**P5**

1. 5A + 5B = 81
   5B + 5C = 83
   5C + 5D = 86
   5A – 5D = 2
   5A + 5C = 86 + 2 = 88
   5A + 5B + 5C = (81 + 83 + 88) ÷ 2 = 126

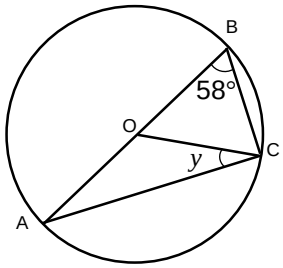
   Number of students in 5A = 126 – 83 = <u>43</u>
   Number of students in 5B = 81 – 43 = <u>38</u>
   Number of students in 5C = 83 – 38 = <u>45</u>
   Number of students in 5D = 43 – 2 = <u>41</u>

2. For 3ABABA to be divisible by 6, 3ABABA must be divisible by 2 and 3,
   that is, A is an even number (0, 2, 4, 6 or 8), and 3 + A + B + A + B + A is divisible by 3.
   Since 3 + 3A + 2B is divisible by 3, then 2B must be divisible by 3.
   Hence B could be 0, 3, 6 or 9.
   Total possible combinations for A and B = 5 × 4 = 20
   However, the numbers 300000 and 366666 cannot be included as in these cases, A is the same as B. Hence, the answer is 20 – 2 = <u>18</u>

3. If David was telling the truth, then Andy and Chum would be telling the truth as well.
   Since only 1 person was telling the truth, then Beng, Chum and David must all be lying, and so only Andy must be telling the truth.
   Since Chum was lying when he said “it wasn’t me”, so <u>Chum</u> must be the robber.

4. Total mass of the boys = 41 × 2 units = 82 units
   Total mass of the girls = 35 × 1 unit 35 units
   Total mass of boys and girls = 82 + 35 = 117
   117 ÷ 3 units = 39
   Average mass of the whole class is <u>39 kg</u>.

5. $\angle OBC = 58°$ and $\angle OCB = 58°$ because $\Delta OCB$ is isosceles,
   $\angle OCA = \angle OAC = \angle y$ because $\Delta OAC$ is isosceles,
   $\angle OBC + \angle OCB + \angle OCA + \angle OAC = 180°$ (Sum of angles of $\Delta ABC$)
   $58 + 58 + y + y = 180°$
   $2y = 180° – 116°$
   $2y = 64°$
   $y = \underline{32°}$



6. Factors of 84 = 1 × 84, 2 × 42, 3 × 28, 4 × 21, 6 × 14, 7 × 12

Factors of 70 = 1 × 70, 2 × 35, 5 × 14, 7 × 10

Factors of 30 = 1 × 30, 2 × 15, 3 × 10, 5 × 6

Common factors of 84 and 70 → 1, 2, 7 and 14

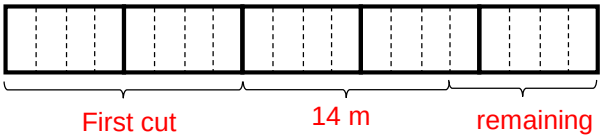
Common factors of 84 and 30 → 1, 2, 3 and 6

6 × 14 = 84

The length (between 84 $cm^2$ and 70 $cm^2$) is 14 cm.
The breadth (between 84 $cm^2$ and 30 $cm^2$) is 6 cm.
The height = 70 ÷ 14 = 5 cm
Volume = 14 × 6 × 5 = 420 $cm^3$

7. First cut = $\frac{2}{5} = \frac{8}{20}$

Remaining length = $\frac{1}{4} = \frac{5}{20}$




20 – 8 – 5 = 7 units
7 units = 14 m
5 units = (14 ÷ 7) × 5 = 10 m

The remaining length is <u>10 m</u>.

8. Let the initial mass be 1 unit.
After 1 week, it is 1 × 1.2 = 1.2 units;
After 2 weeks, it is 1.2 × 1.2 = 1.44 units;
After 3 weeks, it is 1.44 × 1.2 = 1.728 units
After 4 weeks, it is 1.728 × 1.2 = 2.48832 units
Thus after just less than 4 weeks, the chicken doubled their mass.
The chicken farm keeps the chicken for a minimum of <u>4 weeks</u>.

9. $\frac{1}{A} + \frac{7}{3A}$

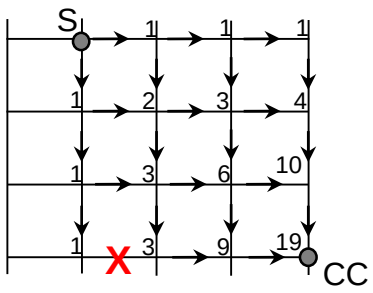
$= \frac{3+7}{3A} = \frac{5}{6}$

$= \frac{10}{3A} = \frac{10}{12}$

Therefore, 3A = 12, and A = <u>4</u>

10. Highest possible score = 20 × 4 = 80
For each miss, the score drops by 6 + 4 = 10 points.
80 – 30 = 50
50 ÷ 10 = 5
Paul missed <u>5 times</u>.

11. Number of different possible ways = <u>19</u>




12.

| | 6A | 6B | 6C | | Dancing | Playing Piano | Baking |
|---|---|---|---|---|---|---|---|
| Emma | ✓ | × | × | | × | ✓ | × |
| Faith | × | ✓ | × | | × | × | ✓ |
| Gina | × | × | ✓ | | ✓ | × | × |

Since Faith, who is not from 6C, does not like playing the piano, she is also therefore not in class 6A. So, Faith is from 6B.
Since the girl who likes to dance is not from 6B, so Faith's hobby is not dancing either.
Therefore, Faith is from 6B and likes baking.
Emma's hobby must be playing the piano and is from 6A, and Gina must be from 6C and likes dancing.

13. The least common multiple of 12, 15 and 20 is 60.
60 ÷ 12 = 5 (group A)
60 ÷ 15 = 4 (group B)
60 ÷ 20 = 3 (group C)
Ratio of monkeys in groups A, B and C is <u>5 : 4 : 3</u>

14. 20% of the males = 5 people + 30% of females
100% of males and 100% of females = 250 people
20% of males and 20% of females = 20% of 250 = 50 correspondents
20% of males = 50 people – 20% of females
5 people + 30% of females = 50 people – 20% of females
50% of females = 45 people
100% of females = 90 people
The number of males that took part in the survey = 250 – 90 = <u>160</u>

15. $\left(1-\frac{1}{5}-\frac{1}{4}-\frac{1}{8}-\frac{1}{8}\right)$ of the apples = 5 + 7 apples

$\frac{12}{40}$ of the apples = 12 apples

Number of apples at first = <u>40</u>

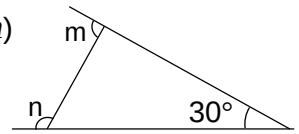
16. Company A:
Total salaries for 4 years = 30 000 + 32 000 + 34 000 + 36 000 = $132 000

Company B:
First year salaries = 2000 × 12 = $24 000
Second to fourth year salaries = (2000 × 36) + 100 + 200 + 300 …. + 3600
$= \$72\,000 + \frac{3700 \times 36}{2}$
= $138 600
Total salary over 4 years = 24 000 + 138 600 = $162 600

<u>Company B</u> will pay him <u>$30,600</u> more.

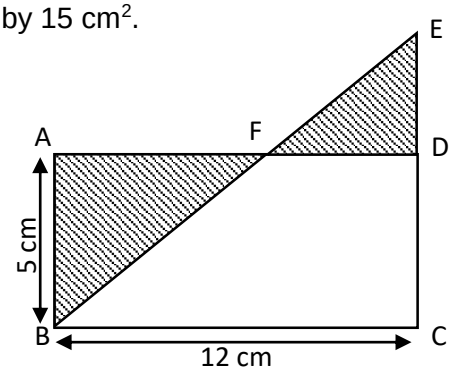
17. *Let* $A + B + C = 45 \times 3$,
$A + B + D = 60 \times 3$,
$A + C + D = 65 \times 3$, *and*
$B + C + D = 70 \times 3$
$3A + 3B + 3C + 3D = (45 + 60 + 65 + 70) \times 3$
*Average of A, B, C and D* $= (45 \times 3 + 60 \times 3 + 65 \times 3 + 70 \times 3) \div 3 \div 4 =$ <u>*60*</u>

18. Sum of angles of a triangle = 180° = 30° + (180° – *m*) + (180° – *n*)




180° = 390° – *m* – *n*
*n* = 210° – *m*
Since $m = \frac{2}{3}n$ or $n = \frac{3}{2}m$
then $\frac{3}{2}m = 210° - m$
$\frac{5}{2}m = 210°$
$m = 84°$

19. Since the area of triangle FED is 15 cm$^2$ smaller than triangle ABF, then the area of triangle BCE is smaller than area of rectangle ABCD by 15 cm$^2$.
Therefore, $\frac{1}{2} \times 12 \times (ED + 5) + 15 = 12 \times 5$
6ED + 30 + 15 = 60
6ED = 60 – 45 = 15
ED = <u>2.5 cm</u>



20. 30% of Jar B = 24% of Jar C
This means that if there are 10 units in Jar B,
then 3 units of B = 24% of C
1 unit of B = 8% of C
10 units of B = 80% of C
100% of C = 12.5 units of B

Also, 3 units of B = 50% of A
100% of A = 6 units of B

A : B : C
= 6 : 10 : 12.5
= 12 : 20 : 25

25 – 20 = 5 more units in C than in B
Percentage = $\frac{5}{20} \times 100\%$ = <u>25%</u>

21. $\frac{3}{7}$ of tank $\rightarrow$ $2\frac{2}{5}$ litres

$\frac{3}{4}$ of tank $= \frac{3}{4} \div \frac{3}{7} \times \frac{12}{5}$ litres

$= \frac{3}{4} \times \frac{7}{3} \times \frac{12}{5}$ litres

$= \frac{21}{5}$ litres

$\frac{12}{5}$ litres $\rightarrow$ $\frac{4}{5}$ hours

$\frac{21}{5}$ litres $\rightarrow$ $\frac{21}{5} \div \frac{12}{5} \times \frac{4}{5}$ hours

$= \frac{21}{5} \times \frac{5}{12} \times \frac{4}{5}$ hours

$= \frac{7}{5}$ hours = $1\frac{2}{5}$ hours

$1\frac{2}{5}$ hours $= \frac{7}{5} \times 60$ = <u>84 min</u>

22. Luke $\rightarrow$ 1 unit
Mary $\rightarrow$ 4 units
Doris $\rightarrow$ $\frac{1}{10} \times (1 + 4)$ units = $\frac{1}{2}$ unit
Grace $\rightarrow$ 4 units
John $\rightarrow$ 4 units less 14 hours

$(1 + 4 + \frac{1}{2} + 4 + 4)$ units = (175 + 14) hours
$13\frac{1}{2}$ units = 189 hours
1 unit = 14 hours
John worked (4 × 14) – 14 = 42 hours
Doris worked 14 ÷ 2 = 7 hours

Ratio of hours John worked to hours Doris worked is 42 : 7 or <u>6 : 1</u>

23. Since each of them were each given numbers 1 to 5, if Peter was told any of the following numbers, he would be able to tell what the two numbers that were picked were:

| | |
|---|---|
| $1 \rightarrow 1 \times 1$ | The two numbers are 1 and 1. |
| $2 \rightarrow 1 \times 2$ | The two numbers are 1 and 2. |
| $3 \rightarrow 1 \times 3$ | The two numbers are 1 and 3. |
| $5 \rightarrow 1 \times 5$ | The two numbers are 1 and 5. |
| $6 \rightarrow 2 \times 3$ | The two numbers are 2 and 3. |
| $7 \rightarrow 1 \times 7$ | The two numbers are 1 and 7. |
| $8 \rightarrow 2 \times 4$ | The two numbers are 2 and 4. |
| $9 \rightarrow 3 \times 3$ | The two numbers are 3 and 3. |
| $10 \rightarrow 2 \times 5$ | The two numbers are 2 and 5. |
| $12 \rightarrow 3 \times 4$ | The two numbers are 3 and 4. |
| $15 \rightarrow 3 \times 5$ | The two numbers are 3 and 5. |
| $16 \rightarrow 4 \times 4$ | The two numbers are 4 and 4. |
| $20 \rightarrow 4 \times 5$ | The two numbers are 4 and 5. |
| $25 \rightarrow 5 \times 5$ | The two numbers are 5 and 5. |

(Products 11, 13, 14, 17, 18, 19, 21, 22, 23 and 24 cannot be formed.)

The only product that is ambiguous is 4 since 4 could be equal to $1 \times 4$ or $2 \times 2$. Therefore, when Peter said that he did not know the numbers, Sally would be able to know that the product Peter was told had to be 4.

Since Sally said that the sum she was told is larger than the product Peter was told, the two numbers that were picked had to be <u>1 and 4</u> (sum = 5) and not 2 and 2 (sum = 4).

24.

| + | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |

As can be seen in the table, there is only 1 way to get the sum of 2; 2 ways to get the sum of 3; 3 ways to get the sum of 4 and so on. The sum of 7 can be formed in 6 ways, hence it is the most likely total.

25. First row: $1 + 2 + 3 + \ldots + 50 = \frac{(50+1)\times 50}{2} = 1275$

Second row: $2 + 3 + 4 + \ldots + 51 = \frac{(2+51)\times 50}{2} = 1325$

:

Last row: $50 + 51 + 52 + \ldots + 99 = \frac{(50+99)\times 50}{2} = 3725$

Total = $\frac{(1275+3725)\times 50}{2} =$ <u>125 000</u>