EULER, HE TRAVELS 2 MILES EVERY 3 MINUTES. WHAT WAS RALPH'S OVERALL AVERAGE SPEED, IN MILES PER HOUR, FOR THE ENTIRE TRIP?

8. FIND THE VALUE OF k FOR WHICH $kx^2 - 5x - 12 = 0$ HAS SOLUTIONS $x = 3$ AND $x = -\frac{4}{3}$.

9. A TRAIN 2 KM LONG IS PASSING THROUGH A TUNNEL 3 KM LONG AND TRAVELS 30 KM PER HOUR. THE TRAIN BEGINS TO ENTER THE TUNNEL AT 9:30 AM. AT WHAT TIME IN THE MORNING DOES THE TRAIN COMPLETELY CLEAR THE TUNNEL?

10. DEFINE $(x \Delta y)$ TO MEAN $2x - 3y$. EVALUATE $((4 \Delta 3) \Delta (5 \Delta 3))$.

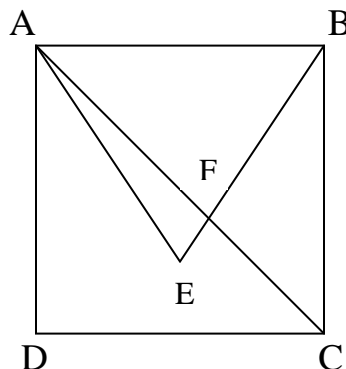
11. IN THE FOLLOWING DIAGRAM, SOLVE FOR X.



12. A IS 6 MORE THAN B, AND B IS 6 MORE THAN C. COMPUTE THE VALUE OF: $(A - B) * (B - C) * (A - C)$

13. A CLASS HAS AN EQUAL # OF BOYS AND GIRLS. IF 8 GIRLS LEAVE, THEN THERE ARE TWICE AS MANY BOYS AS GIRLS. HOW MANY TOTAL STUDENTS WERE ORIGINALLY IN THE CLASS?

14. IN THE FOLLOWING DIAGRAM, ABCD IS A SQUARE, AND ABE IS AN EQUILATERAL TRIANGLE. FIND THE DEGREE MEASURE OF ANGLE BFC.



EACH OF THE FOLLOWING PROBLEMS, 15 THROUGH 20, ARE WORTH THREE (3) POINTS

15. A TRAPEZOID HAS COORDINATES $(-4, 0)$, $(4, 10)$, $(4, 30)$, AND $(-4, 40)$. WHAT IS THE RATIO OF ITS AREA IN THE FIRST QUADRANT TO ITS AREA IN THE SECOND QUADRANT?

16. A FARMER HAD A DAUGHTER WHO SPOKE IN RIDDLES. ONE DAY THE CHILD WAS ASKED TO COUNT THE NUMBER OF GOATS AND THE NUMBER OF DUCKS IN THE BARNYARD. SHE RETURNED AND SAID, "TWICE THE NUMBER OF HEADS IS 76 LESS THAN THE NUMBER OF LEGS." HOW MANY GOATS WERE IN THE BARNYARD?

17. AN I-POD'S PRICE WAS DISCOUNTED 10%, AND THEN AGAIN BY 20%. WHAT IS THE OVERALL % DISCOUNT?

18. THE QUADRATIC EQUATION $X^2 + BX + C = 0$ HAS ONE SOLUTION R. FIND THE RATIO OF B TO C, IN TERMS OF R.

19. DUE TO A BOWLING SCORE OF 204 IN HIS LAST GAME, REMY RAISED HIS AVERAGE FROM EXACTLY 156 TO EXACTLY 158. WHAT SCORE MUST HE BOWL IN THE NEXT GAME TO RAISE HIS OVERALL AVERAGE TO EXACTLY 159?

20. LINE 1 HAS A SLOPE OF M, AND Y INT OF $(0, 2)$. LINE 2 HAS A SLOPE OF 2, AND A Y INTERCEPT OF $(0, M)$. FIND THE COORDINATES OF THE POINT OF INTERSECTION.

2009 ANSWER KEY
CONNECTICUT COMMUNITY COLLEGES
19TH ANNUAL MATH CONTEST

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|-------------------------|--------------------|--------------|
| 1. 4:1 | 2. 25 HR | 3. $A = 37$ |
| 4. 15 MIN | 5. 88 | 6. 7 VALUES |
| 7. 13 $\frac{1}{3}$ MPH | 8. $K = 3$ | 9. 9:40 AM |
| 10. -5 | 11. $X = 10$ | 12. 432 |
| 13. 32 STUDENTS | 14. 105 DEG | 15. 13:15 |
| 16. 38 GOATS | 17. 28 % | 18. $-2 / R$ |
| 19. 1:3 | 20. $(1, M + 2)$. | |