Moment of a Couple

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Definition of a Couple

A couple is defined as two forces that have the same magnitude, parallel lines of action, and opposite sense.

We will show that a couple produces pure rotation.
Find the moment of the couple about point $O$

- $M_{O1} = -aF$
- $M_{O2} = +(a + d)F$
- $M_O = -aF + (a + d)F$
- $M_O = dF$
- $M = dF$

The moment of the couple is the same for any point on the body!
**Moment a Couple**

\[ M = r \times F \]

\[ M = rF \sin \theta = dF \]

\( r \) is a position vector that must satisfy:

- Tail of \( r \) is on any point on the line-of-action of the one force, \( F \)
- Tip of \( r \) is on any point on the line-of-action of the other force, \( F \)

Direction of \( M \) is perpendicular to the plane defined by the couple

Sense of \( M \) is defined by the right-hand rule