

$$1) AS = \frac{1 \text{ rev}}{2 \text{ hrs}} \cdot 2\pi$$

$$LS = \frac{\pi r \omega}{v} \cdot 2400 \text{ mi} = 7539.82 \text{ mph}$$

$$2) 8 \frac{\text{m}}{\text{h}} = AS \cdot 24 \text{ in}$$

$$\frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot 8 \frac{\text{m}}{\text{h}} = AS \cdot 24 \text{ in}$$

$$\frac{42240 \frac{\text{rad}}{\text{hr}}}{(2\pi)} = AS \uparrow \text{ rev } 2\pi$$

$$6722.70 \frac{\text{rev}}{\text{hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}}$$

$$112.045 \frac{\text{rev}}{\text{min}}$$

$$3) 4 \text{ in} = 36 \text{ in} \cdot \theta$$

$$\frac{1}{9} \text{ rad} = \theta$$

$$\frac{1}{9} \text{ rad} \cdot \frac{180}{\pi}$$

$$\theta = 6.37^\circ$$

$$4) A = \frac{1}{2} \theta r^2$$

$$= \frac{1}{2} \left(\frac{1}{9}\right) 3^2$$

$$= \frac{1}{2} \text{ ft}^2$$

$$5) LS = 8 \text{ rad} \cdot 30 \text{ cm} = 240 \text{ cm}$$

$$240 \text{ cm} = \theta \cdot 20 \text{ cm}$$

$$\theta = 12 \text{ radians}$$

$$6) 10 \frac{\text{km}}{\text{h}} = 30 \text{ cm} \cdot \theta$$

$$1000000 \frac{\text{cm}}{\text{hr}} = 30 \text{ cm} \theta$$

$$\text{Back } 33333.33 \frac{\text{rad}}{\text{hr}} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}} = 9.26 \frac{\text{rad}}{\text{sec}}$$

$$10 \frac{\text{km}}{\text{h}} = 20 \text{ cm} \cdot \theta$$

$$100000 = 20 \text{ cm} \theta$$

$$\text{Front } 50000 \text{ rad/hr} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}} = 13.89 \frac{\text{rad}}{\text{sec}}$$

$$7) AL = 20 \left(\frac{\pi}{180}\right) (46 \text{ in}) = 13.96 \text{ in/sec}$$

$$8) AS = \frac{1}{2} \text{ rad} \cdot 20 \text{ sec}$$

$$AS = \frac{1}{60} \frac{\text{rad}}{\text{sec}}$$

$$LS = \frac{1}{60} \frac{\text{rad}}{\text{sec}} \cdot 50 \text{ cm} = \frac{1}{12} \text{ cm/sec}$$

$$9) 35 \frac{\text{m}}{\text{h}} = 13 \text{ in} \cdot AS$$

$$\frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot 35 \frac{\text{m}}{\text{h}} = 13 \text{ in} \cdot AS$$

$$2217600 \frac{\text{in}}{\text{hr}} = 13 \text{ in} \cdot AS$$

$$\frac{170584.62 \frac{\text{rad}}{\text{hr}}}{(2\pi)} = AS \uparrow \text{ rev } 2\pi$$

$$27149.38 \frac{\text{rev}}{\text{hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}}$$

$$452.49 \frac{\text{rev}}{\text{min}}$$

$$10) 2\pi \div 3 = 2.094 \text{ rad}$$

$$AL = 2.094 \text{ rad} \cdot 18 \text{ in}$$

$$AL = 37.7 \text{ in}$$

$$11) AS = \frac{1 \text{ rev}}{27.3 \text{ day}} \cdot 2\pi$$

$$= 0.23015 \text{ rad/day}$$

$$LS = 0.23015 \frac{\text{rad}}{\text{day}} \cdot 2.39 \times 10^5 \text{ miles}$$

$$= 55006.64 \frac{\text{m}}{\text{day}} \cdot \frac{1 \text{ day}}{24 \text{ hr}}$$

$$2291.94 \frac{\text{m}}{\text{hr}}$$

$$12) AS = \frac{10 \text{ rev}}{1 \text{ min}} \cdot 2\pi$$

$$20\pi \frac{\text{rad}}{\text{min}}$$

$$LS = \frac{20\pi \text{ rad}}{\text{min}} \cdot 4 \text{ ft}$$

$$80\pi \text{ ft/min} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$$

$$LS = 2.86 \text{ mph}$$

$$13. \quad 9.55 \frac{m}{hr} = 4.25 \text{ ft} \cdot AS$$

$$\frac{5280 \text{ ft}}{m} \cdot 9.55 \frac{m}{hr} = 4.25 \text{ ft} \cdot AS$$

$$11864.47 \frac{\text{ft}}{hr} = AS \cdot 4.25 \text{ ft}$$

$$1888.29 \frac{\text{rev}}{hr} \cdot \frac{1 \text{ hr}}{60 \text{ min}}$$

$$\boxed{31.47 \text{ rev/min}}$$

$$4) \quad AL = 1 \cdot \frac{\pi}{180} \cdot 6400 \text{ km}$$

$$\boxed{= 111.7 \text{ km}}$$

$$AL = 1 \cdot \frac{\pi}{180} \cdot 4000 \text{ mi}$$

$$\boxed{= 69.81 \text{ miles}}$$

$$15) \quad AS_{50} = 12 \frac{\text{rev}}{\text{min}} \cdot 2\pi$$

$$24\pi \frac{\text{rad}}{\text{min}}$$

$$LS = 24\pi \frac{\text{rad}}{\text{min}} \cdot 25 \text{ cm}$$

$$= 1884.96 \text{ cm/min}$$

$$1884.96 \text{ cm/min} = AS \cdot 15 \text{ cm}$$

$$AS = 125.66 \text{ rad/min}$$

$$125.66 \text{ rad/min} \cdot \frac{1 \text{ min}}{60 \text{ sec}}$$

$$\boxed{AS_{30} = 2.09 \text{ rad/sec}}$$

$$16) \quad AS_{40} = 20 \frac{\text{rev}}{\text{min}} \cdot 2\pi$$

$$= 40\pi \frac{\text{rad}}{\text{min}}$$

$$LS = 40\pi \frac{\text{rad}}{\text{min}} \cdot 40 \text{ cm}$$

$$= 1600\pi \frac{\text{cm}}{\text{min}}$$

$$1600\pi \frac{\text{cm}}{\text{min}} = AS \cdot 50 \text{ cm}$$

$$AS_{50} = 100.53 \frac{\text{rad}}{\text{min}} =$$

$$100.53 \frac{\text{rad}}{\text{min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}}$$

$$\boxed{= 1.68 \text{ rad/sec}}$$