AULA 1.4

VETORES NO ESPAÇO

Base canônica $\{\vec{\imath}; \vec{\jmath}; \vec{k}\}$

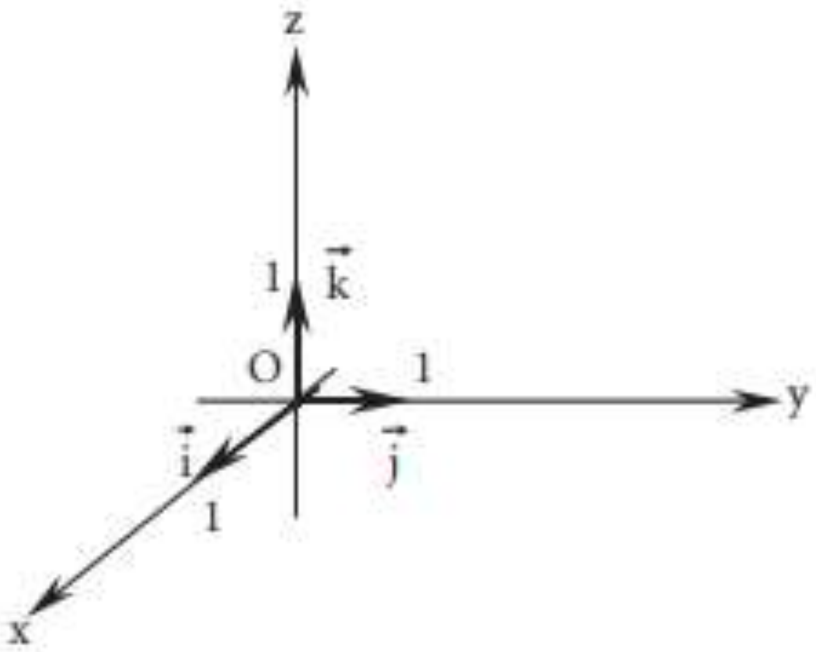


Figura 1.53

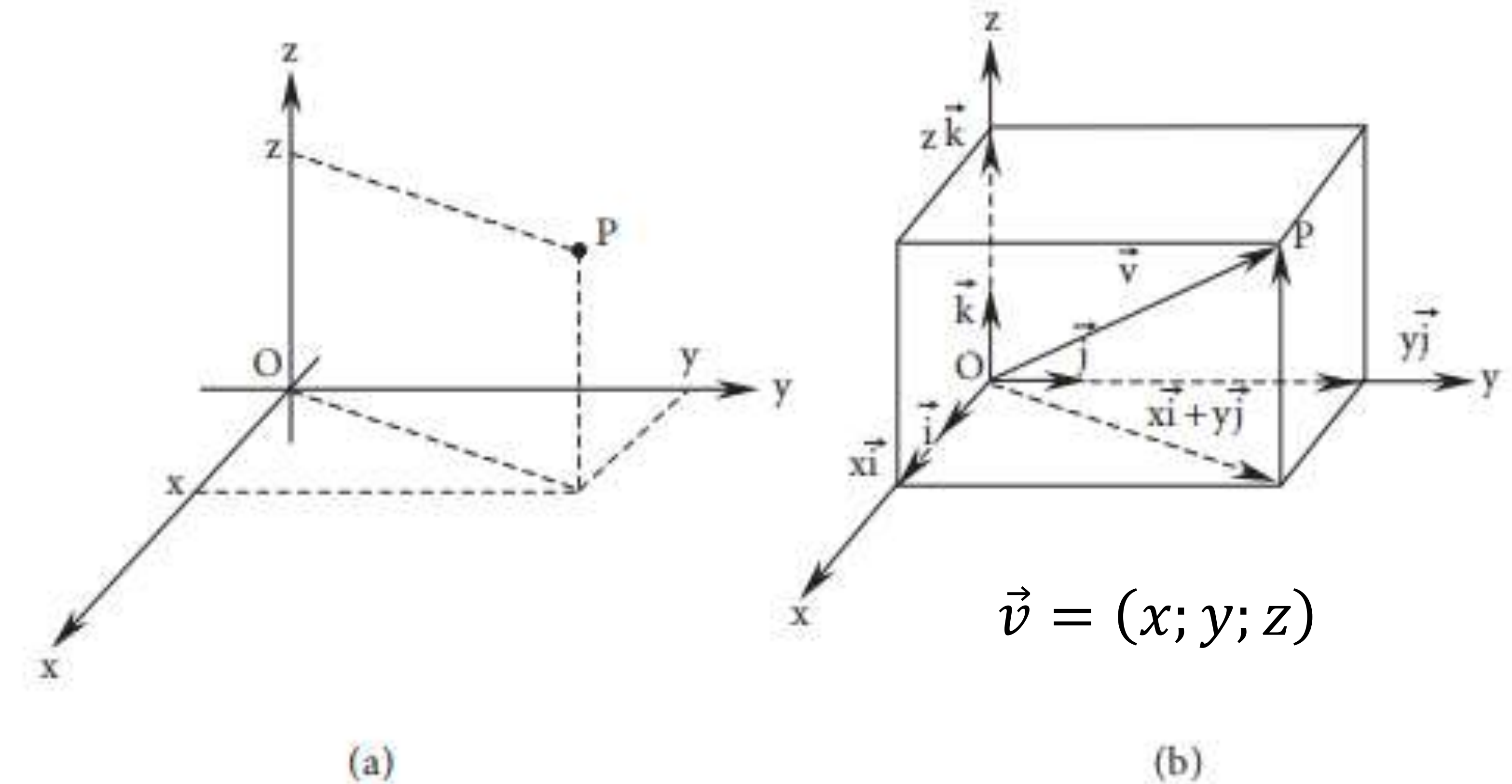
$\vec{v} =$ Abscissas

$\vec{v} =$ Ordenadas

$\vec{v} =$ Cotas

Base canônica $\{\vec{i};\vec{j};\vec{k}\}$

$$\vec{v} = \overline{OP} = x\vec{i} + y\vec{j} + z\vec{k}$$



$$\vec{v} = (x; y; z)$$

Figura 1.55

Identificando pontos

$$A = (2; 0; 0)$$

$$B = (2; 4; 0)$$

$$C = (0; 4; 0)$$

$$D = (0; 4; 3)$$

$$E = (0; 0; 3)$$

$$F = (2; 0; 3)$$

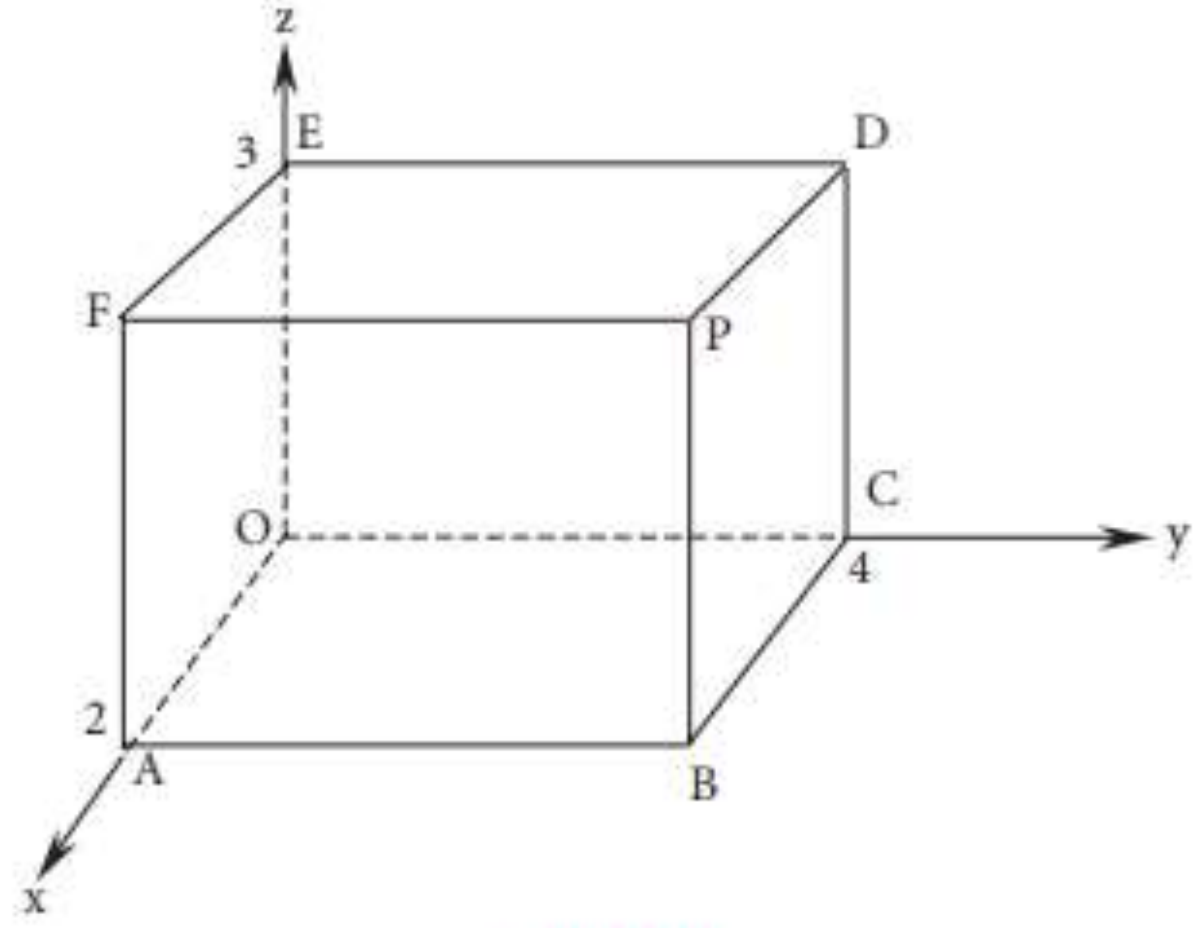


Figura 1.56

Traçando pontos

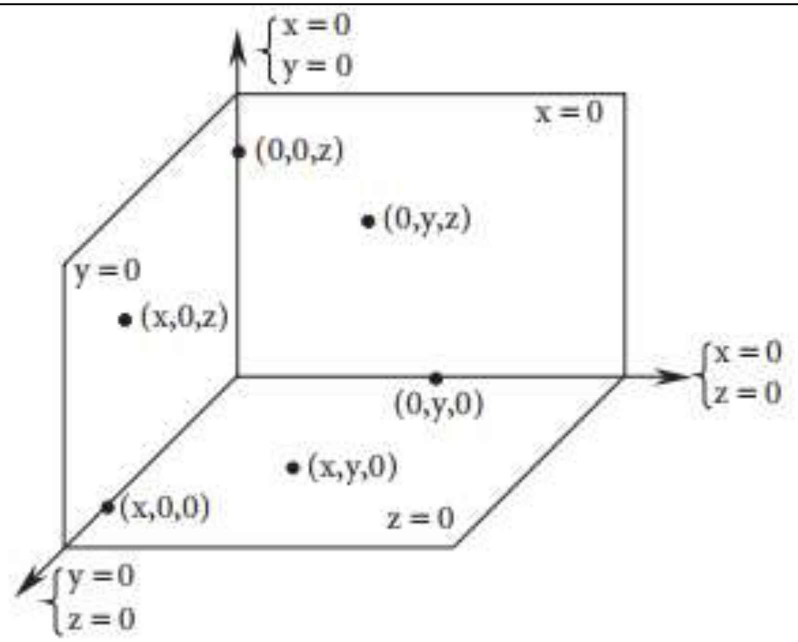


Figura 1.57

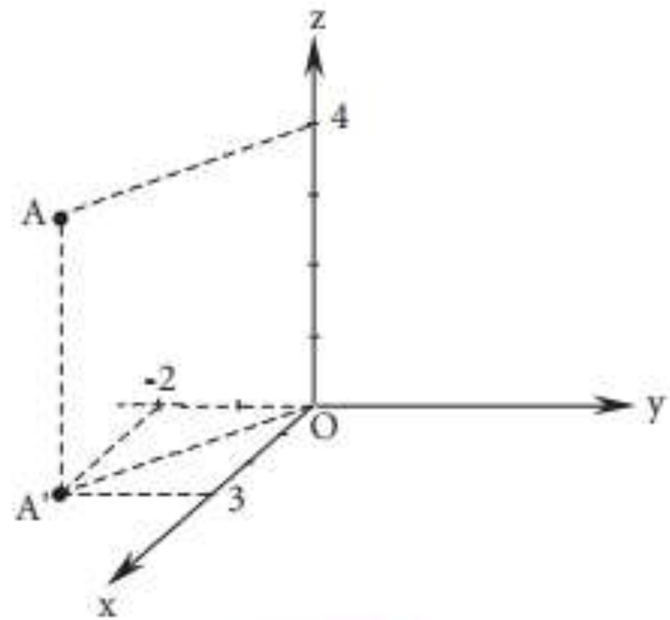


Figura 1.58

Marque no espaço o ponto $A(3; -2; 4)$

Octantes

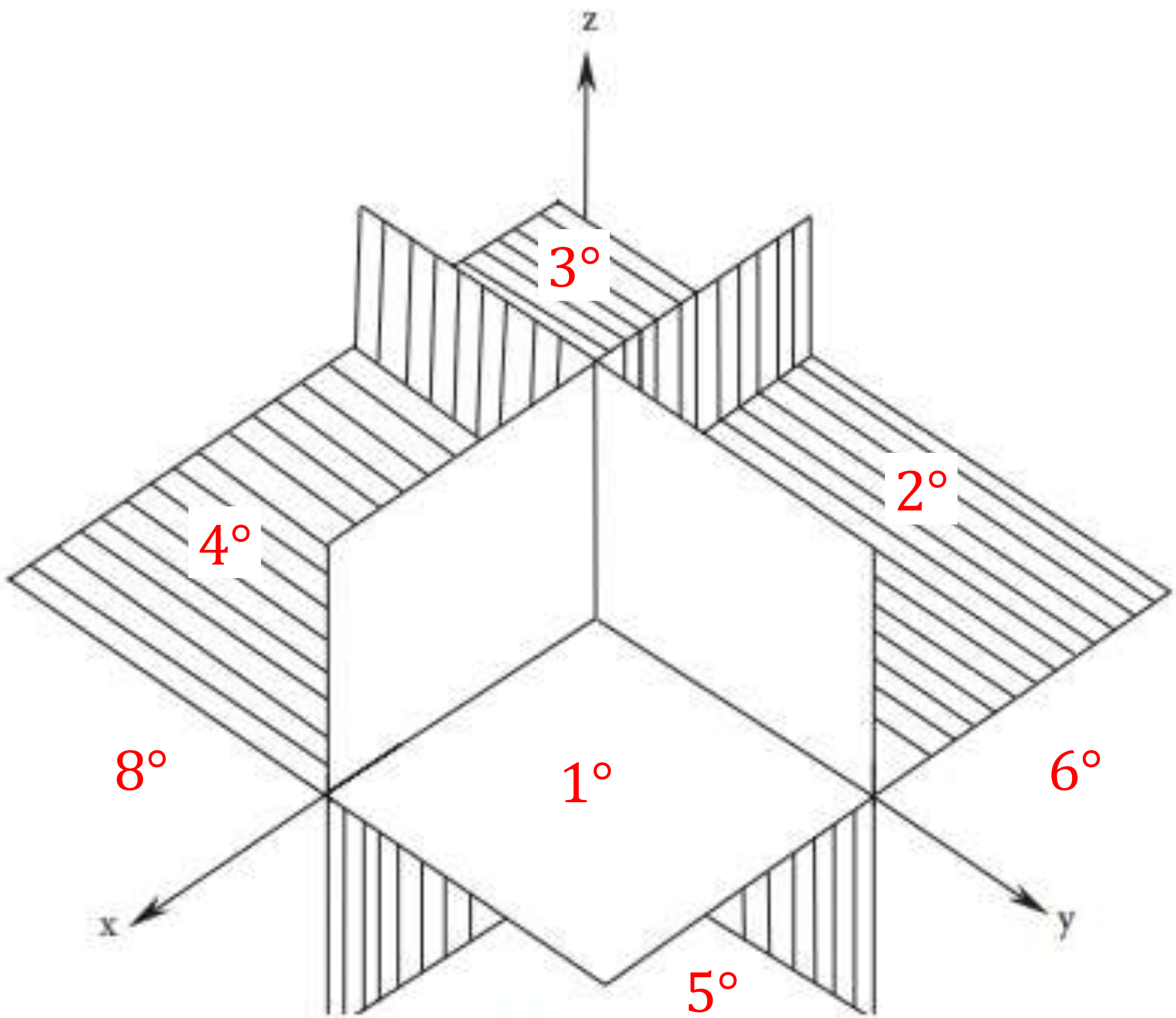


Figura 1.59

Octantes

$A = (6; 4; 2)$

$B = (-5; 3; 2)$

$C = (-6; -5; 2)$

$D = (5; -3; 2)$

$A' = (6; 4; -2)$

$B' = (-5; 3; -2)$

$C' = (-6; -5; -2)$

$D' = (5; -3; -2)$

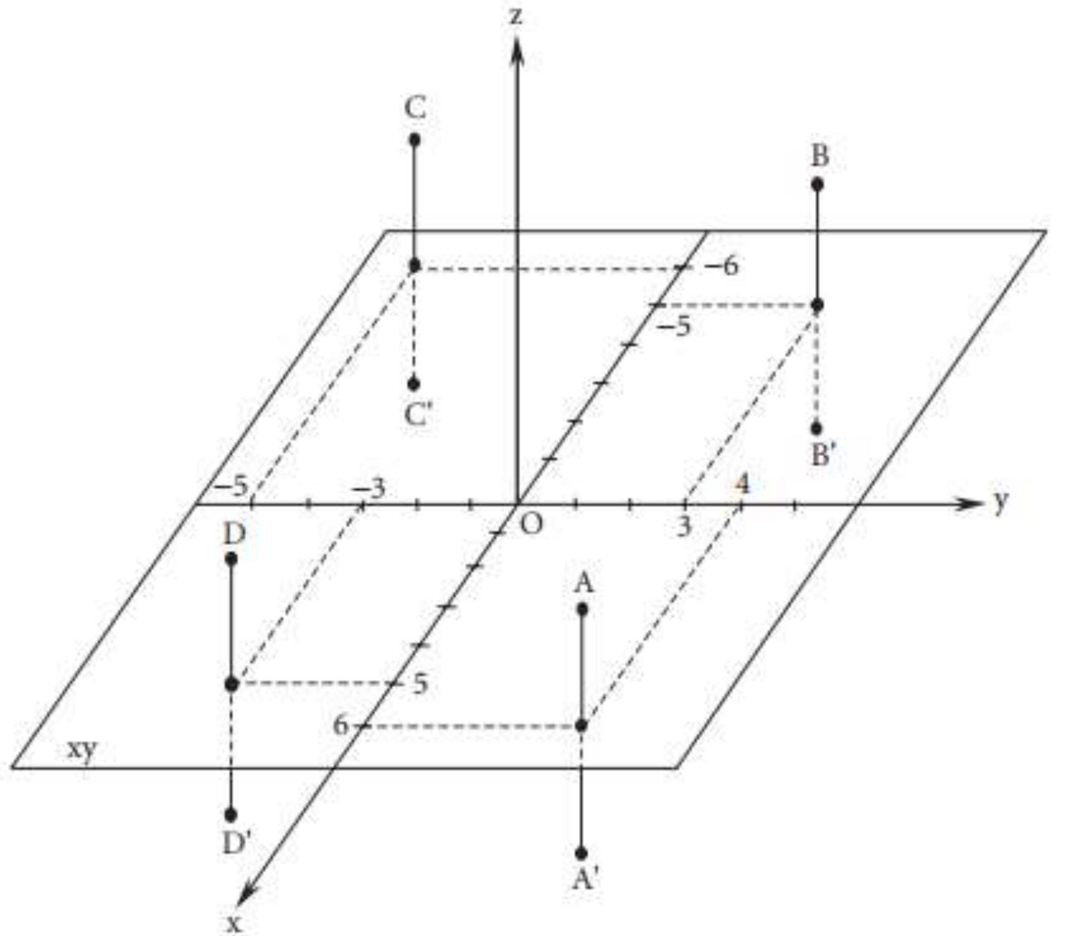


Figura 1.60

Igualdade

Seja $\left.\begin{cases} \vec{u} = (x_1; y_1; z_1) \\ \vec{v} = (x_2; y_2; z_2) \end{cases}\right\}$ E $\left.\begin{cases} x_1 = x_2 \\ y_1 = y_2 \\ z_1 = z_2 \end{cases}\right\}$ $\vec{u} = \vec{v}$

Operação com vetores $\vec{u} = (x_1; y_1; z_1)$; $\vec{v} = (x_2; y_2; z_2)$ $\alpha \in \mathcal{R}$

$$\vec{u} + \vec{v} = (x_1 + x_2; y_1 + y_2; z_1 + z_2) \qquad \alpha\vec{u} = (\alpha x_1; \alpha y_1; \alpha z_1)$$

Vetor definido por dois pontos

$\overline{AB}$ $\begin{cases} A(x_1; y_1; z_1) \\ B(x_2; y_2; z_2) \end{cases}$

$$\overline{AB} = (x_2 - x_1; y_2 - y_1; z_2 - z_1)$$

Ponto médio

Seja $\left.\begin{cases} A = (x_1; y_1; z_1) \\ \\ B = (x_2; y_2; z_2) \end{cases}\right\}$ Pontos extremos de um segmento, seu ponto médio será

$$M = \left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}; \frac{z_1 + z_2}{2}\right)$$

Paralelismo de dois vetores

Seja $\left.\begin{cases} \vec{u} = (x_1; y_1; z_1) \\ \\ \vec{v} = (x_2; y_2; z_2) \end{cases}\right\}$ E $\left.\begin{cases} x_1 = \alpha x_2 \\ y_1 = \alpha y_2 \\ z_1 = \alpha z_2 \end{cases}\right\}$ $\vec{u} \parallel \vec{v}$

Isto é $\dfrac{x_2}{x_1} = \dfrac{y_2}{y_1} = \dfrac{z_2}{z_1} = \alpha$

Módulo de um vetor

$$|\vec{v}| = \sqrt{x^2 + y^2 + z^2}$$

$$d(\overline{AB}) = |\overline{AB}| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

2. Encontrar o vértice oposto a B no paralelogramo ABCD, sendo dados A(3, −2, 4), B(5, 1, −3) e C(0, 1, 2).

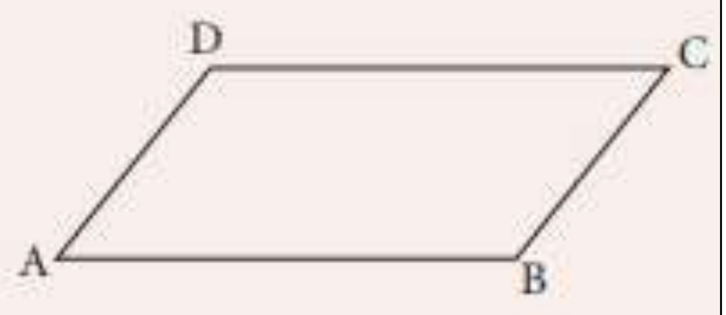


Figura 1.62

4. Seja o triângulo de vértices $A(4, -1, -2)$, $B(2, 5, -6)$ e $C(1, -1, -2)$. Calcular o comprimento da mediana do triângulo relativa ao lado AB.

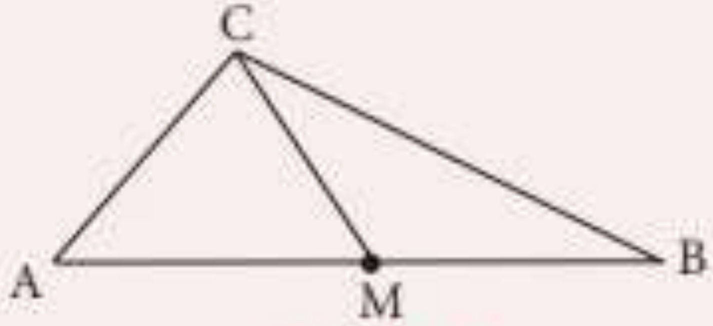


Figura 1.64