COMPETITION QUESTIONS

Scarborough Individual Math Olympics 2014

Instructions

- **Write your information in the boxes provided on the ANSWER SHEET.**
- **You have a maximum of 40 minutes to complete as many questions as you can. Please wait for the Olympic Official's instruction to begin.**
- **Questions are worth 3, 4, or 6 points as indicated.**
- **Questions can be done in any order.**
- **Calculators, rulers and graph paper are allowed.**
- **Record your answers on the ANSWER SHEET. Circle letter that matches your answer choice for each question.**
- **Hand in the QUESTIONS booklet and the ANSWER SHEET.**

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Part A: Each correct answer is worth 3 points.

1. Evaluate $12 \div 2 - 3 \times 5$
   A 15 B -60 C -5 D -9 E 16

2. What is the smallest number of different colours needed so that any two faces of a cube with an edge in common are coloured differently?
   A 2 B 3 C 4 D 5 E 6

3. Of 50 people, if 20 speak French, 20 speak English, and 15 speak both. How many people speak neither French nor English?
   A 25 B 5 C 20 D 15 E 10

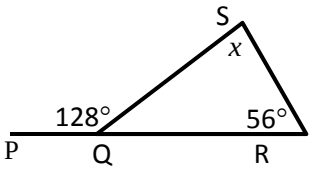
4. The average of -6, -4, 0, 9 and 16 is?
   A 7 B 3.75 C 4.6 D 5 E 3

5. A math class has 16 boys and 12 girls. Every day the size of the class is increased by two girls and one boy. When there is an equal number of boys and girls in the class, the total number of students is
   A 38 B 34 C 32 D 36 E 40

6. The sum of some numbers is1234. If one of the numbers is changed from 36 to 63, the new sum will be
   A 1198 B 1297 C 1261 D 1270 E 1207

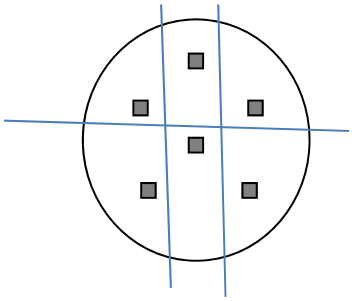
7. What number, when doubled and then increased by 21, equals 57?
   A 18 B 72 C 39 D 156 E 116

8. In the diagram, PQR is a straight line. The value of x is
   A 52° B 72° C 56° D 184° E 180°



9. Three track runners enter a race. They take 3 min, 4 min and 5 min to go around the track. How many laps will the slowest runner have completed when they are together again?
   A 60 B 6 C 20 D 12 E 9

10. What is the smallest number of lines needed to divide the circle shown into areas each containing a single square?
    A 3 B 7 C 5 D 4 E 6



Scarborough Association of Mathematics Educators

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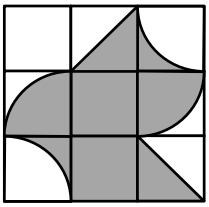
Part B: Each correct answer is worth 4 points.

11. The numbers 11 and 99 are examples of *twin double-digit numbers*. The product of two *twin double-digit numbers* is 1694. What is the smaller of these two numbers?
A 77 B 11 C 22 D 44 E 88

12. Jacob sold 108 cell phones at a constant rate over 6 hours. If he continues to sell phones at the same rate, how many phones will he sell in the next 90 minutes?
A 27 B 18 C 1620 D 108 E 162

13. The sum of three prime numbers is 26. One of these prime numbers must be
A 5 B 19 C 7 D 17 E 2

14. In the diagram on the right, each of the 9 small squares has an area of 1. What is the area of the shaded region if its boundary consists of line segments and quarter circles?
A $3+\pi$ B $3+\frac{\pi}{2}$ C 6 D 5 E π

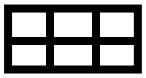


15. Cathy started with $4.50 and Amy with $3.00. Cathy spent twice as much as Amy, and now discovers she has only one-half as much money as Amy has. What is the total amount of money spent by the girls?
A $3.00 B $6.00 C $4.00 D $6.60 E $2.00

16. An equilateral triangle has two sides of 3x and x + 24. What is the perimeter?
A 36 B 18 C 12 D 72 E 108

17. If a☺b means $a^2 + b^2$, find the value of $\sqrt{5☺12}$.
A 13 B 17 C 169 D 60 E 289

18. In the diagram  three rectangles are pictured. How many rectangles are pictured in this second diagram?



A 7 B 20 C 16 D 18 E 9

19. From the addition table shown, the value of x + y is
A 28 B -20 C 8 D -28 E 86

+	*p*	*q*	*r*	*s*
a	16	2	7	18
b	-19	-33	*y*	-17
c	*x*	-6	-1	10
d	4	-10	-5	6

20. Notice that
$1 = 1^3$ $3 + 5 = 2^3$ $7 + 9 + 11 = 3^3$ $13 + 15 + 17 + 19 = 4^3$,...
and
$1 = 1^2$ $1 + 3 = 2^2$ $1 + 3 + 5 = 3^2$ $1 + 3 + 5 + 7 = 4^2$, ...
What is value of
$$1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 + 9^3 + 10^3$$
equal to?
A 55^2 B 60^2 C 45^2 D 50^2 E 54^2

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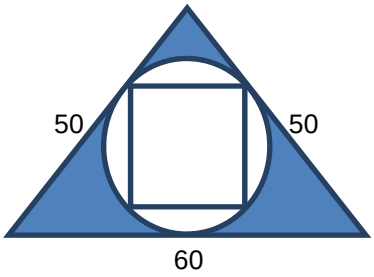
Part C: Each correct answer is worth 6 points.

21. Mathew's rocket is traveling at a speed of 180 km/h and Mathilda's rocket at 240 km/h. If Mathilda's rocket is 1 km behind Mathew's right now, how long will it take hers to catch up to Mathew's?
    A 4 seconds B 1 hour C 4 minutes
    D 10 minutes E 1 minute

22. In the diagram, the side length of the square inscribed in the circle is 20. The area of the shaded region is closest to
    A 1143 B 1772 C 800 D 572 E 872



23. Find the missing number: $2 + 4 + 6 + \ldots + 2014 = 1 + 3 + 5 + \ldots + 2013 + \_\_\_\_$
    A 2015 B 2014 C 4028 D 1007 E 4027

24. A *googol* equals 10^{100}. Find the value of $\frac{1000^{100}}{1 \text{ googol}}$.
    A 10 googols B 100 C (1 googol)^2
    D 2 googols E 100 googols

25. A computer system records dates as a four digit number. For example, January 1 would be recorded as 0101; December 31 as 1231. Find the sum of all the dates in a non-leap year (365 days in total).
    A 247 752 B 243 938 C 243 090 D 242 172 E 253 332

COMPETITION ANSWER SHEET

Scarborough Individual Math Olympics 2014

First Name:		
Last Name:		
School:		
Circle:	**Grade: 7 8**	**Gender: F M**

Circle your choice for each question:

1. A B C **D** E	**11.** A B **C** D E	**21.** A B C D **E**
2. A **B** C D E	**12.** **A** B C D E	**22.** A B C **D** E
3. **A** B C D E	**13.** A B C D **E**	**23.** A B C **D** E
4. A B C D **E**	**14.** A B C **D** E	**24.** A B **C** D E
5. A B C D **E**	**15.** A **B** C D E	**25.** A **B** C D E
6. A B **C** D E	**16.** A B C D **E**	
7. **A** B C D E	**17.** **A** B C D E	
8. A **B** C D E	**18.** A B C **D** E	
9. A B C **D** E	**19.** A **B** C D E	
10. **A** B C D E	**20.** **A** B C D E	
x 3 =	**x 4 =**	**x 6 =**
	Total =	**/ 100 points**