Level 1

1.

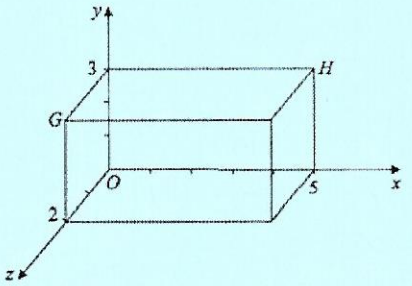
a) Write down the coordinates of G.

(0, 3, 2)

b) Write down the coordinates of H.

(5, 3, 0)

G and *H* are vertices of a cuboid.



Level 2

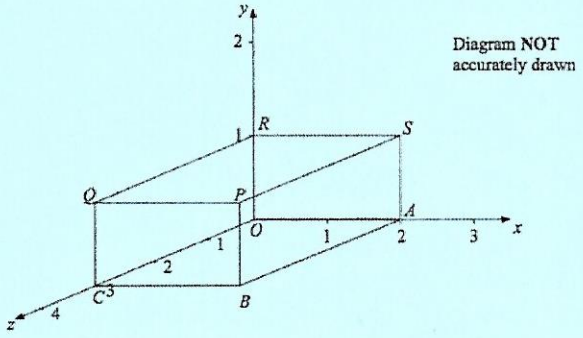


Diagram NOT accurately drawn

A cuboid is shown on a 3-dimensional grid.

2.

a) Write down the letter of the point with coordinates (2, 1, 0) S

b) Write down the coordinates for all vertices

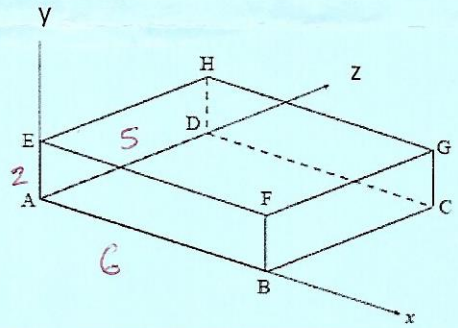
A = (2, 0, 0)
B = (2, 3, 3)
C = (0, 0, 3)
O = (0, 0, 0)
P = (2, 1, 3)
Q = (0, 1, 3)
R = (0, 1, 0)
S = (2, 1, 0)

Level 3

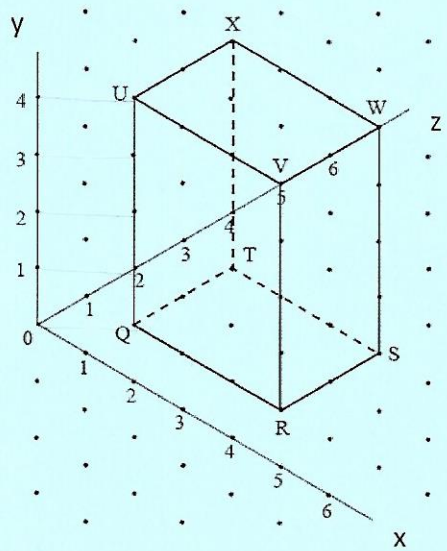
3. If AB = 6, AD = 5 and AE = 2, write down the coordinates of each vertex of the cuboid.

A = 0, 0, 0
B = 6, 0, 0
C = 6, 0, 5
D = 0, 0, 5
E = 0, 2, 0
F = 6, 2, 0
G = 6, 2, 5
H = 0, 2, 5

The diagram shows a cuboid and the *x*, *y* and *z* axes.



Extension



4.

a) Write down the coordinates of each vertex of the cuboid. Q (1,0,1) R(4,0,1) S (4,0,3) T(1,0,3) U(1,4,1) V(4,4,1) W(4,4,3) X(1,4,3)

b) Calculate the volume of the cuboid

2 × 3 × 4 = ~~32~~ 24

c) Calculate the surface area of the cuboid

2×3 = 6 6×2 = 12 (TOP + BOTTOM)
2×4 = 8 8×2 = 16 (ENDS)
3×4 = 12 12×2 = 24 (SIDES) 52

3D Coordinates - 2

Level 1

1. The vertex G has the coordinates (6, 2, 4)

a) Write down the coordinates of the other vertices.

A(0,0,0) B(6,0,0) C(6,0,4)
D(0,0,4) E(0,2,0) F(6,2,0)
G(6,2,4) H(0,2,4)

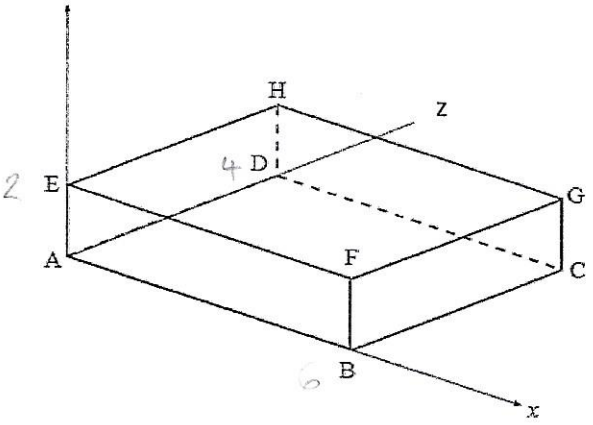
b) Work out the volume of the cuboid

$6 \times 2 \times 4 = 48$

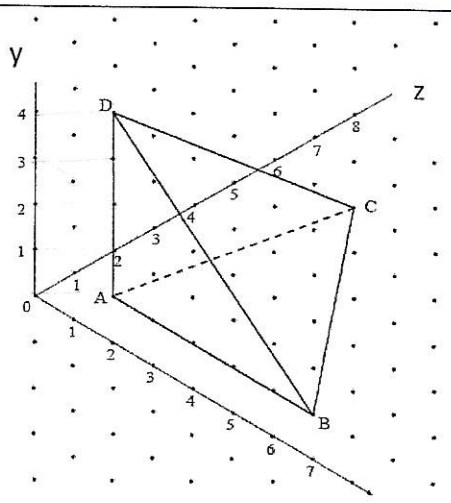
c) Work out the surface area of the cuboid.

ABBA AEHD = 2×4 = 8
ABCA ABFE = 2×6 = 12
ABCA EFGH = 6×4 = 24

24 + 12 + 8 = 44
44 × 2 = 88



Level 2

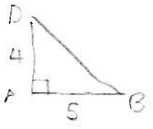


2. The diagram shows a triangular based pyramid, ABCD, in which D is vertically above A. The base ABC is horizontal.

a) Write down the coordinates for all vertices

A(1,0,1) B(6,0,1) C(2,0,6) D(1,4,1)

b) Calculate the length BD



$a^2 + b^2 = c^2$
$4^2 + 5^2 = c^2$
$16 + 25 = 41$
$\sqrt{41} = 6.4$ (1dp)

Level 3

3.

a) Find the surface area of the shape.

MNOP = 2×5 = 10
OPQR = 4×5 = 20
NOR = 4
MPQ = 4

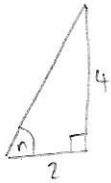
$a^2 + b^2 = c^2$
$2^2 + 4^2 = c^2$
$c = \sqrt{20}$
$c = 4.47$

NNQR = 4.47 × 5 = 22.36

NOR = ½ × 2 × 4 = 1 × 4 = 4

10
20
4
4
22.36
60.36

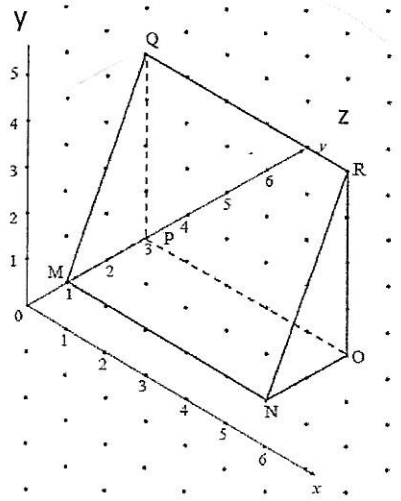
b) Work out the angle of elevation at vertex N.



$\tan n = \frac{4}{2}$

$\tan^{-1} 2 = 63.4°$

(d)



3D Coordinates - 3

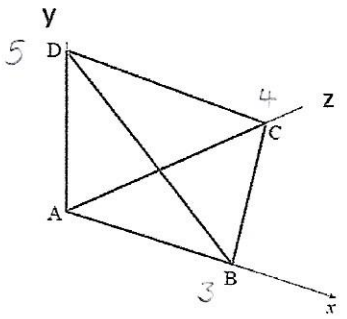
Level 1

1. ABCD is a tetrahedron. AB = 3, AC = 4, AD = 5

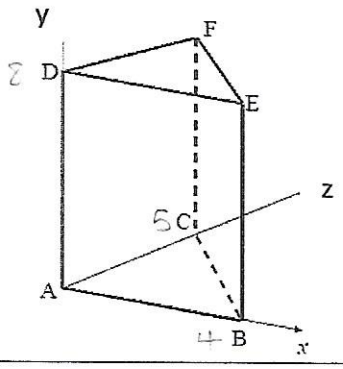
a) Write down the coordinates of the vertices.

A(0,0,0) B(3,0,0) C(0,0,4)

D(0,5,0)



Level 2



2. AB = 4, AC = 5, AD = 8

a) Write down the coordinates of the vertices.

A(0,0,0) B(4,0,0) C(0,0,5)

D(0,8,0) E(4,8,0) F(0,8,5)

b) Calculate the volume of the shape

½ × b × h 2×5 = 10

10 × 8 = 80

Level 3

3.

a) Write down the coordinates for all vertices.

M(0,0,1) N(5,0,1) O(5,0,3)

P(0,0,3) Q(0,0,3)

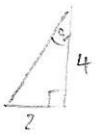
b) Find the length of side MQ

$a^2 + b^2 = c^2$

$2^2 + 4^2 = c^2$ 4.47

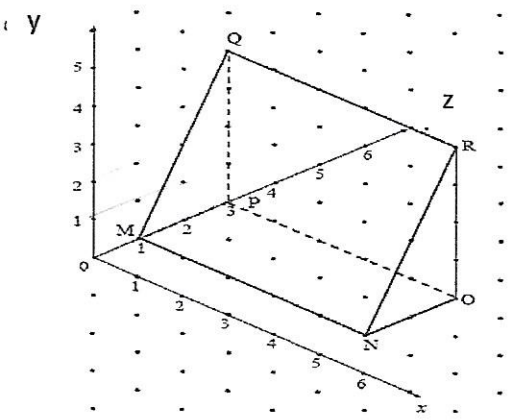
$\sqrt{20}$

c) Find the angle at vertex Q



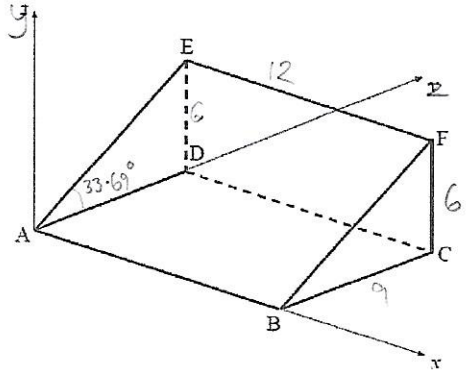
$\tan\theta = \frac{2}{4}$

$\tan^{-1} 0.5 = 26.57°$ (2dp)



Extension

4. The angle of elevation at vertex A is 33.69° (2dp). FC = 6. The area of CDEF = 72



a) Use trigonometry to work out the length of side AD. (round to nearest unit)

$\tan\hat{A} = \frac{O}{A}$ $\tan 33.69 = \frac{6}{AD}$ $\frac{6}{\tan 33.69} = 9.00..$

$\therefore 9$

b) Write down the coordinates of the vertices

A(0,0,0) B(12,0,0) C(12,0,9) D(0,0,9)

E(0,6,0) F(12,6,9)

c) Calculate the volume and surface area of the shape.

$\frac{6 \times 9}{2} = 27$

$27 \times 12 = 324$

VOLUME

SURFACE AREA

$27 \times 2 = 54$ TRIANGULAR ENDS

$6 \times 12 = 72$ BACK

$9 \times 12 = 108$ BOTTOM

$108 + 54 + 72 = 234$