

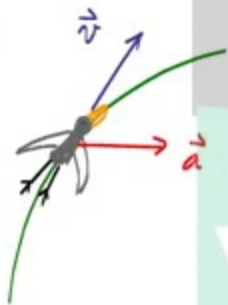
## EXAMPLE : NORMAL AND TANGENTIAL COMPONENTS

Vizle

GIVEN: AT THE INSTANT SHOWN J. SEAGULL HAS A SPEED OF  $150 \frac{m}{s}$   
AND AN ACCELERATION OF  $20 \frac{m}{s^2}$

FIND: • RATE OF INCREASE IN BIRD'S SPEED  
• RADIUS OF CURVATURE OF THE PATH

(i) SCHEMATIC



Vizle

This PDF is generated automatically by **Vizle**.  
Slides created *only for a few minutes* of your Video.



For the full PDF, please **Login to Vizle**.

<https://vizle.offnote.co> (Login via Google, top-right)

**Stay connected** with us:

Join us on **Facebook, Discord, Quora, Telegram**.

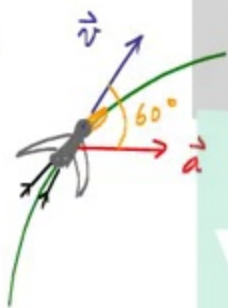
# EXAMPLE: NORMAL AND TANGENTIAL COMPONENTS

Vizle

GIVEN: AT THE INSTANT SHOWN J. SEAGULL HAS A SPEED OF  $150 \frac{m}{s}$   
AND AN ACCELERATION OF  $20 \frac{m}{s^2}$

FIND: • RATE OF INCREASE IN BIRD'S SPEED,  $\frac{dv}{dt}$   
• RADIUS OF CURVATURE OF THE PATH,  $S$

(i) SCHEMATIC



(ii) DRAW COORD. SYS

$$\vec{v} = 150 \frac{m}{s} \swarrow 60^\circ$$

$$\vec{a} = 20 \frac{m}{s^2} \rightarrow$$

n-t components

$$\vec{v} = v \hat{e}_t$$

$$\vec{a} = a_n \hat{e}_n$$

APPROACH:

(i) SCHEMATIC AND DEFINE VECTORS

(ii) DRAW COORDINATE SYS

(iii) DETERMINE COMP. OF  $\vec{v}$  AND  $\vec{a}$  IN DESIRED COORD. SYS.

(iv) SOLVE

• GEOM AND DEFINITIONS

AND AN ACCELERATION OF  $20 \text{ m/s}^2$

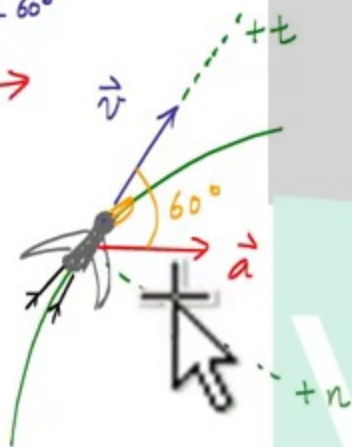


- FIND:**
- RATE OF INCREASE IN BIRD'S SPEED,  $\frac{dv}{dt}$
  - RADIUS OF CURVATURE OF THE PATH,  $S$

(i) SCHEMATIC

$$\vec{v} = 150 \frac{\text{m}}{\text{s}} \swarrow 60^\circ$$

$$\vec{a} = 20 \frac{\text{m}}{\text{s}^2} \rightarrow$$



(ii) DRAW COORD. SYS

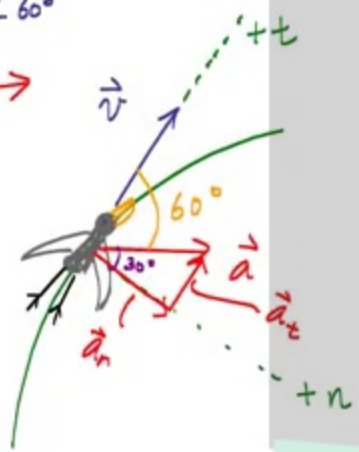
APPROACH:

- (i) SCHEMATIC AND DEFINE VECTORS
- (ii) DRAW COORDINATE SYS
- (iii) DETERMINE COMP. OF  $\vec{v}$  AND  $\vec{a}$  IN DESIRED COORD. SYS.
- (iv) SOLVE
  - GEOM AND DEFINITIONS

Vizle

V (i) SCHEMATIC  
Vizle =  $150 \frac{m}{s}$   $\curvearrowright$   $60^\circ$

$\vec{a} = 20 \frac{m}{s^2} \rightarrow$



(ii) VIZLE

(ii) DRAW COORDINATE SYS  
(iii) DETERMINE COMP. OF  $\vec{v}$  AND  $\vec{a}$  IN DESIRED COORD. SYS.

(iv) SOLVE  
• GEOM AND DEFINITIONS

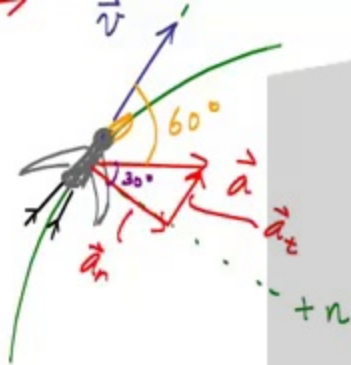
(iii) VECTOR COMPONENTS

$a = 20 \frac{m}{s^2}$

$a_n = a \cos 30^\circ = \left(20 \frac{m}{s^2}\right) \left(\frac{\sqrt{3}}{2}\right) = 17.32 \frac{m}{s^2}$

$a_t = a \sin 30^\circ$





(iv) SOLVE

$$a_n = \frac{v^2}{r} = 17$$

(iii) VECTOR COMPONENTS

$$a = 20 \frac{m}{s^2}$$

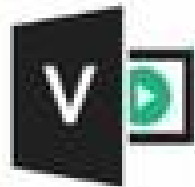
$$a_n = a \cos 30^\circ = \left(20 \frac{m}{s^2}\right) \left(\frac{\sqrt{3}}{2}\right) = 17.32 \frac{m}{s^2}$$

$$a_t = a \sin 30^\circ = \left(20 \frac{m}{s^2}\right) \left(\frac{1}{2}\right) = 10 \frac{m}{s^2}$$

(iv) SOLVE

· GEOM AND DEFINITIONS

This PDF is generated automatically by **Vizle**.  
Slides created *only for a few minutes* of your Video.



For the full PDF, please **Login to Vizle**.

<https://vizle.offnote.co> (Login via Google, top-right)

**Stay connected** with us:

Join us on **Facebook, Discord, Quora, Telegram**.