

Vectors - Lesson 3

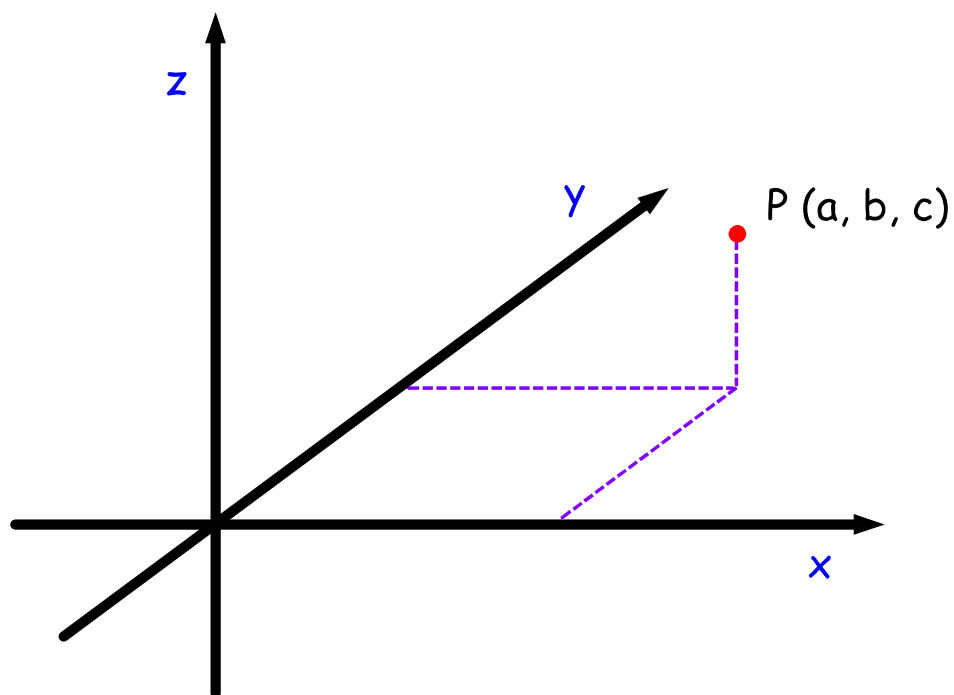
Vectors - 3D Coordinates

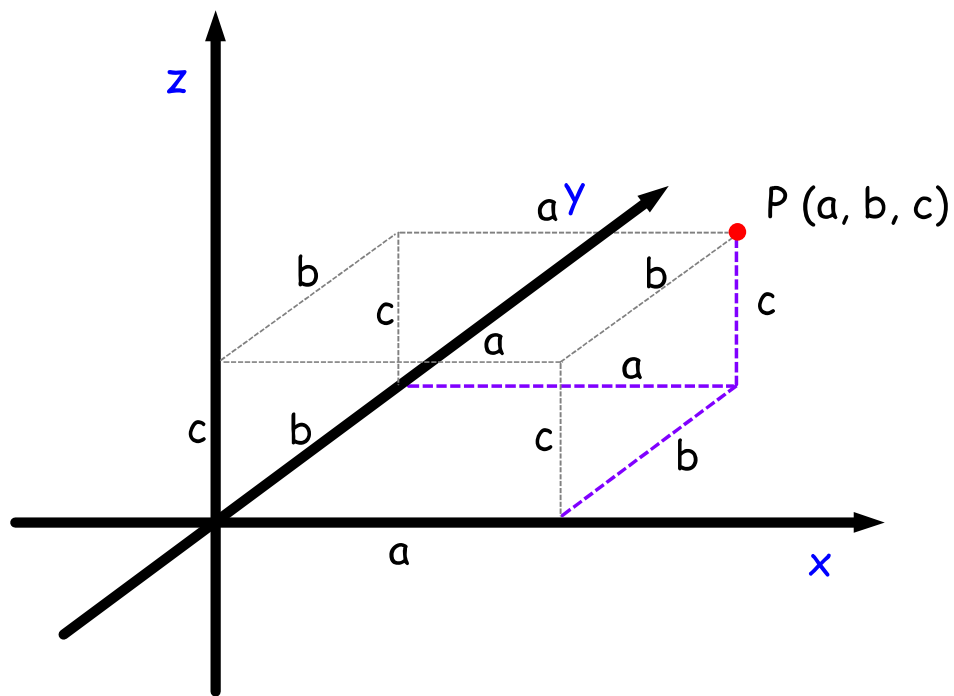
LI

- Find coordinates of points in 3D.

SC

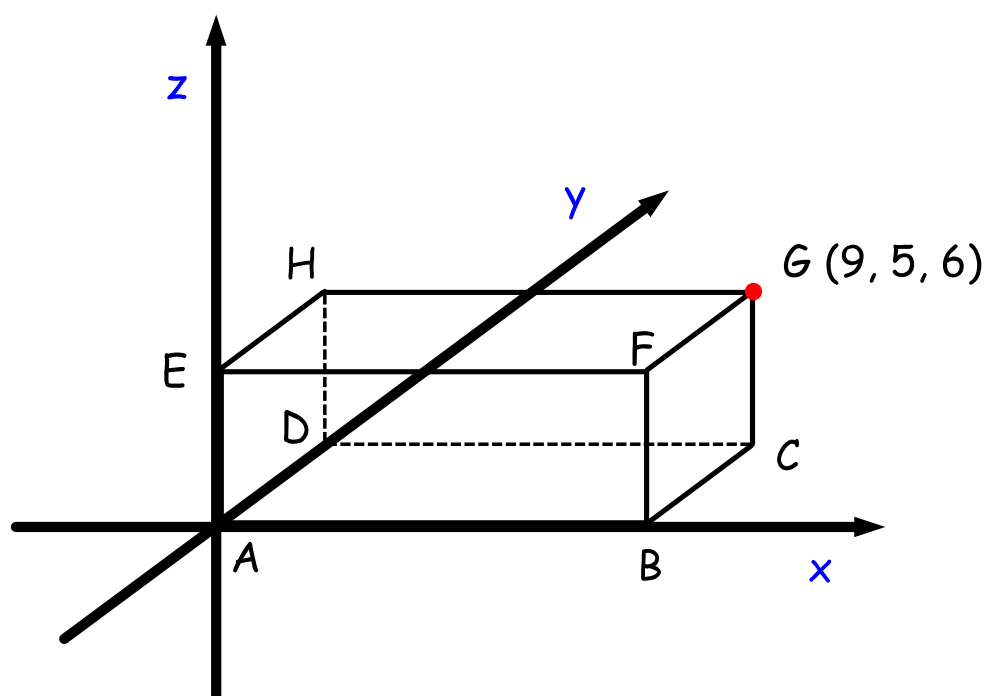
- x -, y -, and z - axes.
- Count numbers along a line.





Example 1

Write down the coordinates of the remaining seven vertices of this cuboid :



A (0, 0, 0)

E (0, 0, 6)

B (9, 0, 0)

F (9, 0, 6)

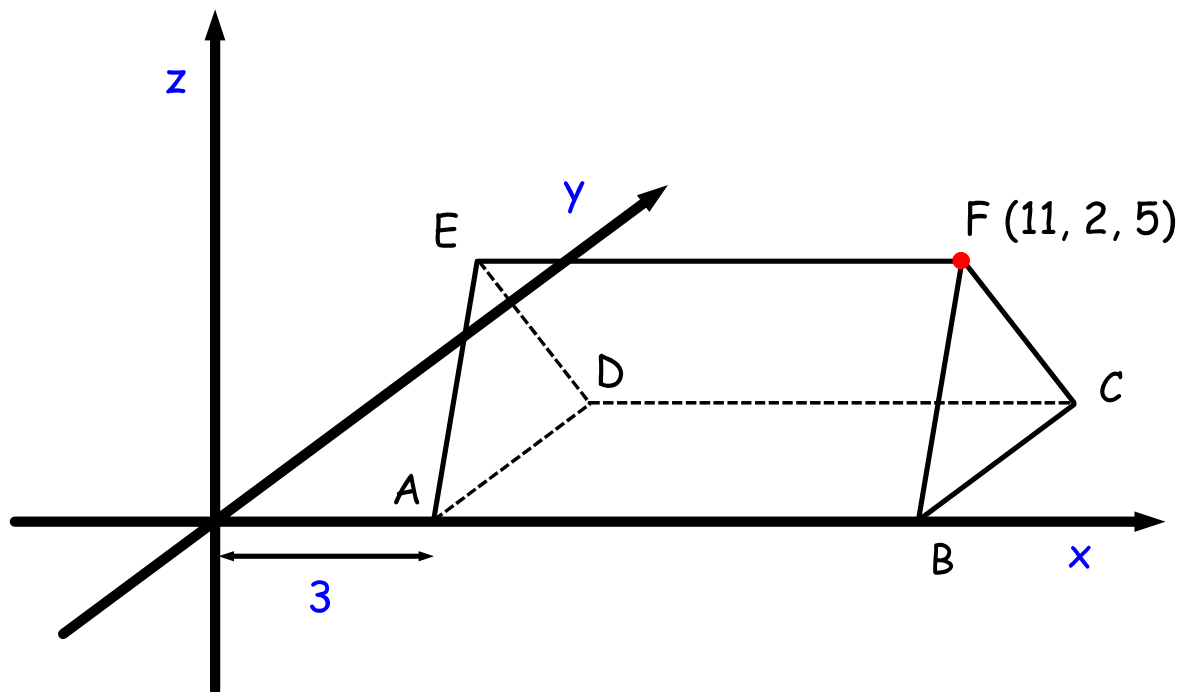
C (9, 5, 0)

D (0, 5, 0)

H (0, 5, 6)

Example 2

Write down the coordinates of A, B, C, D and E in the following triangular prism which has an isosceles triangle cross-section; also state the coordinates of the midpoint of EF :



$A (3, 0, 0)$

$B (11, 0, 0)$

$C (11, 4, 0)$

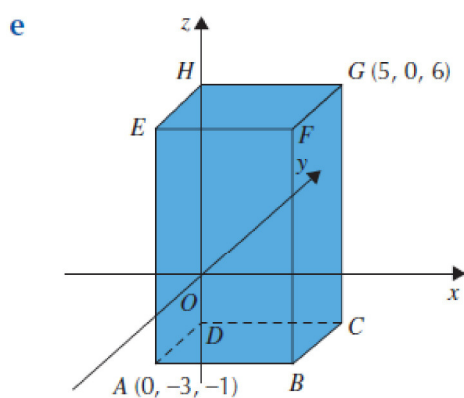
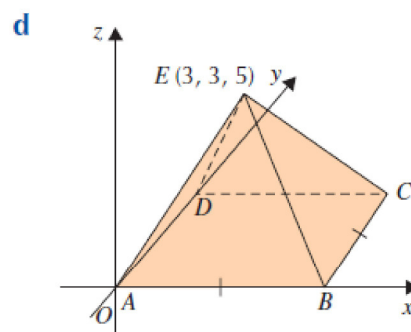
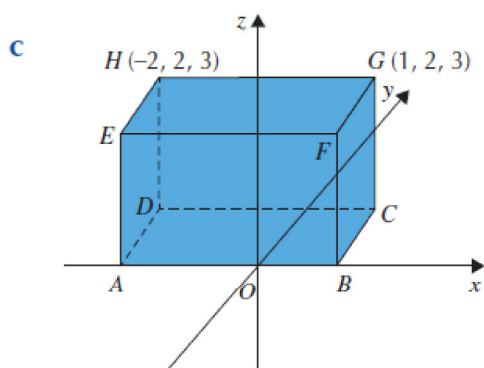
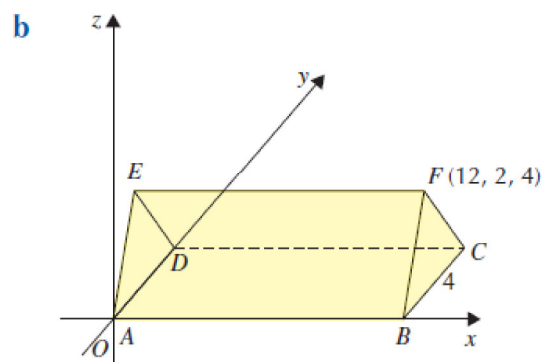
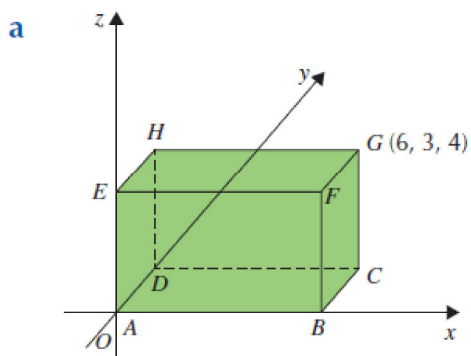
$D (3, 4, 0)$

$E (3, 2, 5)$

Midpoint of EF : $(7, 2, 5)$

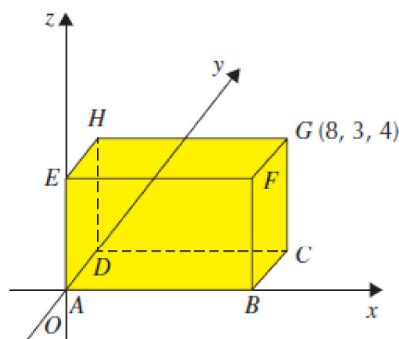
Questions

1 For each diagram, write down the coordinates of the vertices shown.



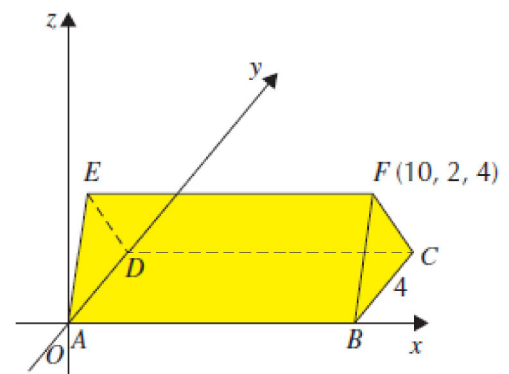
2 Calculate the coordinates of:

- the midpoint of EF
- the midpoint of BF
- the midpoint of FG .

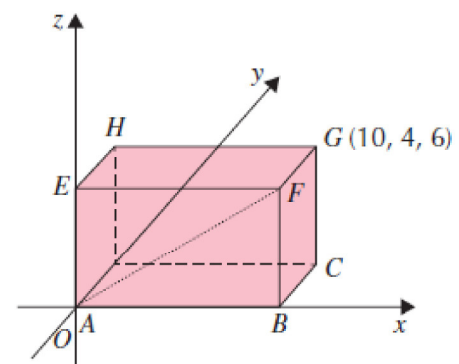


3 For the triangular prism shown:

- find the coordinates of the midpoint of AE
- find the coordinates of the midpoint of BF
- using your answers from **a** and **b**, calculate the centre point of face $ABFE$.



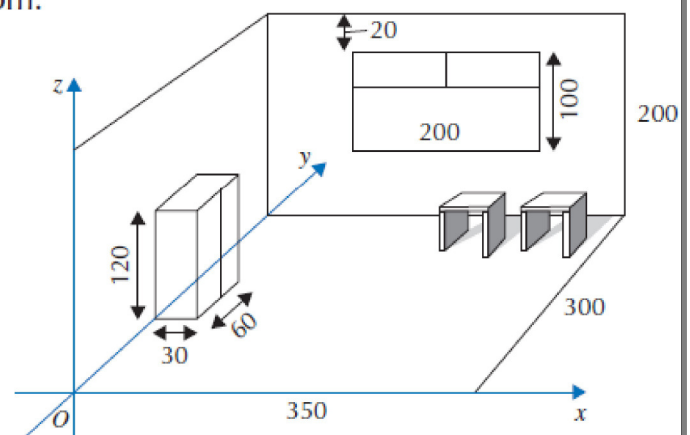
- Write down the length of the line AB .
 - Write down the length of the line BF .
 - Calculate the length of the line AF shown to 1 decimal place.
 - Calculate the size of angle BAF to the nearest degree.



5 The diagram shows the basic plans for a room.

The cabinet against the left wall is in the centre of the wall.

- Write down the coordinates of the vertices of the cabinet.
- The window has equal lengths of wall on either side. Write down the coordinates of the corners of the window.
- A light fitting is to be placed on the centre of the ceiling. Write down the coordinates of the point where the fitting should be placed.
- Calculate the volume of the room assuming sizes are in centimetres. Give your answer in cubic metres.



Answers

1	a	A (0, 0, 0) B (6, 0, 0) C (6, 3, 0) D (0, 3, 0) E (0, 0, 4) F (6, 0, 4) G (6, 3, 4) H (0, 3, 4)	b	A (0, 0, 0) B (12, 0, 0) C (12, 4, 0) D (0, 4, 0) E (0, 2, 4) F (12, 2, 4)	c	A (-2, 0, 0) B (1, 0, 0) C (1, 2, 0) D (-2, 2, 0) E (-2, 0, 3) F (1, 0, 3)	d	A (0, 0, 0) B (6, 0, 0) C (6, 6, 0) D (0, 6, 0)	e	B (5, -3, -1) C (5, 0, -1) D (0, 0, -1) E (0, -3, 6) F (5, -3, 6) G (5, 0, 6) H (0, 0, 6)													
	2	a	(4, 0, 4)	b	(8, 0, 2)	c	(8, 1.5, 4)	3	a	(0, 1, 2)	b	(10, 1, 2)	c	(5, 1, 2)	4	a	10	b	6	c	11.7	d	31°
	5	a	(0, 120, 0), (0, 180, 0), (30, 120, 0), (30, 180, 0), (0, 120, 120), (0, 180,120), (30, 120, 120), (30, 180, 120)																				
	b	(75, 300, 80), (275, 300, 80), (75,300, 180), (275, 300, 180)																					
	c	(175, 150, 200)																					
	d	21m ³																					