4) a) Δ AOD is isosceles at O (proved).
M is midpt of [AD] (given)
then, [OM) is a median relative to [AD].
Thus (OM) is the perpendicular bisector of [AD]
(median issued from main vertex of iso. Δ).

b) Since pts A + O are fixed
and $A\hat{M}O = 90°$ (
Thus, as D varies on (C) M describes a circle of diameter [AO] and center midpt of [AO].

c). G is centroid of Δ ADC (given).
O is mid pt of [AC] (proved)
then, [DO] is a median relative to [AC].

Hence, $OG = \frac{1}{3} OD$ (ratio formed by centroid and median in a triangle).
$OG = 1cm$ which is constant.
Now, O is fixed
G is variable
which means distance between a fixed pt and a variable pt is constant.

Thus as D moves of (C) G trace a circle of center O & radius $OG = 1cm$.

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