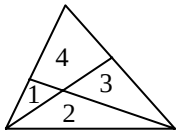
NOTES ON 2004 MEMORANDUM

These notes are necessarily brief and often formal and symbolic.
Many questions could be answered using primitive methods, e.g. "If today is Wednesday, what day of the week will it be 100 days from now?" can be done by counting. That would be laborious, time-consuming and error-prone. The essence of a mathematical approach is to work more smartly by using appropriate representations to model the situation and to exploit the inherent structures and patterns in the situation.

GRADE 4(1)

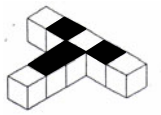
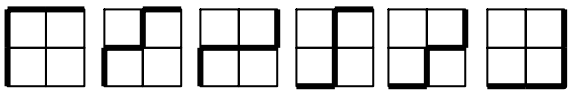
1. 

Invent some notation and count systematically, e.g.:
Areas 1, 2, and 3 each form a triangle (3)
1-2, 2-3, 3-4, 4-1 each form a triangle (4)
1-2-3-4 form a triangle (1)
2. $12 - 3 = 9$, so $\nabla - 12 = 9$, so $\nabla = 9$
3. 1,7 m – 1,05 m = 0,65 m
4. Equal groups, so $629 \div 37 = 17$
5. 340ml in a can of coke
6. 08:00 – 70 min → 06:50
7. 2004 is a leap year, so Jan, Feb, March: 31 +29 + 31 = 91 days, so the 100th day is on 9 April
8. 18×10
9. Make *equal parts,* e.g. 16 triangles, then 8/16 triangles = 1/2 is shaded. Or 8 squares with 1/2 of each square shaded, so 1/2 of whole is shaded.
10. R42,37 – 4 × R9,89 = R2,81
11. The second stack consists of 2 x 2 blocks, the third of 3 x 3 blocks,…,the eighth of 8 x 8 blocks
12. Make a sketch: 

So 15 + ? = 75
13. 11 (*you* and 10 others!) – 3 + 1 – 5 + 3 – 6 = 1
14. Make a systematic list: 1 + 1 = 2; 1 + 2 = 3; ...; 6 + 6 = 12
    Possible totals are 2; 3; 4; ….; 11; 12, i.e. 11 different possible answers.
15. Try each number, e.g. $10 \times 3 \rightarrow 30 + 3 = 33$. Or work backwards: $36 - 3 \rightarrow 33 \div 3 \rightarrow 11$
16. Check each answer, e.g. $19 = 2\times7 + 5$; $17 = 2\times5 + 7$; $15 = 3\times 5$, etc. But you know, or you learn from these calculations, that the sum of three odd numbers is odd, so 18 is not possible!
17. The 1st and 4th and 2nd and 3rd rows/columns are left-right/top-down reverses . . .
18. 3 crosses = heart, so 6 crosses = 2 hearts, so X = 2 hearts = 4 Δ
19. $(71 + 24) + 71 (71 - 24) = 3 \times 71 = 213$
20. Check answers systematically, e.g. 80 = 50 + 20 + 10; 32 = 20 + 10 + 2; 62 = 50 + 10 + 2; etc.
21. Imagine yourself positioned to the left exactly behind the building and describe what you see …
22. 4:8 = 1:2. Share R30 into 3 equal parts, i.e. R10 each, then Thabo pays 1 part.
    Or: One bottle costs R30 ÷12 = R2,50, so 4 bottles cost 4 × R2,50 = R10
23. Continue pattern of subtracting 4 cm/hour. Or the formula is Height = $32 - 2 \times$ time
24. Sipho saves R1,50 + 75c per week, i.e. 75c/week more than Thembo, i.e. 12 × 75c more in 12 weeks
25. 1, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 31, 41, 51, 61, 71, 81, 91, 100 → 21 ones

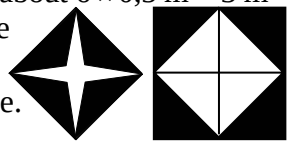
GRADE 4(F)

1. 20:60 should show as 21:00
2. The watch gains 2 minutes every day (24 hours) for 7 days = 2 min/day× 7 days = 14 minutes
3. 2 hours and 55 minutes before 16:45 is 13:50
4. 7 + 8 = 15. So Sizwe caught 7 fish
7. If Zuki has ♥ marbles, Zinkle has ♥ – 15. Together they have 2×♥ – 15 = 95 marbles. So ♥ = 55

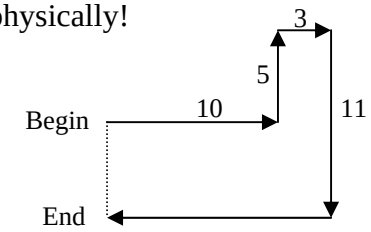
8. 
9. 257 + Δ = 438, so Δ = 438 – 257 = 181 km
10. 438 + 169 = 607 km
11. The width is 750 mm + 2×75 mm = 900 mm, the height is 450 + 2×75 mm = 600 mm
    So total length = 2×(900 mm + 600 mm) = 3000 mm = 3m
12. R45,65 x 3 = R136,95
13. 1,7 × 2 = 3,4; 3,4 × 2 = 6,8; 6,8 × 2 = 13,6
14. If you look directly from behind the tower of the building will be on your left hand side
15. 37 will be opposite 38, therefore Con lives opposite Luke
16. Delia has 71 + 24, Thandi has 71 – 24. In total they have 71+24 + 71 + 71–24 = 71 × 3 = 213
17. Eby, Ram, Temba, Siva, Oscar – from tallest to shortest
18. R35,60 ÷40 = 89c so 89c × 15 = R13,35
19. **4** × 3 → 12 + 8 → 20 ÷ 2 → 10 – 6 → **4**
20. $\frac{3}{4} + \frac{3}{4} \rightarrow 1\frac{1}{2} + \frac{3}{4} \rightarrow 2\frac{1}{4} + \frac{3}{4} \rightarrow 3 + \frac{3}{4} \rightarrow 3\frac{3}{4} + \frac{3}{4} \rightarrow 4\frac{1}{2}$
    ① ② ③ ④ ⑤ ⑥
21. 
23. List all the possibilities and be systematic:
    1 + 1 = 2 2 + 2 = 4 3 + 3 = 6 4 + 4 = 8 5 + 5 = 10 6 + 6 = 12
    1 + 2 = 3 2 + 3 = 5 3 + 4 = 7 4 + 5 = 9 5 + 6 = 11
    Any other combination will be a repetition – therefore 11 possible answers
24. Let the children be 1, 2, 3, 4 and 5. List all the possibilities and be systematic:
    1 vs 2 2 vs 3 3 vs 4 4 vs 5
    1 vs 3 2 vs 4 3 vs 5
    1 vs 4 2 vs 5
    1 vs 5
25. 1; 4; 9; 16; … = 1×1; 2×2; 3×3; 4×4; … So 20 × 20 = 400

GRADE 5(1)

1. 8 – 7,93 = 0,07 < 8,08 – 8 = 0,08
2. (234469 + 234562)/2
3. 14 × Δ = 280, so Δ = 280 ÷ 14
4. Try and test each possible answer!
5. Measure how many baskets fit into the tree. It is about 6, so the tree measures about 6 × 0,5 m = 3 m
7. Fold the black triangles into the white square … they will fit exactly. So the black and white areas are equal, so the black area is 1/2 of the whole.
   Or, if you see 4 squares, them 1/2 of each square is shaded, i.e. 1/2 of whole.
   Or, cut the figure into equal triangles, then 4/8 = 1/2 triangles are shaded.



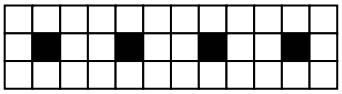
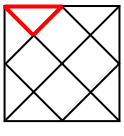
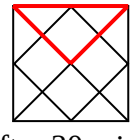
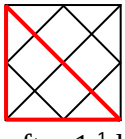
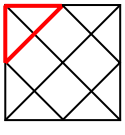
8. 08:30 – 35 min → 07:55
9. Draw it physically!



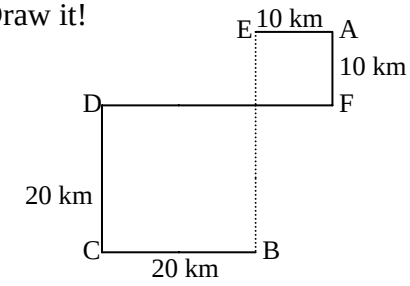
10. Only the block that is right in the middle, and cant be seen from outside.

11. Continue the pattern of adding 5.
    Or, the formula is Output = 5 × Input + 2, so Output (6) = 5 × 6 + 2
12. Start numbering (painting) the sides …
13. Rotate the figures to the same position …
14. In 90 (= 80 + 10) minutes she walks $(4 \times \frac{2}{3}) + (\frac{1}{2}\text{ of }\frac{2}{3}) = \frac{8}{3} + \frac{1}{3} = \frac{9}{3} = 3$ km
15. If C pupils like chocolate, then 4 + 2 × C = 40, so C = (40 – 4)/2
16. 2-1 + 3-2 + 4-3 + 5-4 + 6-5 + ...+ 101-100
    1 (1) 1 (2) 1 (3) 1 (4) 1 (5) 1 (100)
17. If Ferdi's starting number is S, then he did S × 10 = 600. So S = 60. So correct answer is 60 ÷ 10 = 6
18. Peter worked 3 out of the 6 hours, so he should get 3/6 = 1/2 of R48 = R24
19. Make a systematic list of all the possibilities: 32; 34; 31 | 23; 24; 21 | 43; 42; 41 | 13; 12; 14
20. They drink $\frac{1}{2} + (\frac{1}{3}\text{ of }\frac{1}{2}) = \frac{1}{2} + \frac{1}{6} = \frac{2}{3}$ of the milk, so $\frac{1}{3}$ of the milk is left
21. If their ages are *a*, *b* and *c*, then (*a* + 10) + (*b* + 10) + (*c* +10) = 100, so *a* + *b* + *c* = 70
22. The numbers are one more than a multiple of 4 – check each of the given answers …
    Or the generating formula is 4*n* + 1, check if 4*n* + 1= 6152 gives a whole number solution, etc.
23. The 71th multiple of 4 plus 1 = 71 × 4 + 1 = 285
24. List them systematically: 997; 988; 979 898; 889 799
25. 8 pencils will then cost R48,85 – R36,05 = R12,80. One pencil will cost R12,80 ÷ 8 = R1,60.
    16 pencils will cost 16 × R1,60 = R25,60. But Jerry paid R36,05 for 16 pencils and a pen. So the pen costs R36,05 – R25,60 = R10,45.

GRADE 5(F)

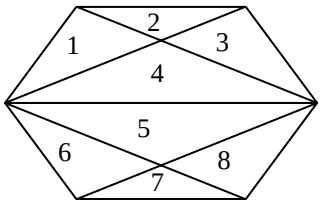
1. 8 × 4 × 2 = 64
2. These are multiples of 7. Test by division, use your calculator!
3. The trip is 31 min, therefor 12:30 + 31 min → 13:01
4. 500 ÷ 12 = 41,6667. Therefore 42 boxes
5. The photo is enlarged 3 times. 22 × 3 = 66 mm
6. If the loser had Δ votes, the winner had Δ + 1002 votes. Together 2×Δ + 1002 = 39218
7.  $\frac{4}{36} = \frac{1}{9}$
8. 274 – 245 = 29
9. Light: 6 12 18 24
   Bell: 8 16 24
11. $\frac{1}{2}$ of $\frac{1}{3} = \frac{1}{6}$
12. 5 litres + 1 litre = 6 litres; 6 × 5 = 30 litres; 5 × 5 = 25 litres
13. 19 can be made up of: 1 tricycle and 8 bicycles = total of 9 (too much)
    3 tricycles and 10 bicycles = total of 13 (too much)
    5 tricycles and 2 bicycles = total of 7 (just right)
14. 99 m = $\frac{9}{10}$ of roll, so 11 m = $\frac{1}{10}$ of roll. Therefore $\frac{10}{10}$ of role = 10 × 11 m = 110 m
15. There are triangles of 4 different sizes. Below, one of each size is highlighted and the number of triangles of that size is indicated:
     (8)  (4)  (4)  (4)
16. man: 2 km after 30 min, 6 km after 1 $\frac{1}{2}$ hours
    wife: 0 km after 30 min, 6 km after 1 $\frac{1}{2}$ hours

17. He buys 12 lollies, each 5c cheaper than the original price. So that is 60c cheaper, so the two extra lollies cost 60c, so 10 lollies cost 5×60c = R3,00
18. 5 + 3 + 3 + 3 + … = 44. So 44 – 5 = 39; 39 ÷ 3 = 13; 13 + 1 = 14
19. 5 + 8 + 11 + 14 + 17 + 20 + 23 + 26 + 29 + 32 + 35 + 38 + 41 +44 = 49 × 7 = 343
20. Make a systematic list and note the number patterns:
    6×20 + 1×10
    5×20 + 3×10
    4×20 + 5×10
    3×20 + 7×10
    2×20 + 9×10
    1×20 + 11×10
    0×20 + 13×10
21. R11,50 × 5 = R57,50; R57,50 – R11,50 – R11,50 = R34,50
22. Draw it!

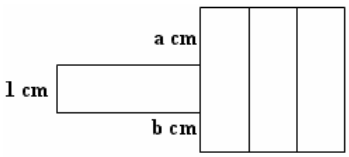


23. 2×20 + 2 = 42
24. (220 – 2) ÷ 2 = 109
25. The number of matches must be an even number (why?), so it cannot be 821

GRADE 6(1)

1. To compare, form equivalent fractions (1000 ths). Or convert all the fractions to decimals …
2. Try trial and error, e.g. 8 + 9 + 10 + …
   Or test each of the given numbers …
   Or, if the smallest is x, then $x + (x + 1) + (x + 2) + \ldots + (x + 6) = 7 \times x + 21 = 63$, so $x = 6$
3. 9 small cubes fit onto the bottom, then there are 3 such layers, so 9 × 3 = 27
4. The pattern is ÷ 6; ÷ 7; ÷ 8; ÷ 9; …
5. $\frac{13}{20}$ is more than $\frac{12}{20}$ ($\frac{3}{5}$) and less than $\frac{16}{20}$ ($\frac{4}{5}$), so he is on side DE
6. He still has $\frac{7}{20}$ of the distance to go, so $\frac{7}{20}$ of 25 cm = (25 cm ÷ 20) × 7 = 8,75 cm
7. 

   Invent some notation and count systematically, e.g.:
   Areas 1 to 8 each form a triangle (8)
   1-2, 2-3, 3-4, 4-1 each form a triangle (4)
   6-5, 5-8, 8-7, 7-6 each form a triangle (4)
8. Make equal parts … Or imagine folding the four corners to the inside … (See Grade 5(1), no 7)
10. Trial and improvement, or check the given numbers …
12. $\frac{2004 + 2003}{2004 - 2003}$
13. Although we do not know the length of a or b, we know that a + b = 2 …



14. 4 books = 2 books + 6 kg, so 2 books = 6 kg, so 1 book = 3 kg
15. The pattern is 1 + **1** + 1 + **2** + 1 + **3** + 1 + **4** + **1** + **(5** + **1** + **6** + **1** + **5)** + **2** + 1 + 8 + 1
16. Make a systematic list, e.g. 3579; 3597 | 3759; 3795 | 3957; 3975 | 9375; 9357 | 9537 …
    Or: He has 4 choices for the first number, then 3 choices for the second, 2 for the third and 1 for the fourth. So 4 × 3 × 2 × 1

17. Check all cases and note behaviour: $1 \times 17 = 17$; $2 \times 16 = 32$; $3 \times 15 = 45$; $4 \times 14 = 56$; etc.
18. Continue both patterns … Or: $17 + 5 \times 7 = 17 + 35 = 52$
19. Length = $12 + 2 \times$ Mass, so Length (15) = $12 + 2 \times 15 = 42$
20. The first three may be blue, red and brown. Then the next one must match one of these colours
21. You can maybe take out, e.g. 10 red, then 10 brown, then 1 blue, then the next one is also blue
22. Make a systematic list, e.g. 11; 13; 15; 17; 19 | 31; 33; 35; 37; 39 | 51; 53; 55; 57; 59 | etc.
23. Generate special cases and organise the data systematically, e.g. in a table, and find patterns:

Row	1	2	3	4	5	6
# triangles	1	3	5	7	9	11

Use the pattern, e.g. # triangles = $2 \times$ Row $- 1$
So in Row 50 there are $2 \times 50 - 1$ triangles

24. Generate special cases and organise the data systematically, e.g. in a table and find patterns:

# rows	1	2	3	4	5	6
# triangles	1	4	9	16	25	36

Use the pattern, e.g. # triangles = $50 \times 50 = 2500$

25. According to question 24 there are 2500 triangles, so the number in the last triangle is 2500!

GRADE 6(F)

1. 365 days ÷ 7days/week = 52 weeks and 1 day …

2005 Wed	2009 Mon
2006 Thurs	2010 Tues
2007 Fri	2011 Wed
2008 Sun (Leap Year!)	2012 Fri (Leap Year!)

2. 5,6 + 5,65 → 11,25 ÷ 2 → 5,625
5. 4653 – 2583 = 2070; 2070 ÷ 90 = 23
7. $\frac{5}{6} = \frac{40}{48}$ and $\frac{7}{8} = \frac{42}{48}$ $\therefore \frac{41}{48}$
8. From half to full in 1 minute $\therefore$ 59 minutes
9. See Grade 4(1) number 11
10. If the book costs Rx, the CD costs Rx + 60. Together they cost $x + x + 60 = 230$
So $x = (230 - 60) \div 2$ = R85
13. $43 = 8 \times 5 + 3$; $78 = 10 \times 7 + 5 + 3$; $56 = 8 \times 7$; $47 = 6 \times 7 + 5$. So all are possible
14. Jane eats 24 sweets in 5 minutes and 48 sweets in 10 minutes
15. $41 + 35 - 30 = 46$; $50 - 46 = 4$
16. 3000 ÷ 100 = 30; 30 x 5 = 150 defective bulbs or 100 ÷ 20 = 5; 3000 ÷ 20 = 150
17. Draw, name some points and look for number patterns …
18.

2	3	
3	5	+2
4	?	+3
5	12	+4
6	17	+5

19. Guess the middle possible number, i.e. 2 (first guess)
If I say you are correct. you have finished.
If I say 2 is too big, then 1 must be right (second guess)
But if I say 2 is too small, guess 3 (second guess).
If I say 3 is correct, you have finished. If I say 3 is too small, then 4 must be right (third guess)
20. Follow the same pattern as in 19: Guess 8, then 4, then 2, … Or 8, 12,14, … A total of 5 guesses.

21. $P_n = 4 \times n + 1$, so $P_{20} = 4 \times 20 + 1$
22. 11, 22, 33, 44, 55, 66, 77, 88, 99, (9)
    101, 111, 121, 131, 141, 151, 161, 171, 181, 191, (10)
    202, 212, 222, 232, 242, 252, 262, 272, 282, 292, (10)
    303, etc. (10)
    404, etc. (10)
    So the total is 49
23. $3 \times 20 + 1 = 61$
24. $(223 - 1) \div 3 = 74$
25. The number of matches must be 1 more than a multiple of 3 (why?), so it cannot be 821 (why not?)

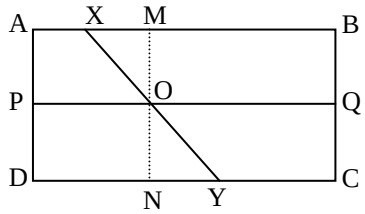
GRADE 7(1)

3. The pattern is that 80/100 = 240/300 = 80%. So 80% of R700 = R560
4. Divide 420 into 7 equal parts:$420 \div 7 = 60$. 3 of these parts are dresses, i.e. $3 \times 60 = 180$
5. Use the structure, e.g. 12×2 cm above, 13×2 cm below, plus 2 cm left and 2 cm right
6. These numbers are cubes: 6^3 ; 5^3 ; 4^3 ; 3^3 ; …
7. 1/3 of 2/3 = 2/9
8. $\frac{8}{11} - \frac{5}{8} = \frac{9}{88}$ of tank is 135 ℓ. So $\frac{1}{88}$ of tank = 135 $\ell \div 9$ = 15 ℓ. So the full tank =15 $\ell \times 88$
9. Find a pattern in 3; 9; 15; … N(n) = 6n – 3, so $N(81) = 6 \times 81 - 6$
   Or: the last column is multiples of 6, so last number in row 81 is 81×6 - 486. So, ...
10. If she is now x years old, then in 3 years $x + 3 = 3(x - 3)$, so $x = 6$
11. Use fact that the area of a triangle is half of area of a rectangle …
12. $T_n = 3 \times n + 1$
13. $X_n = 4 \times n + 1$
14. Petrol used for 325 (i.e. $3 \times 100 + 25$) km = $3 \times 7{,}6\ \ell + 7{,}6\ \ell \div 4 = 24{,}7\ \ell$. So petrol left = $45\ \ell - 24{,}7\ \ell$
15. If the original price is Rx, then final new price is $1{,}30 \times (1{,}10 \times Rx) = 1{,}32 \times Rx$, i.e. 32% more …
16. Volume = $15 \times 8 \times x = 120$, so $x = 1$ cm. So area is (15 cm + 2 cm) × (8 cm + 2 cm) = 170 cm^2
17. Make a systematic list: For Jan: 31 ÷ 1, 30 ÷ 1, etc – 31 days; … For Nov: 22 ÷ 11, 11 ÷ 11; etc.
18. The smallest is $10 \times 10 = 100$, the largest, by trial and test is $31 \times 31 = 961$. So 31 – 10 + 1 = 22
19. $$(1-\frac{1}{2}) \times (1-\frac{1}{3}) \times (1-\frac{1}{4}) \times \ \ldots \ \times (1-\frac{1}{2004})$$
    $$= \frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \ \ldots \ \times \frac{2002}{2003} \times \frac{2003}{2004} = \frac{1}{2004}$$
21. If the youngest sister has Rx, then we can represent the situation symbolically by:
    $x + (x + 2) + (x + 4) + (x + 6) + (x + 8) = 100$, so $5 \times x + 20 = 100$
    Or think of it like this: to make an equal sharing situation, first take away the extra money they get (2 + 4 + 6 + 8 = R20). Then there is R80 to be shared equally between the 5 sisters – each receives R16. The give them the R2, R4, etc. that they get more than the younger sister.
22. If there are x learners in class, then $3 \times x + 31 = 4 \times x + 8$, so $x = 23$, so …
    Or: After giving each learner 3 pages the teacher has 31 pages left. If she now gives every learner a 4th page, she has 8 left, which means she handed out 31 – 8 = 23 papers, so there are 23 learners.
23. $x_1 + x_2 + \ldots + x_7 = 7 \times 49$
    $\therefore (x_1 + 1) + (x_2 + 2) + \ldots + (x_7 + 7) = (x_1 + x_2 + \ldots + x_7) + (1 + 2 + \ldots + 7) = 7 \times 49 + 4 \times 7$
    To get the new average, divide by 7: $(7 \times 49 + 4 \times 7)/7 = 49 + 4$
24. You can draw it, or investigate numerical patterns for a triangle, square, pentagon, hexagon, etc.
    Or you can reason it out: At each vertex of an n-gon there are $n - 3$ diagonals (the point is connected to every other point, except to the two adjacent points and itself). So at n vertices there are $n \times (n - 3)$ diagonals. But do not count the diagonals twice!
    So the formula is $D(n) = n \times (n - 3) \div 2$, so $D(8) = 8 \times (8 - 3) \div 2 = 20$

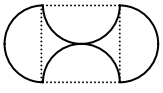
25. When meeting, the distances travelled by A and B are equal.
    Distance = speed × time, so if B travels t hours, then $70t = 50(t + 2)$
    Or: In the 2 hours start that A has, it will cover 50 km/h × 2 h = 100 km. Bus B must now cover this 100 km difference in distance at a (70 – 50) km/h difference in speed. So, at 20 km/h faster, B will cover the extra 100 km in 5 hours.

GRADE 7(F)

1. First pick up 7 then 1 then 6 etc
2. $4 + 4 - 4 \div 4 = 4 + 4 - 1 = 8 - 1 \neq 1$
3. $\frac{2}{8}$ or $\frac{1}{4}$
4. $\frac{3}{8}$
5. For the explanation we name the rectangle ABCD with the line PQ dividing the rectangle in two equal pieces and line XY crossing line PQ at O.



    We know that area OQCY and area YDPO are equal (OP = YC – given and PD = CQ - given).
    Therefore the area of OQCY will be a half of the rectangle PQCD.
    The area of rectangle PQCD = 2 cm × 8 cm = 16 cm^2.
    Half of 16 cm^2 = 8 cm^2 = area of OQCY.
    To work out the area of APOX, we drop the line MN so that triangle OMX ≡ ONY.
    We know NY = 2 cm (5 cm – 3 cm) and NO = 2 cm (given).
    Area of ONY = $\frac{1}{2}(2) \times 2$ = 2 cm^2. This is also equal to area of OMX (OMX ≡ ONY)
    Area of AMOP = 3 cm × 2 cm = 6 cm^2.
    Area of AXOP = Area of AMOP – area of OMX = 6 cm^2 – 2 cm^2 = 4 cm^2.
    The shaded area = area of AXOP + area of OQCY = 8 cm^2 + 4 cm^2 = 12 cm^2.
6. Looking right from the top: 5 cm^2. Right from the bottom: 5 cm^2. Right from the front: 4 cm^2. Right from the back: 4 cm^2. From the right: 4 cm^2. And from the left: 4 cm^2.
    4 cm^2 + 4 cm^2 + 4 cm^2 +4 cm^2 + 5 cm^2 + 5 cm^2 = 26 cm^2.
7. The area of the semi-circles on the left and right side is equal to the area of a full circle.
    $\Pi r^2 = \Pi 3^2$ = 28,27433… cm^2…①
    The area of the square (see the sketch below) is 6 × 6 = 36 cm^2. But we need the area of the square minus the area of the 2 semi-circles: 36 cm^2 – 28,27433 cm^2 = 7,725666… cm^2…②
    ① + ② = 28,27433 + 7,725666 = 36 cm^2.



8. $\sqrt{702}$ = 26,495… therefore 26 × 27 = 702 and 26 + 27 = 53
10. Take for e.g. a 2 × 2 × 2 room. To paint each of the wall he will paint an area of 2 × 2 as well as another 2 × 2 area for the roof, therefore 5(2 × 2) = 20. If you double all the measurements it will be 5(4 × 4) = 80. 80 is four times more than 20. So it will take him four times longer to paint the bigger room. If it took him 2 days to paint the smaller room, it will take him 8 days to paint the bigger room.

11. If her average for the first 4 tests was 67%, we can also express it as (67 + 67 + 67 + 67) ÷ 4. So 67 + 67 + 67 + 67 + 63 + 67 = 398. 398 ÷ 6 = 66,33
12. 20, 22, 24, 26, 28, 40, 42, 44, 46, 48, 60, 62, 64, 66, 68, 80, 82, 84, 86, 88
13. R9,46 = 114%, so R9,46 ÷ 114 × 14 = R1,16
14. $\frac{1}{13} < \frac{5}{61} < \frac{1}{12}$ and $\frac{1}{5} < \frac{13}{57} < \frac{1}{4}$, therefore 12, 11, 10, 9, 8, 7, 6 and 5
15. In four years time Sandy will be 7 and Mandy will be 14. At this moment Sandy is 3 years old and Mandy is 10 years old. 3 + 10 = 13
18. $d = 2{,}4 - 0{,}05 \times t = 2{,}4 - 0{,}05 \times 22 = 2{,}4 - 1{,}1 = 1{,}3$ cm
19. Interpret the formula $d = 2{,}4 - 0{,}05 \times t$ in the physical situation: It means that at a temperature of 0°C the gap is 2,4 cm. Then as the temperature increases, the gap becomes smaller, corresponding to our knowledge of science that heat causes expansion …

    Our science knowledge also tells us that if the temperature *decreases*, the length of metal will decrease, which means the size of the gap becomes *bigger!* To make the size of the gap bigger, we will have to add!

    Logically, we can deduce that in $2{,}4 - 0{,}05 \times 22$ we are *subtracting*, so probably in $2{,}4 - 0{,}05 \times (-2)$ we will have to add

Temp (°C)	0	1	2	3	4	5
Gap (cm)	2,4	2,35	2,30	2,25	2,20	2,15

20. Let C be the cost of a coke and D the cost of a packet of chips. The cost of the first buy is 6C + 7D and of the second is 8C + 4D: So you bought 2 Cokes more, but 3 chips less, so 2 Cokes cost just as much as 3 packets of chips (compare the sentence 6C + 7D = 8C + 4D). So instead of 8C + 4D = 4 × 2C + 4D = 4 × 3D + 4D = 12D + 4D = 16D
21. If he eats x bananas in the last hour, then $(x + 15) + (x + 10) + (x + 5) + x = 90$
    So $4 \times x + 30 = 90$, so $4 \times x = 60$, so $x = 1$
22. 26 letters in the alphabet. Each letter can go together with itself and all the other letters. 26 × 26 = 676
23. 4×20 + 1 = 61
24. (225 – 1) ÷ 4 = 56
25. The number of matches must be 1 more than a multiple of 4 (why?), so it cannot be 431 (why not?)