

Mathematics Challenge

GRADE 7 FINAL ROUND

10 OCTOBER 2007

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!

Wiskunde-uitdaging

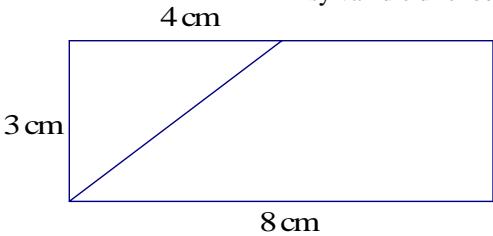
GRAAD 7 FINALE RONDE

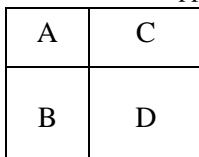
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LET OP:

- Beantwoord die vrae volgens die instruksies op die antwoordblad.
- Jy mag 'n sakrekenaar gebruik.
- Die vrae toets insig. Omslagtige berekening is dus onnodig en tydwendend.
- Ons hoop jy geniet dit!

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1. I multiplied two consecutive numbers (e.g. 4 and 5) on my calculator and got the answer 702. What is the sum of the two numbers?
- (A) 42 (B) 49 (C) 53 (D) 65 (E) 51
2. Which one of these is *not* true?
- (A) $1 \times 1 \div 1 \times 1 = 1$ (B) $2 \div 2 + 2 \div 2 = 2$ (C) $3 \times 3 - 3 + 3 = 3$ (D) $(4 - 4) \div 4 + 4 = 4$ (E) $5 + 5 \times (5 - 5) = 5$
3. The figure consists of a square of side length 2 cm, with an equilateral triangle attached to each end. What is the perimeter of the figure?
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- (A) 10 cm (B) 16 cm (C) 12 cm (D) 14 cm (E) 8 cm
4. The sketch shows a rectangle that encloses two circles each of radius 2 cm. What is the area of the rectangle?
-
- (A) 8 cm^2 (B) 32 cm^2 (C) 16 cm^2 (D) 12 cm^2 (E) 24 cm^2
5. Calculate the value of
- $$1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{3}}}$$
- (A) $1\frac{4}{7}$ (B) $\frac{4}{7}$ (C) $1\frac{2}{3}$ (D) $3\frac{1}{3}$ (E) $5\frac{1}{3}$
-

6. Which of these fractions is the largest?
 (A) $\frac{7}{15}$ (B) $\frac{3}{7}$ (C) $\frac{11}{23}$ (D) $\frac{4}{9}$ (E) $\frac{5}{11}$
7. The average of eleven numbers is 8. If a twelfth number is added to these numbers, the average of all twelve numbers is now 11. What is the twelfth number added?
 (A) 11 (B) 12 (C) 33 (D) 44 (E) 22
8. Speed and Moto are driving on the same highway in the same direction and both drive at a constant speed. Moto drives at 90 km/h and is 30 km ahead of Speed. If Speed drives at 100 km/h, how long will it take for Speed to catch Moto?
 (A) 18 min (B) 1 h (C) 2 h (D) 3 h (E) 4 h
9. A 3 cm by 8 cm rectangle is cut into 2 pieces as shown. The two pieces are then rearranged to form a right-angled triangle. How long is the shortest side of this triangle?
 (A) 9 cm (B) 6 cm (C) 4 cm (D) 7 cm (E) 5 cm
10. In question 9: What is the area of the newly formed triangle?
 (A) 24 cm^2 (B) 12 cm^2 (C) 48 cm^2 (D) 32 cm^2 (E) 16 cm^2
11. In the sketch below, Pattern 3 has nine squares and eight lines. If the pattern continues to grow, how many lines are there in P_{20} ?
 (A) 25 (B) 40 (C) 38 (D) 44 (E) 42
12. In question 11, how many lines are there in the pattern with 64 squares?
 (A) 32 (B) 18 (C) 20 (D) 30 (E) 16
13. In question 11, how many squares are there in the pattern with 64 lines?
 (A) 900 (B) 961 (C) 1024 (D) 128 (E) 841
6. Watter van hierdie breuke is die grootste?
 (A) $\frac{7}{15}$ (B) $\frac{3}{7}$ (C) $\frac{11}{23}$ (D) $\frac{4}{9}$ (E) $\frac{5}{11}$
7. Die gemiddelde van elf getalle is 8. As 'n twaalfde getal by hierdie getalle getel word, is die gemiddelde van al twaalf getalle nou 11. Wat is die twaalfde getal wat bygetel is?
 (D) 44 (E) 22
8. Speed en Moto ry op dieselfde snelweg in dieselfde rigting en albei ry teen 'n konstante spoed. Moto ry teen 90 km/h en is 30 km voor Speed. As Speed teen 100 km/h ry, hoe lank sal dit neem vir Speed om Moto in te haal?
 (D) 3 h (E) 4 h
9. 'n 3 cm by 8 cm reghoek word in twee stukke gesny soos getoon. Die twee stukke word dan herangskik om 'n reghoekige driehoek te vorm. Hoe lank is die kortste sy van die driehoek?
- 
10. In vraag 9: Wat is die oppervlakte van die nuwe driehoek?

14. With one digit you can form one number, e.g. 9. With two digits you can form two numbers, e.g. 68 and 86. How many different four-digit numbers can be formed with four different digits?
- (A) 8 (B) 10 (C) 16 (D) 24 (E) 32
15. Penny had a bag full of marbles. She gave one-third of the marbles to Manto, and then one-fourth of the remaining marbles to John. Penny then had 24 marbles left in the bag. How many marbles did she give Manto?
- (A) 12 (B) 24 (C) 48 (D) 16 (E) 15
16. The areas of rectangles A, B and C below are 12 cm^2 , 21 cm^2 and 20 cm^2 respectively. What is the area of rectangle D?
- 
- (A) 32 cm^2 (B) 35 cm^2 (C) 55 cm^2 (D) 56 cm^2 (E) 88 cm^2
17. The length of a rectangle is four times as long as its width. The perimeter of the rectangle is 100 m. What is the area of the rectangle?
- (A) 50 m^2 (B) 40 m^2 (C) 200 m^2 (D) 100 cm^2 (E) 400 m^2
18. Numbers are arranged in the following pattern:
- | | | | | | | |
|-----|-----|-----|-----|-----|-----|--------------|
| 1 | 2 | 3 | 4 | 5 | 6 | row 1 |
| 7 | 8 | 9 | 10 | 11 | 12 | row 2 |
| 13 | 14 | 15 | 16 | 17 | 18 | row 3 |
| ... | ... | ... | ... | ... | ... | row 4 |
- What will the third number in row 81 be?
- (A) 480 (B) 486 (C) 483 (D) 485 (E) 241
18. Getalle word in die volgende patroon rangskik:
- | | | | | | | |
|-----|-----|-----|-----|-----|-----|-------------|
| 1 | 2 | 3 | 4 | 5 | 6 | ry 1 |
| 7 | 8 | 9 | 10 | 11 | 12 | ry 2 |
| 13 | 14 | 15 | 16 | 17 | 18 | ry 3 |
| ... | ... | ... | ... | ... | ... | ry 4 |
- Wat sal die derde getal in ry 81 wees?
19. In question 18, in which row will the number 4321 be?
- (A) 711 (B) 701 (C) 719 (D) 721 (E) 720
20. Check this number pattern:
- $$1 = 1 \times 1$$
- $$1 + 3 = 2 \times 2$$
- $$1 + 3 + 5 = 3 \times 3$$
- $$1 + 3 + 5 + 7 = 4 \times 4$$
- Now calculate
 $1 + 3 + 5 + 7 + \dots$ all the way up to ... + 97 + 99
- (A) 2500 (B) 10000 (C) 2401 (D) 50000 (E) 2601
20. Kontroleer hierdie getalpatroon:
- $$1 = 1 \times 1$$
- $$1 + 3 = 2 \times 2$$
- $$1 + 3 + 5 = 3 \times 3$$
- $$1 + 3 + 5 + 7 = 4 \times 4$$
- Bereken nou
 $1 + 3 + 5 + 7 + \dots$ al die pad tot by ... + 97 + 99

21. How many two-digit numbers are there with both digits odd?
 (A) 20 (B) 25 (C) 45 (D) 50 (E) 30

22. Lee buys two drinks and one ice-cream for R15. Kim buys one drink and two ice-creams for R12. How much will Mario pay for one drink and one ice-cream?
 (A) R12 (B) R11 (C) R8 (D) R9 (E) R10

23. In question 22, what does a drink cost?
 (A) R6 (B) R3 (C) R9 (D) R4 (E) R5,50

24. x and y are positive whole numbers. How many different pairs of x and y values makes this number sentence true?

$$x + y + x \times y = 63$$

 (A) 5 (B) 4 (C) 3 (D) 2 (E) 1

25. On the planet Alpha they have a different kind of arithmetic. Here are a few Alpha calculations:

$$\begin{array}{ll} 3 + 1 = 4 & 4 \times 3 = 0 \\ 3 + 2 = 5 & 4 \times 2 = 2 \\ 4 + 5 = 3 & 5 \times 4 = 2 \\ 5 + 1 = 0 & 4 \times 4 = 4 \end{array}$$

What is the answer of $2 \times 5 + 4$ on Alpha?
 (A) 4 (B) 5 (C) 2 (D) 3 (E) 6

21. Hoeveel tweesyfer-getalle is daar met beide syfers onewe?
 (D) 50 (E) 30

22. Lee koop twee koeldranken en een roomys vir R15. Kim koop een koeldrank en twee roomyse vir R12. Hoeveel sal Mario betaal vir een koeldrank en een roomys?
 (D) R9 (E) R10

23. In vraag 22, wat kos 'n koeldrank?
 (D) R4 (E) R5,50

24. x en y is positiewe heelgetalle. Hoeveel verskillende pare x en y waardes maak hierdie getalsin waar?

$$x + y + x \times y = 63$$

 (D) 2 (E) 1

25. Op die planeet Alpha doen hulle 'n ander soort rekenkunde. Hier is 'n paar Alpha berekeninge:

$$\begin{array}{ll} 3 + 1 = 4 & 4 \times 3 = 0 \\ 3 + 2 = 5 & 4 \times 2 = 2 \\ 4 + 5 = 3 & 5 \times 4 = 2 \\ 5 + 1 = 0 & 4 \times 4 = 4 \end{array}$$

Wat is die antwoord van $2 \times 5 + 4$ op Alpha?
 (D) 3 (E) 6