

UNIVERSITY OF NEW BRUNSWICK
and
UNIVERSITÉ DE MONCTON

**JUNIOR HIGH SCHOOL
MATHEMATICS COMPETITION**

May 14, 1993

GRADE 9

PART A

1. Which of the following expressions is not equal to the others?

(A) $\frac{5}{12}$ (B) $\frac{1}{2} - \frac{1}{3} + \frac{1}{4}$ (C) $\sqrt{\frac{25}{144}}$ (D) $\frac{6^2 - 5^2}{9^2 - 8^2}$

(E)
$$\frac{1}{\left(\frac{3}{1 + \frac{1}{4}}\right)}$$

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2. What value do you get by subtracting 48 from four times -25 ?

(A) -148 (B) -52 (C) 21 (D) 52 (E) 1482

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3. The area of a triangle with a height of 12 cm is 24 cm^2 . How long is the base of the triangle?

(A) 2 cm (B) 4 cm (C) 6 cm (D) 12 cm (E) None of these

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4. A school bus transports a group of students. At the first stop, four students get off of the bus and seven others get on. At the second stop, Isabelle and her little sister get off. The remaining twelve students get off at the third and final stop. How many students were on the bus before the first stop?

(A) 10 (B) 11 (C) 12 (D) 13 (E) 14

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5. Robert builds a wall made from bricks. Each layer has exactly three more bricks than the layer immediately above it. If the wall has five layers, how many bricks will the top layer have if the total number of bricks in the wall is 80?

(A) 10 (B) 13 (C) 16 (D) 22 (E) None of these

6. Mr. A purchased an automobile. He added 20% to his cost and sold the automobile to Miss B. Miss B added 25% to the price that she paid and sold the same automobile to Mr. C who paid \$6000. How much did Mr. A pay for the automobile?

(A) \$3300 (B) \$3600 (C) \$3800 (D) \$4000 (E) None of these

7. On his last two exams, John had an average mark of 55%. If he had doubled his mark on the first exam, he would have had an average of 75%. What mark did he get on his first exam?

(A) 20 (B) 40 (C) 65 (D) 70 (E) None of these

8. What is the next term in the sequence 1, 3, 5, 11, 21, 43 ...?

(A) 64 (B) 78 (C) 85 (D) 87 (E) 100

9. It takes 880 drops of water to fill two teaspoons and 3 tablespoons. One tablespoon contains three teaspoons. How many drops of water does it take to fill one tablespoon?

(A) 80 (B) 176 (C) 200 (D) 240 (E) None of these

10. If 4 apples, 6 oranges and 4 plums cost \$6, and 8 apples, 12 oranges and 6 plums cost \$11, how many plums can you buy for \$10?

(A) 5 (B) 12 (C) 20 (D) 100 (E) Not enough information

PART B

11. Donald can pick 25% more apples than Roman in the same amount of time. If together they can pick 90 apples in an hour, how long would it take Donald to pick 120 apples?
- (A) 2 hours (B) 2 hours and 24 minutes (C) 2 hours and 40 minutes (D) 3 hours
- (E) None of these
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12. Twenty-eight students in a class each select 2 gloves from a box containing red and green gloves. If 20 students have gloves that are both the same colour, how many students have at least one green glove?
- (A) 8 (B) 15 (C) 20 (D) 28 (E) Not enough information
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13. How many different totals can be made by adding two or more values from the set $\{1, 2, 3, 4, 8\}$. Each value can be used only once in a given total.
- (A) 5 (B) 10 (C) 18 (D) 31 (E) None of these
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14. Two trains start at the same point and travel at the same constant speed. One train travels due east while the other train travels due north. What will be the distance between the trains when each of them has travelled 50 km?
- (A) 50 km (B) $50\sqrt{2}$ km (C) 75 km (D) 100 km
- (E) Not enough information
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15. The perimeter of a rectangular field is 70 m and the diagonal of the field measures 25 m. What is the area of the field?
- (A) 200 m^2 (B) 300 m^2 (C) 360 m^2 (D) 400 m^2 (E) 420 m^2
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16. In the expression $a - b + c - d$, the variables are replaced by the numbers 1, 2, 3, 4 with no repetitions allowed. How many ways can a negative total be obtained?
- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9
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17. In the game of 6**9, a person chooses 6 different integers from 1 to 9. If the order in which the numbers are chosen is not important, how many choices are possible?
- (A) 36 (B) 54 (C) 84 (D) 504 (E) 720
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18. An organization has 32 members. It hopes to increase the membership by 50% each year. If this is done, how many members will the organization have in 5 years?

- (A) 112 (B) 162 (C) 200 (D) 243 (E) None of these
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19. A carpenter builds a hollow wooden box using wood that is 1 cm thick. How much wood does he use in building a box whose shape is a cube with exterior dimensions of 5 cm on each side?

- (A) 61 cm^3 (B) 64 cm^3 (C) 98 cm^3 (D) 125 cm^3
(E) Not enough information
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20. Julie carries out a sequence of calculations on her calculator which shows an answer of 27.42. She realizes that on the last operation, she has multiplied by .1 instead of dividing by .1, and on the operation previous to that, she had added 2 instead of subtracting 2. What would the answer have been if she had not made these two errors?

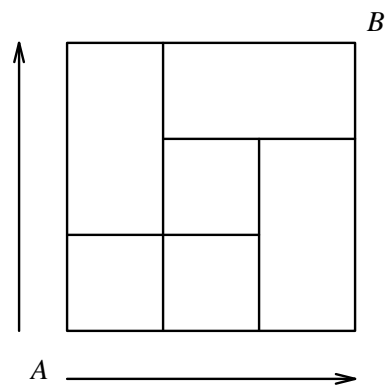
- (A) 254.2 (B) 272.2 (C) 2702 (D) 2720
(E) Not enough information
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PART C

21. What is the digit in the ones' place in the expansion of 3^{47} ?

- (A) 1 (B) 3 (C) 5 (D) 7 (E) 9
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22. How many different routes are there from point A to point B ? The arrows indicate the direction that must be followed.

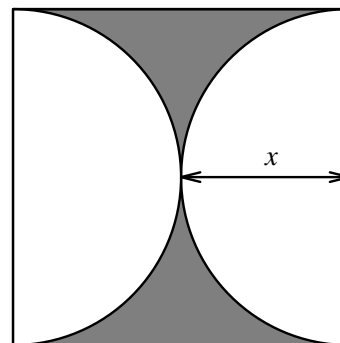


- (A) 5 (B) 7 (C) 9 (D) 10 (E) None of these
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23. The sum of two numbers is 11 and the product of the two numbers is 33. What is the sum of the squares of the two numbers?

- (A) 22 (B) 33 (C) 44 (D) 55 (E) Not enough information
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24. In the figure shown at the right, two tangent semi-circles with a radius equal to x are inscribed in a square. What is the area of the shaded region?

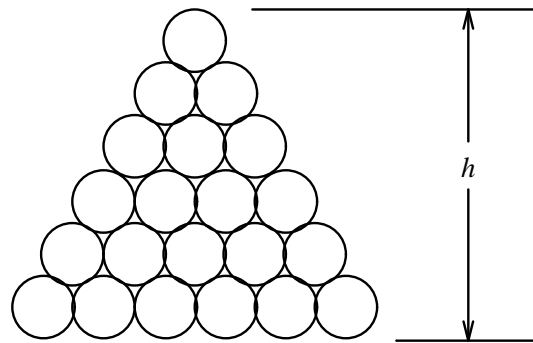


- (A) $4x^2$ (B) πx^2 (C) $(2 - \pi)x^2$ (D) $(4 - \pi)x^2$
 (E) Not enough information
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25. An automobile travels at a velocity of v km/hr for 10 km, $2v$ km/hr for 20 km, and $3v$ km/hr for 30 km. What is the average velocity of the automobile?

- (A) v km/hr (B) $11v/6$ km/hr (C) $2v$ km/hr (D) $14v/3$ km/hr
 (E) None of these
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26. Identical circles are piled as illustrated in the figure. The diameter of each circle is 4 cm. What is the height of a pile containing six levels?



- (A) $10\sqrt{3}$ cm (B) 20 cm (C) 24 cm (D) $4 + 10\sqrt{3}$ cm
(E) Not enough information
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