

INDIVIDUAL EVENT ANSWERS

Scarborough Math Olympics 2012

4. Hot dog wieners are sold in packages of 10. Hot dog buns are sold in packages of 8. What is the least total number of wiener and bun packages you would have to buy to get the same number of wieners as buns?

A 18 B 9 C 40 D 160

Answer: B; 4 packages of wieners and 5 packages of buns are needed

5. The side length of an equilateral triangle is 5 cm. Six identical triangles are used to make a hexagon. Determine the perimeter of the hexagon.

A 25 cm B 30 cm C 90 cm D 40 cm

Answer: B; six equal sides of 5 cm

Part B: Each correct answer is worth 4 points.

6. In the diagram, the length of side PQ of the sail is closest to:

A 5 m B 8 m C 6 m D 4 m

Answer: D; $\sqrt{2^2 + 4^2} \approx 4.47$

7. Evaluate: $\frac{77 + 7 \times 77}{77}$

A 84 B 12 C 78 D 8

Answer: D

8. What is the last digit when the numbers 528, 736, 344 and 252 are multiplied?

A 2 B 4 C 6 D 8

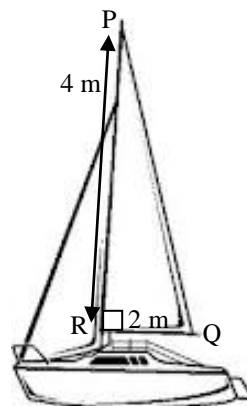
Answer: B

9. The chart on the right shows how much some celebrities earned in the year 2011. Which of the following reflects the average celebrity earnings the best?

A Mean B Median
 C Mode D All are appropriate

Answer: B; Justin Bieber is an outlier

Selena Gomez	\$89 462
Jason Derulo	\$136 140
Justin Bieber	\$5 016 774
Hanna Montana	\$90 046
Jay Chou	\$150,488
Taeyang	\$188,140
Rihanna	\$190,084



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10. A regular die is rolled 5 times. What is the probability that 5 different numbers are rolled?

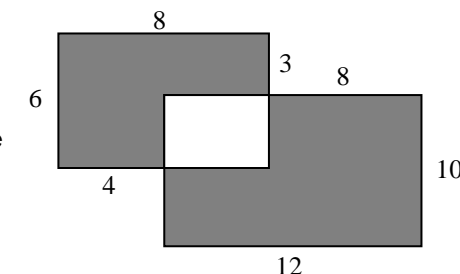
A $\frac{5}{54}$ B $\frac{1}{5}$ C $\frac{1}{6}$ D $\frac{5}{36}$

Answer: A; $\frac{6}{6} \times \frac{5}{6} \times \frac{4}{6} \times \frac{3}{6} \times \frac{2}{6}$

11. Determine the area of the shaded region of the figure shown on the right.

A 132 B 144 C 156 D 168

Answer: B



12. Coach O'Neil bought a 36 km² rectangular piece of land. Coach Allen bought the 60 km² rectangular piece of land beside Coach O'Neil's. The two pieces share a straight border and together form a large rectangle whose dimensions are whole kilometres. What is the longest possible border between the two pieces of land?

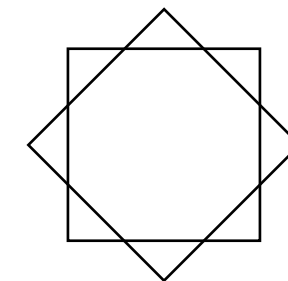
A 36 km B 12 km C 6 km D 3 km

Answer: B; the greatest common factor of 36 and 60

13. How many lines of symmetry does the figure on the right have?

A 2 B 8 C 12 D 4

Answer: B; through vertices and intersections



14. A store purchases a bicycle for \$60. The ticket price is 400% of the purchase cost. Today, there is a 20% off sale, how much would a customer pay for the bicycle, before tax?

A \$60 B \$48 C \$192 D \$240

Answer: C; 60x4x0.8

15. Agnes Macphail, Bliss Carman, David Lewis, Henry Hudson, Henry Kelsey, J.B. Tyrrell, John Buchan and Terry Fox are the schools at a co-ed basketball tournament. Each team plays each other once. How many games will be played in total?

A 56 B 48 C 64 D 28

Answer: D; Half of 8x7

Part C: Each correct answer is worth 5 points.

16. How many positive fractions in simplest form have denominators of 36?

- A 35 B 10 C 15 D 12

Answer: D; numerator could be 1,5,7,11,13,17,19,23,25,29,31,35

17. Given that $3 \blacklozenge 2 = 9$, $2 \blacklozenge 6 = 64$, $1 \blacklozenge 7 = 1$ and $4 \blacklozenge 4 = 256$. What is the value of $10 \blacklozenge 5$?

- A 50 B 100 000 C 5000 D 5

Answer: B; base \blacklozenge exponent

18. Duane draws an octagon. Five (5) of the interior angles sum to 845° . Two of the remaining angles are supplementary, and two of the remaining angles are complementary. The measures of the remaining angles could be:

- A $90^\circ, 45^\circ, 45^\circ$ B $35^\circ, 55^\circ, 145^\circ$
 C $45^\circ, 45^\circ, 45^\circ$ D $60^\circ, 30^\circ, 90^\circ, 180^\circ$

Answer: B; of the 3 remaining angles, two must sum to 180° and two sum to 90°

19. XueYe fills a 250 mL cup with hot chocolate. She drinks half, then tops up the cup with coffee. She stirs it until it is completely mixed. XueYe drinks half of her new mixture, and again tops it up with coffee. She continues this until she has consumed 500 mL. When she next tops up the cup, what fraction of the cup will be coffee?

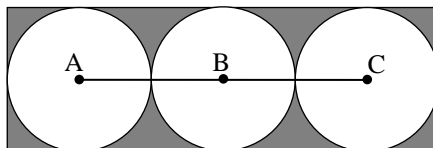
- A $\frac{15}{16}$ B $\frac{1}{4}$ C $\frac{7}{8}$ D $\frac{1}{16}$

Answer: A

20. Three equal circles, with centres A, B, and C, are inscribed in a rectangle, as shown. If $AC = 4x$, then the area of the shaded region is:

- A $12x^2 - 3\pi x^2$ B $9x^2 - 3\pi x^2$
 C $12x^2 - 6\pi x^2$ D $6x^2 - 6\pi x^2$

Answer: A; dimensions of rectangle are $6x$ and $2x$, area of one circle is πx^2

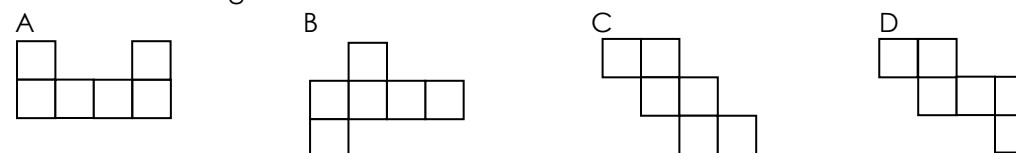


Instructions

- Write your team name and your name in the box provided on the ANSWER SHEET.
- You have a maximum of 40 minutes to complete this event. Please wait for the Olympic Official's instruction to begin.
- Questions are worth 3, 4, or 5 points as indicated.
- Questions can be done in any order.
- Calculators, rulers and graph paper are allowed.

Part A: Each correct answer is worth 3 points.

1. Which of these figures cannot be folded to form a cube?



Answer: A

2. Of the following, the one with the largest value is:

- A $\frac{9}{12}$ B $\frac{5}{7}$ C $\frac{8}{11}$ D $\frac{7}{9}$

Answer: D; converting to decimals, the choices are: 0.750, 0.714, 0.727, 0.777

3. Michelle has a building set which includes 60 short pieces, 60 long pieces, and 60 nuts with bolts. The number of objects she can make, identical to the one shown, is

- A 5 B 10 C 15 D 30

Answer: B; each object uses 2 long pieces, 4 short pieces and 6 nuts and bolts

