20. a) Lollipops cost 12p each, or a pack of 3 costs 30p.

×6 = £1.80

£1.80 for

6 × 3 = 18 Lollipops

I have £2 to spend.

What is the maximum number of lollipops I can buy?

20p left

→ they can buy one more.

18 + 1 = 19

& left with 8p.
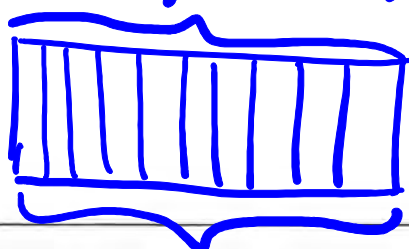
................19.......lollipops (2 marks)

b)

Every 100g of brown bread contains 6g of fibre.

A small loaf of bread weighs 400g and has 10 equal slices.
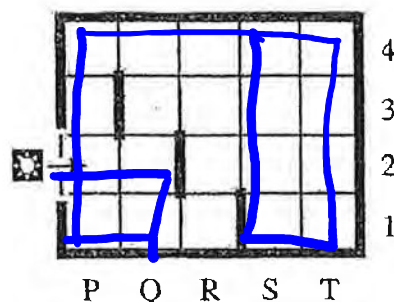
How much fibre is there in one slice?

24g of fibre → 4 × 6g of fibre = 24g of fibre

24 ÷ 10 = 2·4

10 Slices

................2·4.......g (3 marks)

21. The robot in the diagram has been programmed to move in a straight line and, if it meets a wall (shown by a thick line), to turn to its right by 90° and then to continue straight on.

If it cannot go straight or turn right, it will stop.

What will happen to the robot? (Write A, B, C, D or E as your answer.)

    A. It will stop at square P2.

    B. It will stop at square P1

    C. It will stop at square T1.

    D. It will stop at square S1.

    E. It will never stop.
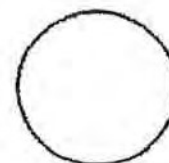
...........**E**...............(3 marks)

22. Kate is looking at a 3-D mathematical object.

When she looks at it from the front, this is what she sees:

When she looks down at it from above, this is what she sees:
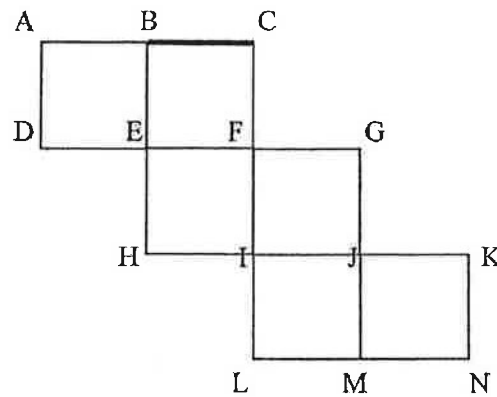
What is the mathematical name for Kate's 3-D object?

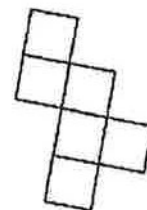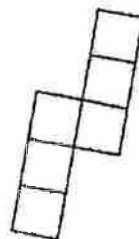.....**Cone**...(1 mark)

23. i) The diagram shows a net of a cube.

Which edge meets the edge BC when the net is folded to form the cube?

A   B   C

D   E   F   G

H   I   J   K

L   M   N

KN

.......................(2 marks)

ii) Which of the following are possible nets for a cube?

(Write 'yes' or 'no' in each of the spaces provided.)
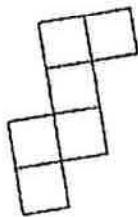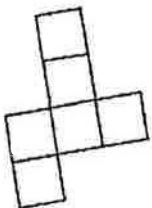
....**yes**....   ....**yes**....   ....**yes**....   ....**yes**....

(3 marks)

24. a) Calculate $(9999 - 999 + 99 - 9) \div 9$.

$9000 + 90$

$9090 \div 9 =$

...**10.10**....(2 marks)

b) What is the value of 20% of $(60)^2$?

$60^2 = 3600$

$10\% \ of \ 3600 = 360$

$20\% \ " \quad " \quad = 720$

......**720**....(2 marks)

25. a) What is the smallest positive number that can be divided exactly by 2, 3, 4, 6 and 8 without a remainder?

16 ✗

24 ✓

......**24**......(2 marks)

b) What is the largest 4-digit number that can be formed by using four different digits that add up to 18?

......**9810**......(2 marks)

26. a) On the cards below, each club ♣ has the same value and each

   spade ♠ has the same value (but a different value to each club).

   The number on each card is the total value of the symbols on that

   card. Find the value of one club ♣ .

[Handwritten annotations on first card (value 20): clubs circled → 6, spades circled → 14]

[Handwritten annotations on second card (value 27): one spade circled → extra]

20   **27**

extra 7

♠ = 6/2 = 3

♠ = 7

♣ = ...**3**......(3 marks)

---

27. Claire is two years older than her brother and five years younger than

   her sister. The total of their ages is 87 years.

   How old is Claire?

[Handwritten bar model diagram labelled B, C, S, total 87]

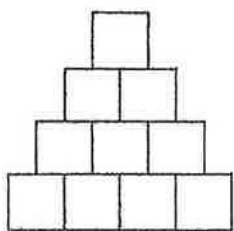87 - 5 - 2 - 2 = 78

28

......**28**......years (3 marks)

3 units = 78
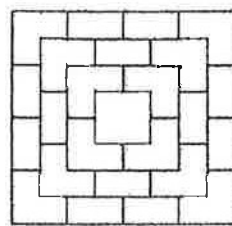1 unit = 78 ÷ 3 = 26
→ Claire 26 + 2 = 28

28. Here are the side view and top view of a *solid* pyramid.

    The pyramid was made by using cubes as building blocks.

    How many blocks did it take to make the pyramid?

    SIDE VIEW   TOP VIEW

    1 + 4 + 9 + 16 = 30

    ......**30**.......blocks (3 marks)

---

29. James cycles home from school every day in a particular week and tries
    to beat the school bus. Think about the following possible events:

    X. James beats the bus on Monday.   *Beats 1/5 (maybe more)*
                                           4/5 left?
    Y. James beats the bus on Monday, but not on any other day. *1/5 for sure*

    Z. James beats the bus on Monday but not on Tuesday. *B 1/5*
                                                            3/5 left

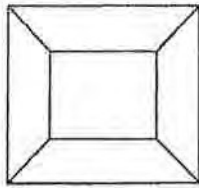   i) Which event (X, Y or Z) is the *most* likely to happen?

        ....**X**........(1 mark)

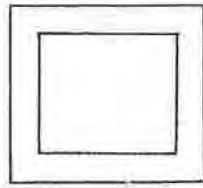   ii) Which event (X, Y or Z) is the *least* likely to happen?

        ....**Y**.........(1 mark)

TURN OVER!

30.a)
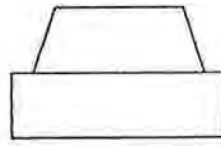
A   B   C
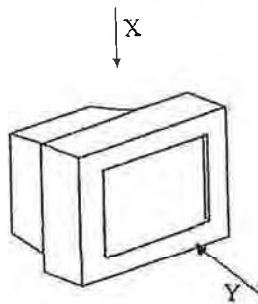
i) Which view (A, B or C) can I get by looking

down at the 3-D object from above,

in the direction of arrow X?

...........**C**..... (1 mark)

ii) Which view (A, B or C) can I get by looking

at the object from the front,

in the direction of arrow Y?

............**B**..... (1 mark)

b) Which view (P, Q or R) can I get by looking down at the cylinder from

above, in the direction of arrow Z?
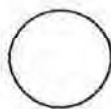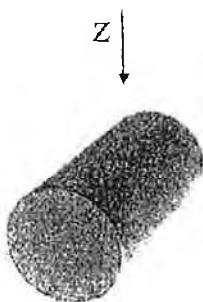
P   Q   R

...........**Q**........(1 mark)

YOU HAVE NOW FINISHED SECTION A.

NOTE: THERE ARE **NO** SECTIONS B OR C.

THE NEXT SECTION IS SECTION D.

SECTION D

DO NOT START THIS SECTION UNTIL YOU HAVE DONE AS MUCH AS YOU CAN IN SECTION A.

YOU ARE NOT EXPECTED TO BE ABLE TO DO ALL OF THESE QUESTIONS.

IF YOU CANNOT ANSWER A PARTICULAR QUESTION TRY THE NEXT ONE.

DO AS MANY QUESTIONS AS YOU CAN.

ANY MARKS YOU SCORE IN THIS SECTION WILL BE ADDED TO YOUR TOTAL.

1. Look at this pattern:

$$3^2 = 1^2 + 8$$
$$4^2 = 2^2 + 12$$
$$5^2 = 3^2 + 16$$
$$6^2 = 4^2 + 20$$

(a) Write down the next line of the pattern:

$$7^2 = 5^2 + 24$$

(1 mark)

(b) *Use the pattern* to complete this line:

$$20^2 = 18^2 + 76$$

(2 marks)

$$2 \times (20 + 18) = 76$$

(c) *Use the pattern* and the fact that $249^2 = 62001$

to find the value of 251^2.

$$251^2 = 249^2 + 1000 = 63,001$$

$$2 \times (251 + 249)$$

63001 ....(3 marks)

2. a) How many square numbers are there from 1 to 10 000 inclusive?

$1^2, 2^2, 3^2, 4^2, 5^2, \ldots, 100^2$

$1, 4, 9, 16, 25, \ldots, 10\,000$

...................(2 marks)

$Ans = 100$

b) The area of a right angled triangle is 32 cm^2.

The lengths, in cm, of the two shorter sides are both different square numbers bigger than 1.
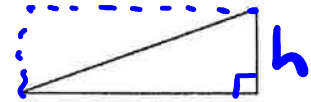
What are the lengths of the two shorter sides?

$area \;\triangle = \dfrac{b \times h}{2} \rightarrow \dfrac{Check}{}$

$\dfrac{4 \times 16}{2} = 32cm^2$

$32cm^2 = \dfrac{b \times h}{2}$

$b \times h = 64 cm^2$ ....4..cm, ...16......cm (3 marks)

both square numbers.

$\boxed{4} \times \boxed{16} = 64$

3. a)   *Use* the fact that $17 \times 18 \times 19 = 5814$ ×2 ×2 ×2

$x^2($ ×2(×4(

to work out the value of $34 \times 36 \times 38.$

46512 .... (2 marks)

b)   Seven *consecutive* whole numbers add up to 7357.

1048

What is the largest of the seven numbers?

$7357 - 21 = 7336$

$7336 \div 7 = \underline{1048}$

7357

1054 ....(3 marks)

$1048 + 6 = 1054$

c)   When three *consecutive* whole numbers are multiplied together,

Barmodel   the answer is 990.   What are the three numbers?

$10 \times 10 \times 10 = 1000$

$9 \times 10 = 90$

$90 \times 11 = 990$ **9** , **10** , **11** ...(2 marks)

4. On Planet Cash, money is measured in Tinkles and Clinks.

Here is an addition sum (which is known to be correct).

$5 + 4 + 3 + 3 = 15 \text{ tinkles} = 2 \text{ Clinks}$ & 3

Clinks	Tinkles
2 .	5
2 .	4
+ 1 .	3
1 .	3
8	3

$2 + 2 + 1 + 1 \leftarrow$
$= 6$

each clink $= 6$

i) How many Tinkles make one Clink?

..........**6**.........Tinkles (2 marks)

ii) Work out the answer to this subtraction.

Clinks	Tinkles
3	3 + 6
− 2	5
1	**4**

(2 marks)

iii) Work out the answer to this division. $2 + 18 = 20$

$20 \div 4 = 5$

	Clinks	Tinkles
4	7	2 +18
	1	**5**

(2 marks)

5. A sequence of *solid* 'towers' is built from cubes, as shown below:

| 1 | 2 | 3 |
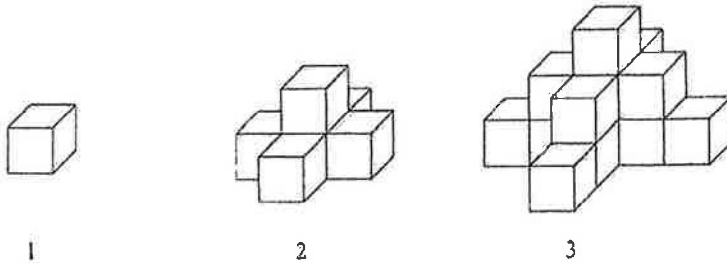
i) Complete the table:

Tower number	1	2	3	4
Number of cubes used to make tower	1	6	15	28

(handwritten:) 5 | 6 | 7

(handwritten brackets under table:) +5 +9 +13

(handwritten:) +4 +4

(2 marks)

ii) How many cubes will there be in the 7th tower?

(handwritten:) 91

.....................(3 marks)

iii) How many *more* cubes will there be in the 11th tower than in the 10th tower?

(handwritten:) 7th 8th 9th 10th 11th

91 − − − − 41

+29 +33 +37 +41

or

thinking about how many more 4s
(difficult to show with space)

.....................(3 marks)

6. Here is some information about Sports Day:

• There were 4 teams: Red, Blue, Green, Yellow	• There were 6 races: Parents race, Sack race, Egg-And-Spoon, Three-Legged race, Obstacle race, Nose Pushing race
• Blue won the Obstacle race, just beating Yellow, but Blue came last in the Egg-And-Spoon, which was won by Green	• In the Parents, Sack and Three-Legged races, Blue came second and Green came last
• Everyone won at least one race	• There was exactly the same result in the Sack race as there was in the Three-Legged race
• Red came first on two occasions, with Blue second each time	• First and third in the Nose race and Parents race were the same, but were the opposite way round in the Three-Legged race
• Yellow came third three times and first twice	• Red did not win the Nose race
• Green came last three times, but Yellow never came last	• The winner of each race got 6 points, second got 4 points, third 3 points, fourth 2 points

i) Use the information to complete the following table to show each result:

	Red	Blue	Green	Yellow
Parents	3rd	2nd	4th	1st
Sack	1st	2nd	4th	3rd
Egg-And-Spoon	2nd	4th	1st	3rd
Three-Legged	1st	2nd	4th	3rd
Obstacle	4th	1st	3rd	2nd
Nose Pushing	3rd	4th	2nd	1st

(4 marks)

ii) How many points did each team score?

Red...**24**..., Blue...**22**..., Green...**19**..., Yellow...**25**...

(3 marks)
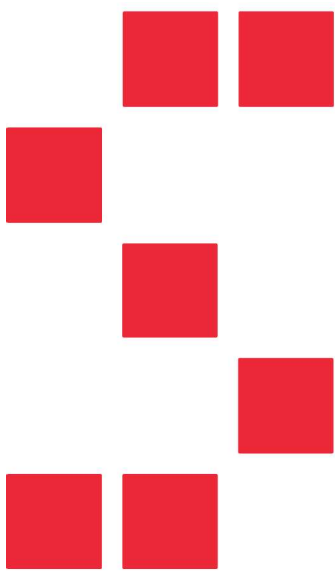
iii) Which team won Sports Day?   **Yellow**...(1 mark)

STOP! Now go back and CHECK your work.

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