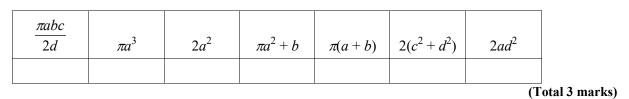1.   The table shows some expressions.
      The letters a, b, c and d represent lengths.
      π and 2 are numbers that have no dimensions.
      Three of the expressions could represent areas.

      Tick ($\checkmark$) the boxes underneath the **three** expressions which could represent areas.

$\dfrac{\pi abc}{2d}$	πa^3	$2a^2$	$\pi a^2 + b$	$\pi(a + b)$	$2(c^2 + d^2)$	$2ad^2$

(Total 3 marks)

2.   The table shows some expressions.

      a, b, c and d represent lengths.

      π and 3 are numbers which have no dimensions.

$3a^2$	$\dfrac{\pi ab^3}{3d}$	πbc	$ac + bd$	$\pi(a + b)$	$3(c + d)^3$	$3\pi bc^2$

      Tick ($\checkmark$) the boxes underneath the **three** expressions which could represent volumes.

(Total 3 marks)

3.   This table shows some expressions.

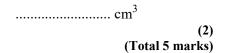   The letters x, y and z represent lengths.

      (a)   Place a tick in the appropriate column for each expression to show whether the expression
             can be used to represent a length, an area, a volume or none of these.

Expression	Length	Area	Volume	None of these
$x + y + z$				
xyz				
$xy + yz + x$				

(3)

The volume of a cube is 8 m³.

(b)   Change 8 m³ to cm³.

.... cm³

(2)
(Total 5 marks)

4.   The table shows some expressions.

p, q and *r* represent lengths.
π, 2, 3 and 4 are values that have no dimension.

Place a tick (✔) in the appropriate column for each expression to show whether the expression can be used to represent a length, an area, a volume or none of these.

Expression	Length	Area	Volume	None of these
3*pqr*				
4*p* + 2*q*				
π*r*²				

(Total 3 marks)

1.   Tick boxes 1,3 & 6   3

$B1$ for $\dfrac{\pi abc}{2d}$; $B1$ for $2a^2$; $B1$ for $2(c^2 + d^2)$

(–B1 for each additional expression ticked (>3) to a minimum of 0)

[3]

2. $\dfrac{\pi ab^3}{3d}$ $3(c + d)^3$ $3\pi bc^2$ 3

	√				√	√

B3 (B1 for each one correct)
Nb –B1 for each of the 4th, 5th, 6th tick

[3]

3. (a) Length
        Volume
        Area   3
            B1 for Length
            B1 for Volume
            B1 for Area

     (b) 8×10^6 2

        $8 \times 100 \times 100 \times 100$
            M1 for sight of $100 \times 100 \times 100$ oe
            A1 for 8000000 oe

                                                                   [5]

4. volume   3
            B1 cao

     Length
            B1 cao

     Area
            B1 cao

                                                                   [3]

1.   Mathematics A

Paper 3

The majority of candidates gained either one or two marks. $2(c^2 + d^2)$ and $2a^2$ were the two correct expressions most commonly identified. The most popular wrong answer was $2ad^2$. Unfortunately, some candidates lost marks because they ignored the instructions and ticked more than three boxes.

Paper 5

The vast majority of candidates gained credit in this question on dimensions. The most common error was omitting the first expression, $\dfrac{\pi abc}{2d}$ and replacing it by the fourth expression, $\pi a^2 + b$.

Mathematics B

Paper 18

The majority of candidates were able to score at least one mark on this question. $2ad^2$ was a popular incorrect answer.

Paper 16

37% gained 2 or more marks. 53% did not score.

2.   **Specification A**

       Higher Tier

       Many candidates scored well on this question with a majority of grade C candidates, or above, obtaining at least two of the three marks. The most common incorrect choices were $3a^2$ and πbc.

       Intermediate Tier

       Quite well answered. Most candidates earned at least 2 marks.

       Specification B

       Higher Tier

       Virtually all candidates were able to gain some credit with their answers to this question with approximately 55% of candidates gaining full marks.

       Intermediate Tier

       Many candidates gained at least one mark in this question and often more, without fully convincing the reader of their understanding of dimensional analysis.

3.   The majority of candidates were able to score some marks in part (a). The recognition of $xy + yz + xz$ as an expression for an area caused the most problems. Part (b) was poorly done. Few candidates knew how to convert m^3 into cm^3. 800 cm^3 was frequently given as an incorrect answer. A number of candidates clearly misunderstood the concept of m^3 as a unit and interpreted the value given as a cube of sides 8m thus obtaining the incorrect answer of 512 000 000 cm^3.

4.   Mistakes in this question usually centred around identifying the dimensions of $3pqr$ and $4p + 2q$, with πr^2 usually being correctly associated with area.