

Mathematics Challenge

GRADE 6 FINAL ROUND

12 OCTOBER 2005

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. The figure is formed by successively joining the midpoints of the sides of a square. What fraction of the whole figure is shaded?

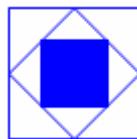
(A) $\frac{1}{3}$

(B) $\frac{1}{4}$

(C) $\frac{1}{2}$

(D) $\frac{2}{9}$

(E) $\frac{3}{8}$



2. How many small blocks are in this solid pile?

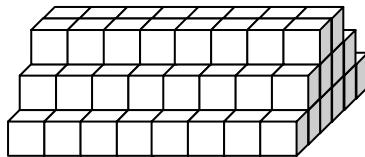
(A) 96

(B) 24

(C) 41

(D) 32

(E) 1004



3. In the magic square below the sum of the three numbers in each row, column and diagonal is 18. What number comes in block A?

| | | |
|----|---|----|
| | | A |
| 11 | 6 | |
| | | 10 |

(A) 1

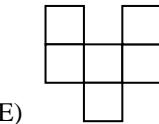
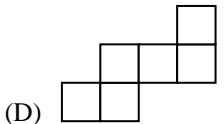
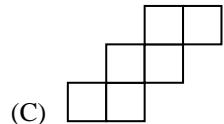
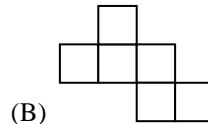
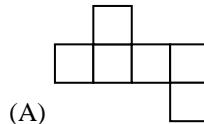
(B) 3

(C) 5

(D) 7

(E) 9

4. Which one of the following figures below *cannot* be folded along the lines to form a cube?



In cooperation with the
Western Cape Education Department
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5. What fraction is exactly halfway between $\frac{1}{5}$ and $\frac{1}{7}$?

(A) $\frac{1}{6}$

(B) $\frac{2}{12}$

(C) $\frac{1}{12}$

5. Watter breuk is presies halfpad tussen $\frac{1}{5}$ en $\frac{1}{7}$?

(D) 0,6

(E) Not one of these
Nie een hiervan nie

6. The symbol \diamond represents a number. What value of \diamond makes this sentence true?

$$\frac{\diamond}{2} = \frac{32}{\diamond}$$

(A) 4

(B) 64

(C) 8

6. Die simbool \diamond stel 'n getal voor. Watter waarde van \diamond maak hierdie getalsin waar?

$$\frac{\diamond}{2} = \frac{32}{\diamond}$$

(D) 17

(E) 16

7. The tuckshop sells ‘ combos’ which include a cooldrink, a sandwich and a chocolate. You can choose between Coke and Fanta cooldrink, between a cheese, an egg and a ham sandwich, and between a Bar One, a Lunch Bar and a Crunchie chocolate. How many different combos can you order at the tuckshop?

(A) 12

(B) 18

(C) 8

7. Die snoepwinkel verkoop pakkies wat 'n koeldrank, 'n toebroodjie en 'n sjokolade insluit. Jy kan kies tussen 'n Coke en 'n Fanta koeldrank, tussen 'n kaas-, 'n eier- en 'n ham-toebroodjie en tussen 'n Bar-One, 'n Lunch Bar en 'n Crunchie sjokolade. Hoeveel verskillende pakkies kan jy by die snoepwinkel bestel?

(D) 3

(E) 9

8. The numbers in the pattern 2, 7, 12, 17, 22, ... increase by five. The numbers in the pattern 3, 10, 17, 24, 31, ... increase by seven. The number 17 occurs in both patterns. If the two patterns are continued, what is the next number that will be seen in both patterns?

(A) 17

(B) 27

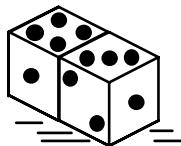
(C) 38

8. Die getalle in die patroon 2, 7, 12, 17, 22, ... neem toe met vyf. Die getalle in die patroon 3, 10, 17, 24, 31, ... neem toe met sewe. Die getal 17 kom in albei patronne voor. As die twee patronne voortgesit word, wat sal die volgende getal wees wat in albei patronne voorkom?

(D) 42

(E) 52

9. If we place dice side by side in a row on a table, only some of the faces are visible: With 2 dice in the row 8 faces are visible; with 3 dice in the row 11 faces are visible, etc. If 75 dice are placed in a row, how many faces will be visible?



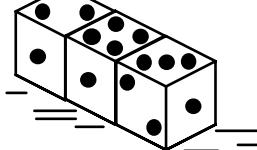
(A) 75

(B) 227

(C) 225

9. As ons dobbelstene op 'n tafel in 'n ry teen mekaar pak, is net sommige sye sigbaar: Met 2 dobbelstene in die ry is 8 sye sigbaar; met 3 in die ry is 11 sye sigbaar, ens.

Hoeveel sye sal sigbaar wees as 75 dobbelstene so in 'n ry gepak word?



(D) 300

(E) 275

10. In question 9, if 359 faces are visible, how many dice are in the row?

(A) 59

(B) 120

(C) 89

10. In vraag 9, indien 359 sye sigbaar is, hoeveel dobbelstene is daar in die ry?

(D) 119

(E) 101

11. You have three 10c coins, two 5c coins and two 20c coins. In how many different ways can you give a person 35c?

(A) 1

(B) 2

(C) 3

11. Jy het drie 10c muntstukke, twee 5c muntstukke en twee 20c muntstukke. Op hoeveel verskillende maniere kan jy 'n persoon 35c gee?

(D) 4

(E) 5

12. 102 marbles are divided among 7 boys. How many more marbles are still needed so that each boy will receive the same number of marbles and there are none left over?

(A) 1

(B) 2

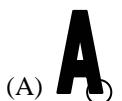
(C) 3

12. 102 albasters word tussen 7 seuns verdeel. Hoeveel albasters is nog nodig sodat elke seun dieselfde getal albasters sal hê en daar niks sal oorby nie?

(D) 4

(E) 5

13. The letter A is rotated 180° about O. What will the position of A be now?



(A)



(B)



(C)



13. Die letter A word deur 180° om O geroteer. Wat is die posisie van A nou?



(D)



(E)

14. Each of the nine small squares in the diagram are to be filled so that each row and each column contains exactly one 1, one 2 and one 3. What must $M + N$ be?

| | | |
|---|---|---|
| | | M |
| | 2 | N |
| 1 | | |

(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

15. In question 14, what is the sum of all nine numbers in the square?

(A) 9

(B) 12

(C) 15

15. In vraag 14, wat is die som van al nege getalle in die vierkant?

(D) 18

(E) 16

16. In a chess competition players get 1 point for winning a game, $\frac{1}{2}$ a point for drawing and no points for losing.

Molly played 7 games in a tournament and only lost one game. Her final score was 5 points. How many games did she win?

(A) 5

(B) 4

(C) 3

16. In 'n skaakkompetisie kry spelers 1 punt as hulle 'n wedstryd wen, $\frac{1}{2}$ punt as hulle gelykop speel en geen punte as hulle verloor nie. Molly het 7 wedstryde gespeel en slegs een verloor. Haar finale telling was 5 punte. Hoeveel wedstryde het sy gewen?

(D) 2

(E) 1

17. The sum of two numbers is 18. What is the greatest possible product of the two numbers?

(A) 36

(B) 81

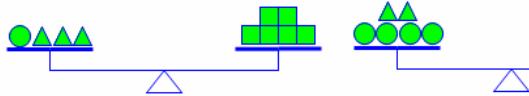
(C) 80

17. Die som van twee getalle is 18. Wat is die grootste moontlike produk van die twee getalle?

(D) 100

(E) 18

18. The first two scales below are perfectly balanced. How many squares are needed in place of ? so that the third scale will balance?



(A) 8

(B) 9

(C) 12

18. Die eerste twee skale hieronder is perfek gebalenseer. Hoeveel vierkante moet in die plek van die ? wees sodat die derde skaal balenseer?



(D) 14

(E) 10

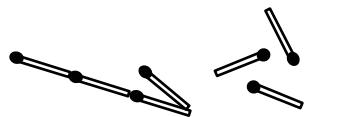
19. How many different triangles can you build with 7 whole matches? Note: the order of the sides does not matter, e.g. the triangles with sides 3, 3, 1 and 3, 1, 3 are the same.

(A) 2

(B) 3

(C) 4

19. Hoeveel verskillende driehoede kan jy met 7 heel vuurhoutjies bou? Let op dat die volgorde van die sye nie saak maak nie, bv. die driehoede met sye 3, 3, 1 en 3, 1, 3 is dieselfde.



(D) 5

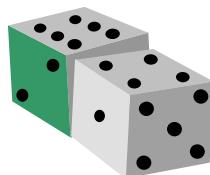
(E) 6

20. The sum of seven single-digit positive whole numbers is 17. If six of these numbers are equal, what is the other number?
 (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

21. I am thinking of a 3-digit number which:
 When it is divided by 3 the remainder is 1
 When it is divided by 4 the remainder is 2
 When it is divided by 5 the remainder is 3
 When it is divided by 9 the remainder is 7

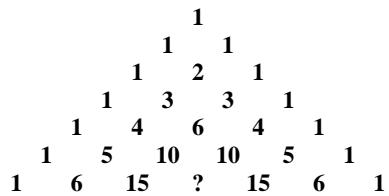
What number am I thinking of?

- (A) 58 (B) 118 (C) 598 (D) 133 (E) 178
22. The sum of the numbers on opposite sides of a dice is always 7, e.g. $2 + 5 = 7$. In the picture below, what is the sum of the numbers on the two sides facing each other?



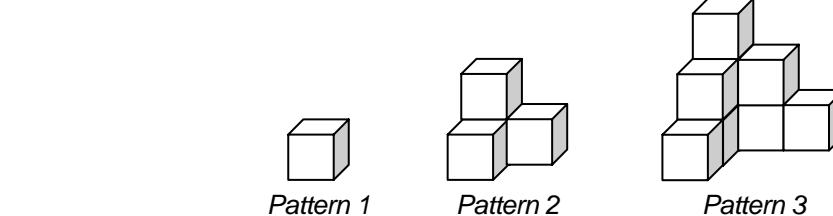
- (A) 5 or 6 (B) 4 or 7 (C) 3 or 7 (D) 4 or 8 (E) One cannot say
 Mens kan nie sê nie

23. The number pattern below is called Pascal's Triangle.
 Which number is missing?



- (A) 28 (B) 20 (C) 30 (D) 19 (E) 22
24. One piece of bubble gum and one small chocolate cost R0,90. Ten pieces of bubble gum and five small chocolates cost R4,70. How much does one small chocolate cost?
 (A) R0,96 (B) R0,04 (C) R0,90 (D) R0,86 (E) R3,80

25. Thandi builds a pattern of cubes as shown. How many cubes will there be in Pattern 20?



- (A) 312 (B) 400 (C) 412 (D) 441 (E) 40

20. Die som van sewe eensyfer positiewe heelgetalle is 17.
 As ses van die getalle gelyk is, wat is die sewende getal?

21. Ek dink aan 'n 3-syfer getal wat:
 As dit deur 3 gedeel word is die res 1
 As dit deur 4 gedeel word is die res 2
 As dit deur 5 gedeel word is die res 3
 As dit deur 9 gedeel word is die res 7
 Aan watter getal dink ek?

- (D) 133 (E) 178
22. Die som van die getalle op teenoorgestelde kante van 'n dobbelsteen is altyd 7, bv. $2 + 5 = 7$. In die prentjie hieronder, wat is die som van die getalle op die twee kante wat na mekaar toe wys?

Mens kan nie sê nie

23. Die getalpatroon hieronder word Pascal se Driehoek genoem. Watter getal ontbreek?

24. Een stuk kougom en een klein sjokolade kos saam R0,90. Tien stukke kougom en vyf klein sjokolades kos R4,70. Hoeveel kos een klein sjokolade?
 (A) R0,96 (B) R0,04 (C) R0,90 (D) R0,86 (E) R3,80

25. Thandi bou patronne met kubusse soos getoon. Hoeveel kubusse sal in Patroon 20 wees?

