HIGHER

# 6.5 Expanding Triple Brackets: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

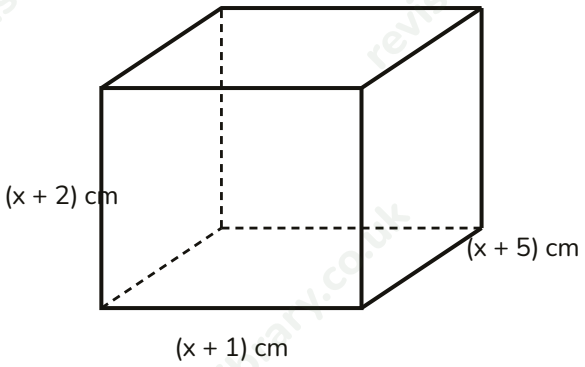
**1** Expand and simplify $(x + 1)(x + 2)(x + 3)$.

**(Total for Question 1 is 3 marks)**


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**2** A cuboid has dimensions (x + 1) cm, (x + 2) cm and (x + 5) cm, where x > 0.

Diagram NOT accurately drawn




**(a)** Show that the volume, V $cm^3$, of the cuboid is given by $V = x^3 + 8x^2 + 17x + 10$ **(3)**

**(b)** Use your calculator to work out the volume of the cuboid when x = 3.5 cm. Give your answer to 3 significant figures. **(2)**

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**(Total for Question 2 is 5 marks)**

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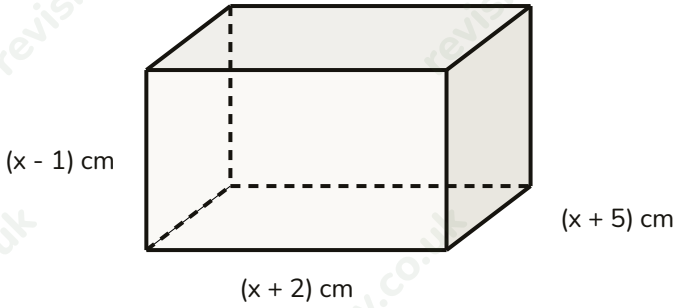
**3** Work out the coefficient of $x^2$ in the expansion of (x + 1)(x + 1)(x + 5).

**(Total for Question 3 is 3 marks)**


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**4** A cuboid has length (x + 2) cm, width (x + 5) cm and height (x - 1) cm. Find an expression for the volume of the cuboid in the form $ax^3 + bx^2 + cx + d$.

Diagram NOT accurately drawn




**(Total for Question 4 is 3 marks)**

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**5** Expand and simplify (x - 1)(x - 2)(x - 3).

**(Total for Question 5 is 3 marks)**


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**6** When $(x + 3)(x - 2)(2x + k)$ is expanded and simplified, the coefficient of $x^2$ is 5.
Find the value of k.

**(Total for Question 6 is 3 marks)**

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**7** Expand and simplify $(3 - x)(x + 1)(x + 4)$.

**(Total for Question 7 is 4 marks)**


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# Mark scheme · 6.5 Expanding Triple Brackets: 30-minute Pack

## Question 1

| | |
|---|---|
| expands any two of the three brackets correctly, e.g. $x^2 + 3x + 2$ (oe) | **M1** |
| multiplies their quadratic by the remaining linear bracket, with at least 4 of the 6 terms correct | **M1** |
| $x^3 + 6x^2 + 11x + 6$ (cao) | **A1** |

**Answer: $x^3 + 6x^2 + 11x + 6$**

## Question 2

| | |
|---|---|
| (a) expands $(x + 1)(x + 2)$ correctly, $x^2 + 3x + 2$ (oe) | **M1** |
| (a) multiplies their quadratic by $(x + 5)$, with at least 4 of the 6 terms correct | **M1** |
| (a) $x^3 + 8x^2 + 17x + 10$ shown correctly with no errors (cso) | **A1** |

**(a) Answer: $x^3 + 8x^2 + 17x + 10$ (shown)**

| | |
|---|---|
| (b) substitutes $x = 3.5$ into $V = x^3 + 8x^2 + 17x + 10$ (or into $(x+1)(x+2)(x+5)$) | **M1** |
| (b) awrt 210 $cm^3$ (units not required for the mark but expected in the answer space) | **A1** |

**(b) Answer: 210 $cm^3$ (3 s.f.)**

## Question 3

| | |
|---|---|
| expands two brackets correctly | **M1** |
| identifies the terms of the cubic giving $x^2$ | **M1** |
| 7 cao | **A1** |

**Answer: 7**

## Question 4

| | |
|---|---|
| multiplies two of the expressions | **M1** |
| multiplies by the third expression | **M1** |
| $x^3 + 6x^2 + 3x - 10$ $cm^3$ cao | **A1** |

**Answer: $x^3 + 6x^2 + 3x - 10$ $cm^3$**

## Question 5

| | |
|---|---|
| expands two of the three brackets correctly, e.g. $(x-1)(x-2) = x^2-3x+2$ oe | **M1** |
| (dep) multiplies their quadratic by the remaining bracket, with at least 4 of the 6 terms correct | **M1** |
| $x^3 - 6x^2 + 11x - 6$ cao | **A1** |

**Answer: $x^3 - 6x^2 + 11x - 6$**

## Question 6

| | |
|---|---|
| expands $(x + 3)(x - 2)$ correctly, $x^2 + x - 6$ (oe) | **M1** |
| expands $(x^2 + x - 6)(2x + k)$ in terms of k and identifies the $x^2$ coefficient as $(k + 2)$, oe | **M1** |
| $k = 3$ (cao) | **A1** |

**Answer: $k = 3$**

## Question 7

| | |
|---|---|
| expands $(x+1)(x+4)$ correctly to get $x^2+5x+4$ oe | **M1** |
| (dep) multiplies their quadratic by $(3-x)$, taking care with signs, with at least 4 of the 6 terms correct | **M1** |
| correct unsimplified expansion, e.g. $3x^2+15x+12-x^3-5x^2-4x$ oe | **A1** |
| $-x^3 - 2x^2 + 11x + 12$ oe cao | **A1** |

**Answer: $-x^3 - 2x^2 + 11x + 12$**


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