

KWAZULU NATAL PROBLEM SOLVING

MATHEMATICS CHALLENGE 2006

GRADE 10

DATE: WEDNESDAY 23 AUGUST 2006
DURATION: 90 MINUTES

GENERAL INFORMATION

1. Congratulations on being selected to participate in this challenge.
2. This examination paper consists of 20 questions.
3. Enter your final answer in the correct block on the ANSWER SHEET. Working details are not required.
4. Candidates that qualify to the SECOND ROUND will be required to show full working details.
5. Each question is worth 1 point. No marks are deducted for incorrect answers.
6. Calculators or other computing devices are NOT allowed.
7. Some questions have blanks. You are expected to fill in the blanks.
8. For multiple choice questions, write only the LETTER of your choice.
9. Please do not turn over until the invigilator gives you the signal

1. Simplify

$$\frac{4}{5} - 1\frac{1}{2} + \frac{3}{4}$$

2. Solve for x :

$$3x - 7 = 2(x - 3)$$

3. In 1980 Zola paid R0, 80 for a toy.



Today he paid R8.

What was the % increase in the price?

4. If $y = \frac{2x-1}{2x+1}$, make x the subject of the formula.

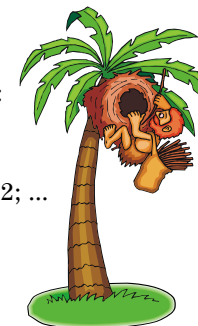
5. Simplify:

$$(100 - 10)(99 - 10)(98 - 10) \dots \\ \dots (3 - 10)(2 - 10)(1 - 10).$$

6. Round $\frac{300,14 \times 0,0999}{5,99}$ off to the nearest integer.

7. What is the next number in the pattern:

2; 3; 6; 15; 42; ...

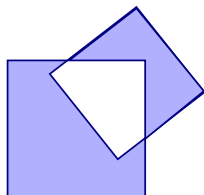


8. 90 students plan a camping trip and they take food to last 3 weeks.



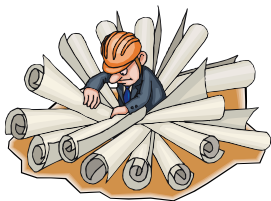
However, 5 students do not go.
How many days will the food last now?

9. In the figure $\frac{3}{4}$ of the small



square is shaded and $\frac{6}{7}$ of the big square is shaded. What is ratio of the area of big square to the area of the small square.

10. A three digit number is reversed and the two numbers are subtracted (e.g. $981 - 189$).



The first and the last digits of the answer are 3 and 6 respectively. What is the middle digit?

11. The year 1296 was a 'Square Year' since $1296 = 36^2$.



Which is the next 'Square Year' after 2006?

12. Four interior angles of a pentagon are 170° , 80° , 95° and 105° .

Calculate the remaining angle.

13. Toothpaste tube is in the shape of a cylinder of length 12 cm and diameter 4 cm.

The opening nozzle is a cylinder of diameter 5 mm.



What length of toothpaste can be squeezed out of the tube?

14. Solve for n if $\frac{1}{6} < \frac{n}{8} < \frac{3}{4}$ and n is a positive integer.

15. At 10 am two cyclists are 20 km apart. If they cycle towards each other (along the same road) at an



average speed of 10km/h and 14 km/h respectively at what time will they meet?

16. In $\triangle ABC$, $\angle A = 2x$, $\angle B = 2x + y$ and $\angle C = y - x$.

If $\angle B + \angle C = 70^\circ$ calculate the largest angle of $\triangle ABC$.

17. A lift is designed to carry 6 adults with an average mass of 95 kg.

How many teenagers with an average mass of 65 kg can the lift carry?

18. Ronaldo scored $2006^2 - 2007 \times 2005 + 2008 \times 2004 - 2009 \times 2003 + 9$ goals in the World Cup games.



How many goals did he score?

19. ABCDE is a regular pentagon.

P is a point inside the pentagon such that $\triangle ABP$ is equilateral.

Find $\angle DPE$.

20. If $f(n) = 2f(n - 1) + 3f(n - 2)$ and $f(3) = 1$ and $f(4) = 2$.

Calculate $f(7)$.