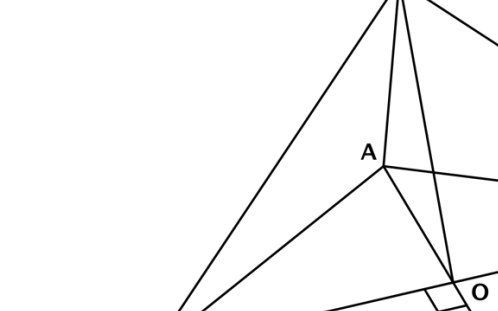


- Pentru orice soluție corectă, chiar dacă este diferită de cea din barem, se acordă punctajul corespunzător.
- Nu se acordă fracțiuni de punct, dar se pot acorda punctaje intermediare pentru rezolvări parțiale, în limitele punctajului indicat în barem .
-

Dacă $c \geq 2 \Rightarrow c^2 \geq 4 \Rightarrow 22 + (2b + 1)c^2 \geq$ $\geq 22 + (2b + 1) \cdot 4 = 8b + 27 > 2b$ Dacă $c = 1 \Rightarrow 22 + 2b + 1 = 2b \Rightarrow 23 = 0$ Fals! Dacă $c = 0 \Rightarrow 22 = 2b \Rightarrow b = 11$ Soluție: $c = 0; b = 11$	2p 1p 2p 2p
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Fie $a \in \mathbb{N}^*$; $\frac{\sqrt{a}}{a+1} < \frac{1}{\sqrt{a+2}}$ deoarece: $\sqrt{a(a+2)} < a+1 \Leftrightarrow a^2+2a < a^2+2a+1$ $\frac{\sqrt{1}}{2} < \frac{1}{\sqrt{3}}$ $\frac{\sqrt{2}}{3} < \frac{1}{\sqrt{4}}$ ----- $\frac{\sqrt{2015}}{2016} < \frac{1}{\sqrt{2018}}$ $\frac{\sqrt{1}}{2} + \frac{\sqrt{2}}{3} + \dots + \frac{\sqrt{2015}}{2016} < \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{4}} + \dots + \frac{1}{\sqrt{2018}}$	1p 2p 3p 1p
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1p

a. $\left. \begin{array}{l} MA \perp (ABD) \\ AO \perp BD \\ BD \subset (ABD) \end{array} \right\} \Rightarrow MO \perp BD \Rightarrow d(M, BD) = MO$

1p

$$AO = \frac{12\sqrt{2}}{2} = 6\sqrt{2}$$

1p

$$MO^2 = AO^2 + MA^2 = 144 \Rightarrow MO = 12$$

1p

$$d(A, MBD) = \frac{MA \cdot AO}{MO} = \frac{6\sqrt{2} \cdot 6\sqrt{2}}{12} = 6$$

$$b. A[MBD] = \frac{MO \cdot BD}{2} = \frac{12 \cdot 12\sqrt{2}}{2} = 72\sqrt{2}$$

1p

$$MB^2 = MD^2 = (6\sqrt{2})^2 + 12^2 = 9 \cdot 4 \cdot 6$$

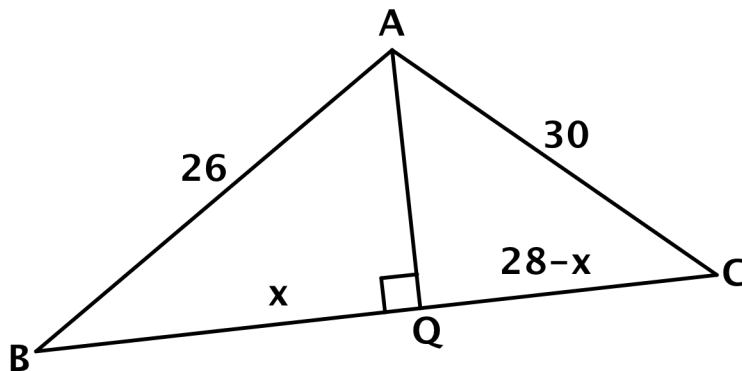
1p

$$MB = MD = 6\sqrt{6}$$

$$P_{\Delta MBD} = MB + MD + BD = 6\sqrt{6} + 6\sqrt{6} + 12\sqrt{2} = 12\sqrt{2}(\sqrt{3} + 1)$$

1p

SUBIECTUL IV



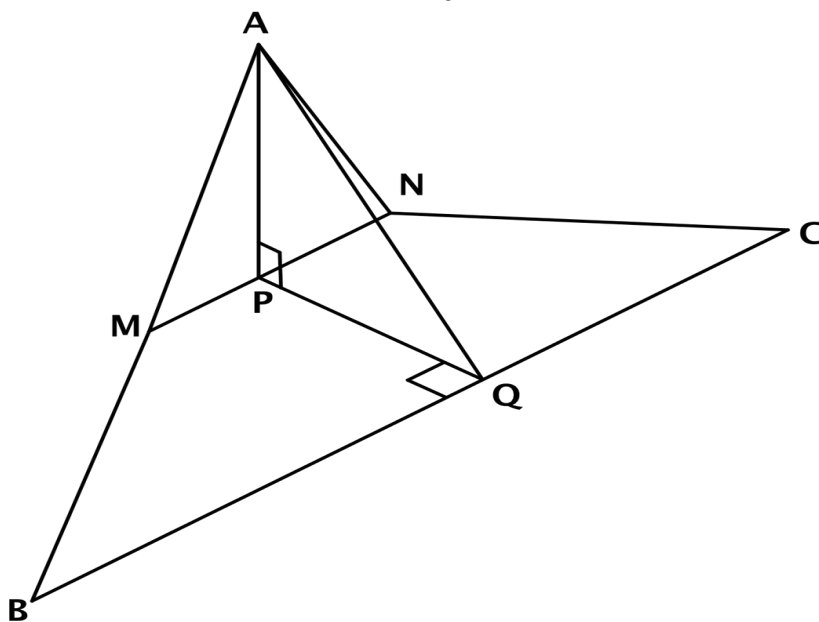
1p

$$AQ^2 = AB^2 - BQ^2 = AC^2 - CQ^2$$

$$26^2 - x^2 = 30^2 - (28 - x)^2$$

$$x = 10$$

1p



1p

$$AP \perp MN; PQ \perp BC$$

$$AP \perp (MNCB)$$

$$PQ \perp BC$$

$$BC \subset (MNCB)$$

$$\Rightarrow AQ \perp BC \Rightarrow d(A, BC) = AQ$$

$$AQ \perp BC; AQ = \sqrt{26^2 - 10^2} = 24$$

$$AP = 12; PQ = 12; AQ = 12\sqrt{2}$$

1p

$$b. A[ABC] (\text{înainte}) = \frac{AQ \cdot BC}{2} = \frac{24 \cdot 28}{2} = 336$$

1p

$$A[ABC] (\text{după}) = \frac{AQ \cdot BC}{2} = \frac{12\sqrt{2} \cdot 28}{2} = 168\sqrt{2}$$

1p

$$\frac{A[ABC] (\text{înainte})}{A[ABC] (\text{după})} = \frac{336}{168\sqrt{2}} = \frac{2}{\sqrt{2}} = \sqrt{2}$$

1p