Check-Up...

Arrange the following angles in descending order: ④

① 340°   ③ 4.28 rad $\frac{9\pi}{5}$ (10π)°

②

$4.28 \, Rad \times \dfrac{180°}{\pi \, Rad}$ $\dfrac{9(180°)}{5}$ $31.4°$

$= 245.2°$ $= 324°$

$\dfrac{5881(180°)}{3}$
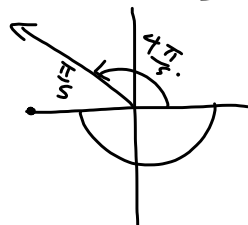
Determine a negative angle co-terminal with each of the following:

(i) $\dfrac{5881\pi}{3}$ → 352 860°   (ii) $\dfrac{29784\pi}{5}$

② $-\underline{300°}$

① $\dfrac{5883\pi}{3} - \dfrac{2\pi}{3}$

$-\dfrac{300\pi}{180}$

③ $\dfrac{5881\pi}{3} - \dfrac{10000\pi}{1}$

$\boxed{1961\pi} - \dfrac{2\pi}{3}$

$\boxed{-\dfrac{5\pi}{3}}$

$\dfrac{5881\pi}{3} - \dfrac{30000\pi}{3}$

$\dfrac{-24119\pi}{3}$

$\dfrac{\pi}{3} - 2\pi$

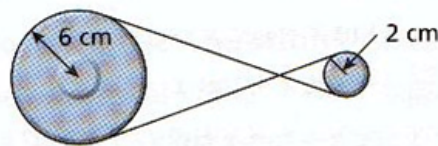$\dfrac{\pi}{3} - \dfrac{6\pi}{3}$

$\boxed{= -\dfrac{5\pi}{3}}$

$\dfrac{29784\pi}{5}$

$\dfrac{29785\pi}{5} - \dfrac{\pi}{5}$

$5957\pi - \dfrac{\pi}{5}$

$\dfrac{4\pi}{5} - 2\pi$

$\dfrac{4\pi}{5} - \dfrac{10\pi}{5}$

$\boxed{= -\dfrac{6\pi}{5}}$

Two flywheels are connected by a belt, as shown in the diagram below. The larger one has a radius of 6 cm and the smaller one has a radius of 2 cm.

$1:3$

(a) If the small wheel rotates $-300°$, then through how many radians does the large wheel rotate?

(b) If the large wheel rotates $\dfrac{7\pi}{6}$ radians, what distance would a point on the circumference of the small wheel rotate?

(a) $100°$

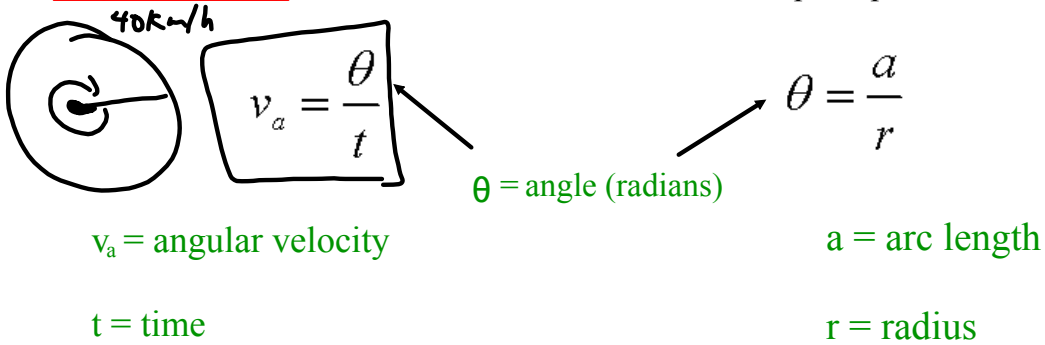$$\frac{100\pi}{180} = \frac{10\pi}{18} = \boxed{\frac{5\pi}{9}}$$

b) $\theta = \dfrac{a}{r}$

$(\cancel{6})\dfrac{7\pi}{\cancel{6}} = \dfrac{a}{6cm} (6)$

$a = 7\pi cm$

$\boxed{a = 21.99cm}$

Angular Velocity

Angular velocity - amount of rotation around a central point per unit of time

40km/h

$$v_a = \frac{\theta}{t}$$

$$\theta = \frac{a}{r}$$

θ = angle (radians)

v_a = angular velocity

a = arc length

t = time

r = radius

Ex. The roller on a computer printer makes 2200 rpm (revolution per minute).
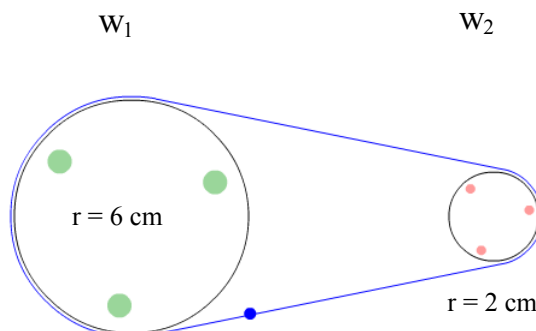Find the roller's angular velocity.

$$V_A = \frac{\theta}{t}$$

$$V_A = \frac{4400\pi \, Rad}{60 \, sec}$$

$$V_A = 230.4 \, Rad/sec$$

$$2200 \, Rev \times \frac{2\pi \, Rad}{1 \, Rev} =$$

$$= 4400\pi \, Radians$$

Ex. (a) If wheel 1 rotates 40 radians, how far has the belt traveled?

(b) Given the 40 rad rotation of wheel 1, what was the angle of rotation for wheel 2?

W_1 W_2

r = 6 cm

r = 2 cm

Ex. A small electrical motor turns at 2200 rpm.

(a) Express the angular velocity in rad/s.
(b) Find the distance a point 0.8cm from the center of rotation
   travels in 0.008 s.

Ex. A Ferris Wheel rotates 3 times each minute. The passengers sit in seats
   that are 5 m from the center of the wheel. What is the angular velocity of
   the wheel in radians per second? What distance do the passengers travel
   in 6.5 seconds?
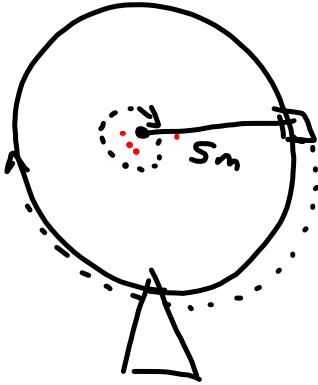
$$3 \, Rot = 3(2\pi) = 6\pi \, Rad$$

$$V_A = \frac{6\pi \, Rad}{60 \, sec} = \frac{\pi}{10} \, Rad/sec$$
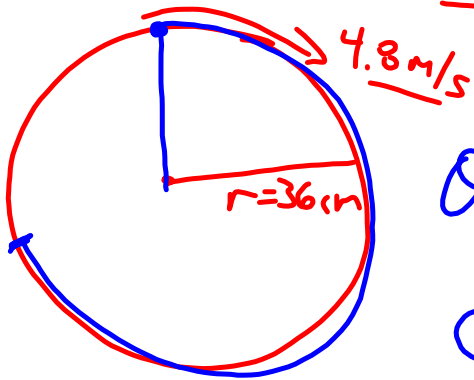
$$\theta = \frac{a}{r}$$

$$\theta = V_A \cdot t$$

$$\theta = \frac{\pi}{10} \, Rad/sec \times 6.5 \, sec$$

$$(S) \; \frac{6.5\pi}{10} = \frac{a}{5m} \, (5)$$

$$\theta = \frac{6.5\pi}{10} \, Rad$$

$$a = 10.21 \, m$$

Ex. A bicycle wheel has a radius of 36 cm and is turning at 4.8m/s. Determine the angula velocity of this wheel? (Rad/Sec)
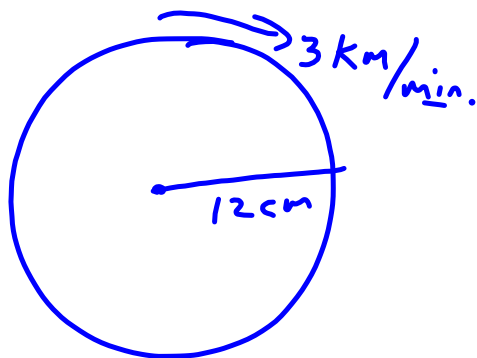
→ 4.8 m/s

$\theta = ??$

r = 36cm

$\theta = \dfrac{a}{r}$

In 1 second

arc = 4.8m

$\theta = \dfrac{480cm}{36cm}$

$\theta = 13.3\bar{3}$ Rad

$V_A = \dfrac{13.33\,Rad}{1\,Sec}$

$= 13.33$ Rad/sec

→ 3 km/min.

12cm

$\dfrac{3\,km}{Min} \times \dfrac{10^3\,m}{1\,km} \times \dfrac{1\,min}{60\,Sec}$

$= 50m/s$

Angular Velocity??

Rad/Sec??

$\theta = \dfrac{50m}{0.12m}$

$\theta = 416.\bar{6}$ Rad

$V_A = \dfrac{416.6\,Rad}{1\,Sec}$

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