GCSE - Numeracy and Mathematics Topic: Dimensions	Tier: Intermediate	Grade: B

Starter

Simplify the following:

a) 2a + a +3c

b) $3n^2$ + 3m + p + $3n^2$

c) 2a(a + 1)

Skills:

The letters a, b and c represent lengths. For each of the following expressions, decide whether it represents a length, area, volume or none of these.

(i) $3ab$

(ii) $\pi c^2 a - b^3$

(iii) $5b^3 + 2ac$

(iv) $4a(b + 2c)$

(v) $\dfrac{b^2 + c^2}{2a}$

(vi) $3c + a - 2b.$

Top Tips! – Length, Area and Volume

Adding:

Length + Length = Length ✓

Area + Area = Area ✓

Volume + Volume = Volume ✓

Multiplying:

Number × Length = Length (one dimension)

Number × Area = Area (two dimensions)

Number × Volume = Volume (three dimensions)

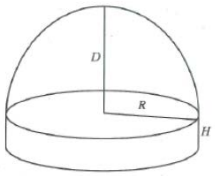
Length × Length = Area (two dimensions)

Length × Length × Length = Volume (three dimensions)

Length × Area = Volume (three dimensions)

Examination Question: June 200 Linear Intermediate (P97 guidelines)

The diagram shows a solid. The lengths D, R and H are as shown.



One of these formulae may be used to estimate V, the volume of the solid.

$V = 3H + 2R + 5D$
$V = 3R + 5DR$
$V = 3R^2H + 2R^2D$
$V = 3R(4D + 5H)$

(a) Explain why the formula V = 3H + 2R + 5D cannot be used to estimate the volume of the solid. [1]

(b) State, with a reason, which of the above formulae may be used to estimate the volume of the solid. [2]

Assessment for Learning	Video / QR code

GCSE - Numeracy and Mathematics Topic: Dimensions	Tier: Intermediate	Grade: B

Starter

Simplify the following:

a) 2a + a +3c = 3a + 3c

b) $3n^2$ + 3m + p + $3n^2$ =$6n^2 + 3m + p$

c) 2a(a + 1) = $2a^2$ + 2a

Skills:

The letters a, b and c represent lengths. For each of the following expressions, decide whether it represents a length, area, volume or none of these.

(i) $3ab$

(ii) $\pi c^2 a - b^3$

(iii) $5b^3 + 2ac$

(iv) $4a(b + 2c)$

(v) $\dfrac{b^2 + c^2}{2a}$

(vi) $3c + a - 2b.$

i) Area

ii) Volume

iii) None of these

iv) Area

v) Length

vi) Length

Top Tips! – Length, Area and Volume

Adding:

Length + Length = Length ✓

Area + Area = Area ✓

Volume + Volume = Volume ✓

Multiplying:

Number × Length = Length (one dimension)

Number × Area = Area (two dimensions)

Number × Volume = Volume (three dimensions)

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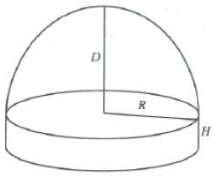
Examination Question: June 200 Linear Intermediate (P97 guidelines)

The diagram shows a solid. The lengths D, R and H are as shown.



One of these formulae may be used to estimate V, the volume of the solid.

$V = 3H + 2R + 5D$
$V = 3R + 5DR$
$V = 3R^2H + 2R^2D$
$V = 3R(4D + 5H)$

(a) Explain why the formula V = 3H + 2R + 5D cannot be used to estimate the volume of the solid. [1]

Explanation that the expression (on the right) is for length OR is one-dimensional.
(Length + Length + Length = Length)

(b) State, with a reason, which of the above formulae may be used to estimate the volume of the solid. [2]

V = $3R^2$H + $2R^2$D (Disregarding the constants,) both terms are '$length^3$ ', giving volume. (Volume + Volume = Volume)

Assessment for Learning	Video / QR code