

**SA Mathematics Challenge 2015**  
**GRADE 7 FINAL ROUND**  
**29 July 2015**

**NOTE:**

- Answer the questions according to the instructions on the answer sheet.
- You may use a calculator.
- The questions test insight. Complex calculations will therefore not be necessary.
- We hope you enjoy it!

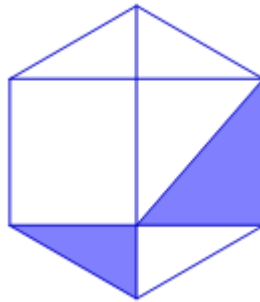
---

1. Which one of these numbers has exactly seven factors (including 1 and itself)?

- (A) 28      (B) 36      (C) 56      (D) 64      (E) 81

---

2. In this regular hexagon, the area of the shaded parts is  $10 \text{ cm}^2$ . What is the area of the hexagon?



- (A)  $20 \text{ cm}^2$       (B)  $30 \text{ cm}^2$       (C)  $40 \text{ cm}^2$       (D)  $50 \text{ cm}^2$       (E)  $60 \text{ cm}^2$

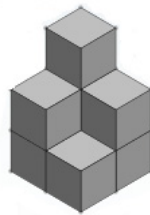
---

3. How many numbers between 1 and 2015 are multiples of both 12 and 20?

- (A) 16      (B) 17      (C) 33      (D) 65      (E) 66

---

4. Seven identical cubes, each with a surface area of  $6 \text{ cm}^2$ , are stuck together to form this solid object. What is the total surface area of the object?



- (A)  $24 \text{ cm}^2$       (B)  $42 \text{ cm}^2$       (C)  $28 \text{ cm}^2$       (D)  $26 \text{ cm}^2$       (E)  $30 \text{ cm}^2$



---

5. What is the smallest whole number that 112 must be multiplied by to make a square number?

- (A) 7                      (B) 112                      (C) 4                      (D) 8                      (E) 16
- 

6. The angles of a triangle are in the ratio 3:4:5. What is the difference between the largest angle and the smallest angle of the triangle?

- (A)  $20^\circ$                       (B)  $25^\circ$                       (C)  $30^\circ$                       (D)  $35^\circ$                       (E)  $40^\circ$
- 

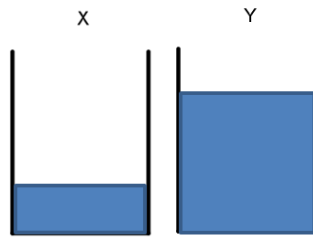
7. In how many different ways can 50 be written as the sum of two prime numbers?

- (A) 3                      (B) 4                      (C) 5                      (D) 6                      (E) 7
- 

8. What is the median of the four numbers  $\frac{1}{4}$ ,  $\frac{1}{6}$ ,  $\frac{1}{9}$  and  $\frac{1}{2}$ ?

- (A)  $\frac{5}{24}$                       (B)  $\frac{1}{5}$                       (C)  $\frac{37}{144}$                       (D)  $\frac{1}{12}$                       (E)  $\frac{11}{36}$
- 

9. X and Y are two identical water tanks. X is  $\frac{1}{4}$  full and Y is  $\frac{3}{4}$  full. When 200 litres of water is transferred from Y to X, both tanks have the same volume of water. How many litres of water does each tank hold when full?



- (A) 400                      (B) 500                      (C) 600                      (D) 800                      (E) 1000
- 

10. If  $m$  is an even positive number and  $n$  is an odd positive number, which of the following expressions will be an odd number?

- (A)  $m^2$                       (B)  $3 \times m \times n$                       (C)  $m^2 + 4 \times n$                       (D)  $m^3 + n^2$                       (E)  $(m \times n)^5$
- 

11. The perimeter of an isosceles triangle is 22 cm. If the side lengths are whole numbers, how many different triangles are possible?

- (A) 5                      (B) 6                      (C) 7                      (D) 10                      (E) 11
- 

12. In a sequence, each term (from term 4 onwards) is obtained by adding the previous three terms. If the 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> terms are 8, 15 and 27, what is the 9<sup>th</sup> term?

- (A) 193                      (B) 169                      (C) 145                      (D) 121                      (E) 184
- 

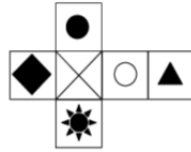
13. Which of the following is divisible by 9?

- (A)  $10^{2015} + 5$                       (B)  $10^{2015} + 6$                       (C)  $10^{2015} + 7$                       (D)  $10^{2015} + 8$                       (E)  $10^{2015} + 9$
-

14. What is the units digit (the last digit) of  $7^{2015}$ ?

- (A) 1                      (B) 9                      (C) 3                      (D) 7                      (E) 5

15. Which of the given cubes cannot be folded from this net?



- (A) (B) (C) (D) (E)

16. A palindrome reads the same forwards as backwards. For example, 151, 2332 and 14641 are all palindromes. What is the difference between the largest palindrome less than 2015 and the smallest palindrome greater than 2015?

- (A) 90                      (B) 140                      (C) 200                      (D) 100                      (E) 110

17. In this magic square, the sums of the numbers in each row, column, and diagonal are equal. What is the value of  $x$ ?

	24	$x$
18		
25		21

- (A) 26                      (B) 23                      (C) 22                      (D) 20                      (E) 19

18. After playing 300 games of Solitaire, my success rate is 47%. If I win every game from now on, how many games do I need to play in order to increase my success rate to 50%?

- (A) 9                      (B) 12                      (C) 15                      (D) 18                      (E) 21

19. Two natural numbers are said to be relatively prime if they have no factors (except 1) in common. For example, 15 and 28 are relatively prime. How many different pairs of relatively prime numbers are there in this list of numbers?

2; 14; 35; 36; 49; 51; 55?

- (A) 9                      (B) 10                      (C) 11                      (D) 12                      (E) 13

20. In a multiple choice test consisting of 20 questions, 4 marks are awarded for a correct answer, 2 marks are subtracted for a wrong answer, and 1 mark is awarded if the question is not answered. Which total mark is not possible for the test?

- (A) 59                      (B) 60                      (C) 62                      (D) 65                      (E) 68