UNIVERSITY OF NEW BRUNSWICK

UNIVERSITÉ DE MONCTON

32nd NEW BRUNSWICK MATHEMATICS COMPETITION

Friday, May 9, 2014

GRADE 8

INSTRUCTIONS TO THE STUDENT:

1. Do not start the examination until you are told to do so.

2. You are permitted to use rough paper. No other aids are necessary.

3. This is a multiple choice test. Each question is followed by five answers marked A, B, C, D, E. Only one is correct. When you have decided on your choice, mark the appropriate letter on your answer sheet using the pencil provided.

4. Problems are worth 3 points each in part A , 4 points each in part B, and 5 points each in part C. The penalty for incorrect answers is one quarter of the points assigned for that question. No penalty is assessed for answers which are left blank.

5. Diagrams are NOT drawn to scale. They are intended as aids only.

6. You have 60 minutes to answer the questions.

7. The use of calculators in the examination room is not allowed.

Grade 8

Part A

1. What is the value of $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$?

(A) $\frac{3}{14}$ (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{7}{8}$ (E) 1

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2. The final two digits in 2468 would be 68. What are the final two digits in the value of 25 x 13?

(A) 00 (B) 15 (C) 25 (D) 50 (E) 75

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3. Which of the following has the greatest value?

(A) $(3+3)^3$ (B) 33 x 3 (C) 3^3 x 3^3 (D) $(3^3+3)^3$ (E) 33^3

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4. How many prime numbers are between 10 and 20?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

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5. An automobile with 5 tires (four tires and a spare tire) traveled 30 000 km. All five tires were used equally. How many kilometres of wear did each tire receive?

(A) 6 000 (B) 7 500 (C) 24 000 (D) 30 000 (E) 150 000

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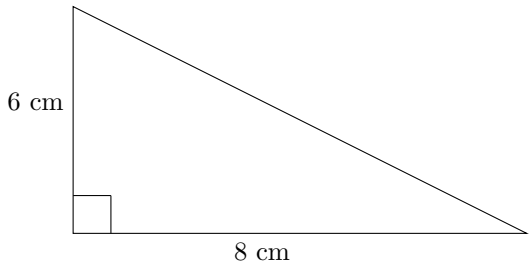
6. Which of these numbers is the average of the other four numbers?

(A) 20 (B) 22 (C) 23 (D) 24 (E) 31

7. What is the area of the triangle shown?



(A) 14 cm^2 (B) 24 cm^2 (C) 28 cm^2 (D) 30 cm^2 (E) 48 cm^2

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8. What is the value of $\sqrt{100} - \sqrt{6^2 + 8^2}$?

(A) -34 (B) -4 (C) 0 (D) 12 (E) 90

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9. The length of each side of a rectangle is doubled to create a new rectangle. The area of the new rectangle is M times the area of the original rectangle. What is M?

(A) 2 (B) 4 (C) 8 (D) 16 (E) none of these

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10. Which of the letters does not have a horizontal line of symmetry?

(A) B (B) E (C) K (D) O (E) Z

Part B

11. How many kilometres are equal to 452 metres?

(A) 0.0452 (B) 0.452 (C) 4.52 (D) 45.2 (E) 452 000

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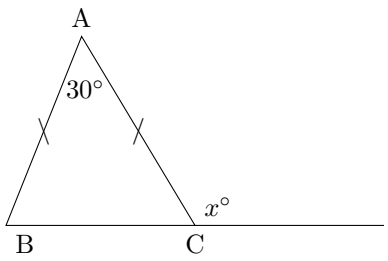
12. Two fair coins are tossed. What is the probability that they both land "heads"?

(A) $\frac{1}{4}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) $\frac{3}{4}$

13. In the diagram, $\triangle ABC$ is isosceles. What is the value of x?



(A) 75 (B) 105 (C) 120 (D) 135 (E) 150

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14. Paul makes his own salmon flies. It takes twice as long to make a "Marabou Comet" as it does to make a "Glo Bug Egg". Paul made 5 "Marabou Comets" and 5 "Glo Bug Eggs" in 1 hour. How many minutes does it take Paul to make a "Marabou Comet"?

(A) 5.5 (B) 8 (C) 12.5 (D) 25 (E) 50

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15. In the game of Martian Ball, scores are made in two ways: Kick and Throw. A Kick is worth three times as much as a Throw. Which of the following scores cannot be worth the same as 12 Kicks and 7 Throws?

(A) 1 Kick 40 Throws (B) 3 Kicks 34 throws (C) 6 Kicks 24 Throws
(D) 13 Kicks 4 Throws (E) Not enough information

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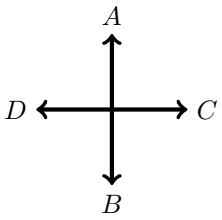
16. If $3A1D2B2C$ denotes three steps in the A direction, followed by one step in the D direction, followed by two steps in the B direction and then two steps in the C direction, then the sequence ends at the same place as



(A) $2A1B3D2C$ (B) $3B3C2A2D$ (C) $1A2D3C$ (D) $2B1A1D$ (E) $3C4A2D$

17. A number has 2014 digits, all of which are the digit 3. If the number is divided by 101, what is the remainder?

(A) 0 (B) 3 (C) 11 (D) 33 (E) 100

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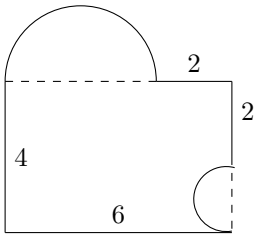
18. What is the perimeter of the figure shown? The figure is constructed of lines at right angles and semi-circles.



(A) $3\pi + 14$ (B) $3\pi + 16$ (C) $6\pi + 14$ (D) $6\pi + 16$ (E) None of these

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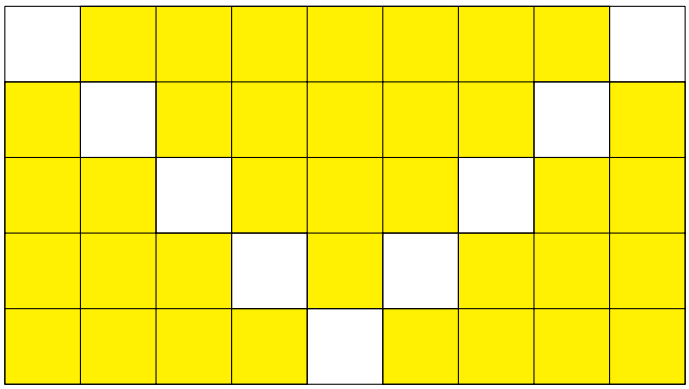
19. A grid made up of small squares is drawn, as shown. What percent (to the nearest whole number) of the grid is shaded?



(A) 70 (B) 75 (C) 78 (D) 80 (E) 85

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20. Two school volleyball teams each have 10 players. Following the game every player on one team shakes hands with every player on the other team. How many handshakes will there be?

(A) 50 (B) 90 (C) 100 (D) 180 (E) 200

Part C

21. The digits from 1 to 6 are rearranged into two 3 digit numbers where each digit is used exactly once. The resulting two numbers are then added. The largest total that can be obtained is

(A) 579 (B) 975 (C) 1083 (D) 1173 (E) 1332

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22. One fine day, David and Ruth plant 88 blueberry bushes on their farm. For the first hour, they work together and plant 42 bushes. For the next two hours, Ruth works alone at the same pace and finishes planting the bushes. How many bushes did David plant?

(A) 15 (B) 17 (C) 19 (D) 21 (E) 23

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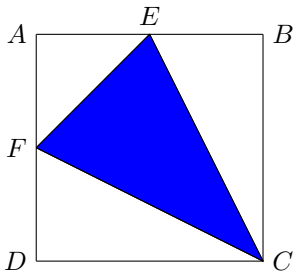
23. The points E and F are joined to C to form a triangle (as shown) inside of a square $ABCD$. If $AE = EB$ and $AF = FD$, and the area of square $ABCD$ is 16 cm^2, what is the area of triangle CEF?



(A) 6 cm^2 (B) 8 cm^2 (C) 9 cm^2 (D) 10 cm^2 (E) $10\frac{2}{3}$ cm^2

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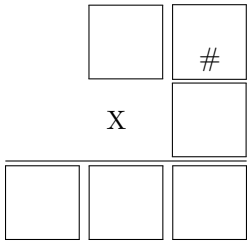
24. The digits 1, 2, 3, 4, 5 and 6 must each be placed in one of the boxes to make the product correct. What is the value of the digit represented by "#" in the product?



(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

25. The faces of a cube are marked with the numbers 1, 2, 3, 4, 5, 6. Each corner of the cube is assigned "vertex number" equal to the sum of all the numbers on the faces that meet at this corner. The sum of all the vertex numbers is

(A) 21 (B) 42 (C) 63 (D) 84 (E) 96

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26. There are 120 people staying at the DROP INN. The ratio of females to males is 5:1 for adults and 1:1 for children. If there are 84 females at the DROP INN, what is the ratio of adults to children?

(A) 2:1 (B) 3:1 (C) 3:2 (D) 5:3 (E) cannot be determined