Ratio of similitude:

$\triangle \frac{IBE}{ION}$ | $\overset{①}{\frac{IB}{IO}} = \overset{②}{\frac{IE}{IN}} = \overset{③}{\frac{BE}{ON}}$

From ratios ① + ② we get:

$\frac{IB}{IO} = \frac{BE}{ON}$ but $ON = 3$ cm (radius of (C))

& $EB = 2OM$ (midpt theorem in $\triangle AEB$)

$= 6$ cm

then, $\frac{IB}{IO} = \frac{6}{3}$

Thus, $IB = 2IO$.

b). pts O, I & B are Collinear (

And $OB = OI + IB$

So $OB = OI + 2OI$.

$OB = 3OI$.

Thus, $\boxed{OI = 1cm}$ & $\boxed{IB = 2cm}$

c). In $\triangle MNB$ we have:

O is midpt of [MN] (O is center of (C) with diameter [MN])

then [BO) is a median relative to [MN].

$IB = 2OI$ (proved)

Thus, I is center of gravity of $\triangle MNB$.

3)a). In $\triangle AMB$ we have

$A\hat{M}B = 90°$ (proved)

So $\triangle$ AMB is right at M.

Apply pyth. theorem to get $\overline{BM}$

$AB^2 = AM^2 + MB^2$

$MB^2 = AB^2 - AM^2$

$= 36 - 9 = 27$

Thus, $MB = 3\sqrt{3}$

Area $ABE = \frac{B \times H}{2} = \frac{BM \times AE}{2}$.

$S = \frac{3\sqrt{3} \times 6}{2} = 9\sqrt{3}$ cm².

b) $\sin B\hat{E}A = \frac{opp}{hyp} = \frac{MB}{EB}$.

$MB = EB \sin B\hat{E}A$

So, $S = \frac{E \times EB \sin B\hat{E}A}{2}$

Thus, $2S = AE \times EB \times \sin B\hat{E}A$.

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