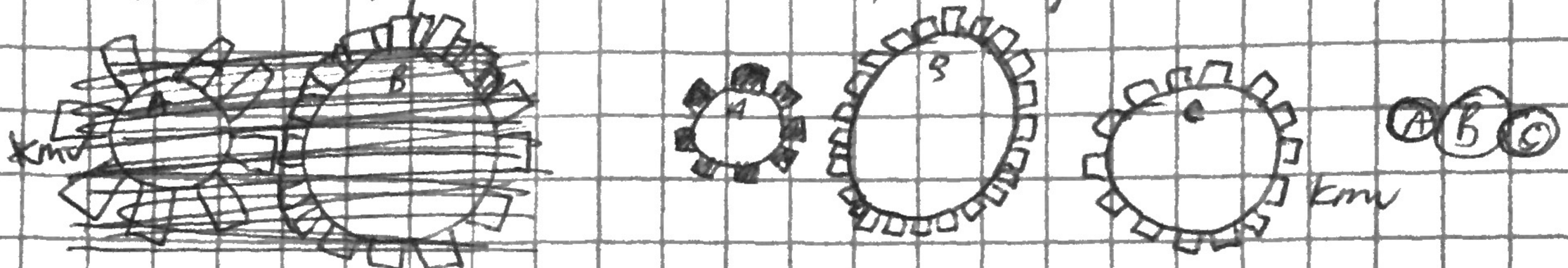
1/14/16

~~Compound Machine Design~~

# Lesson 1.1.6

## 1.1.5 Homework

1. A simple gear train is composed of three gears. Gears A is the driver and has 8 teeth, gear B has 24 teeth, and gear C has 16 teeth.




2. If the output is at C, what is the gear ratio

$\frac{16}{8} = 2:1$

3. If gear A rotates at 60 rpm, how fast is gear C rotating?

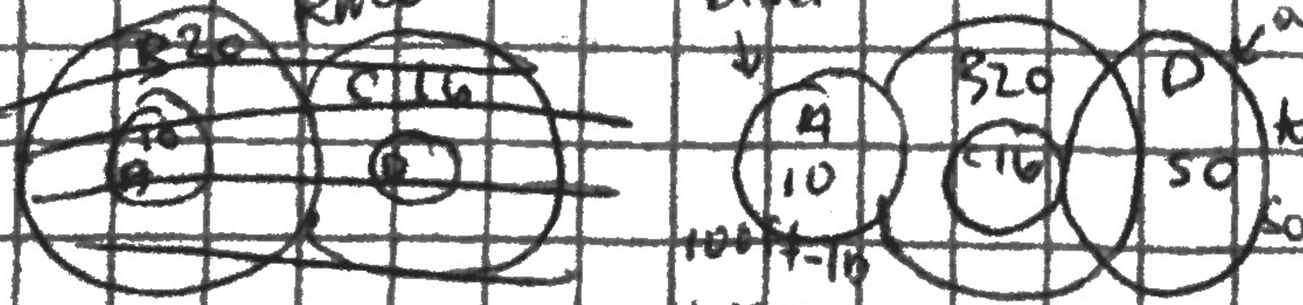
gear A = 60 rpm  gear C = 30 rpm

$\frac{\omega in}{\omega out} = \frac{60}{2} = 30$

4. If the output of torque at gear C is 150 ft-lb, input torque at gear A?

$\frac{16}{8} = \frac{150}{x}$  $\frac{16x}{16} = \frac{1200}{16}$  $x = 75$ ft-lb

5. A compound gear train is composed of four gears A, B, C, and D. Gear A has ten teeth and is meshed with gear B. Gear B has 20 teeth and shares a shaft with gear C, which has 16 teeth. Gear C is meshed with gear D the output gear. Power is supplied at gear A with 100 100 ft-lb of torque and is traveling at 1,600 rpm

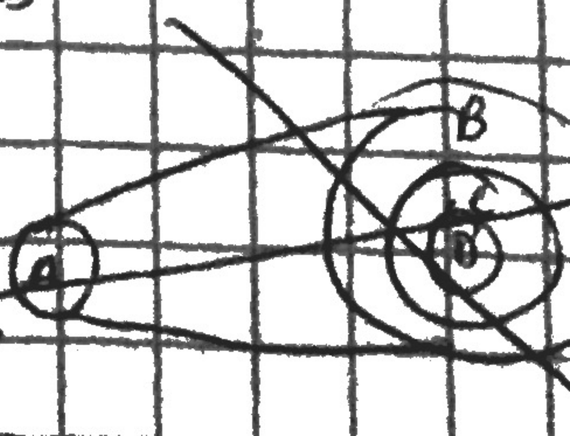



$\frac{500}{100} = \frac{x}{10}$  $100x = 500(10)$

$\frac{100x}{100} = \frac{5000}{100}$  $x = 50$

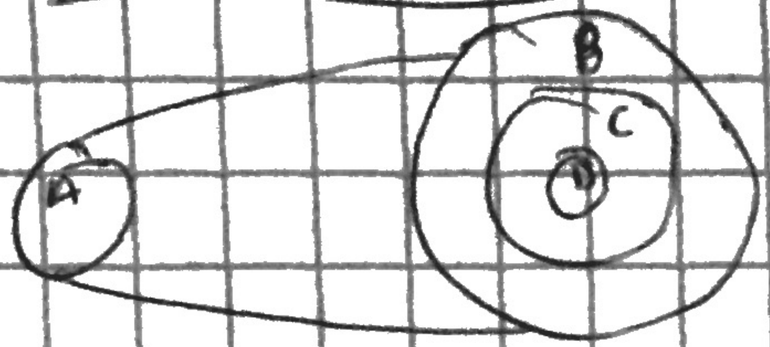
6. $\frac{300 \text{ ft-lb}}{100 \text{ ft-lb}} = GR = 5$

7. $\frac{\omega out}{\omega in} = \frac{d out}{d in}$



4/16 Homework cont

8.

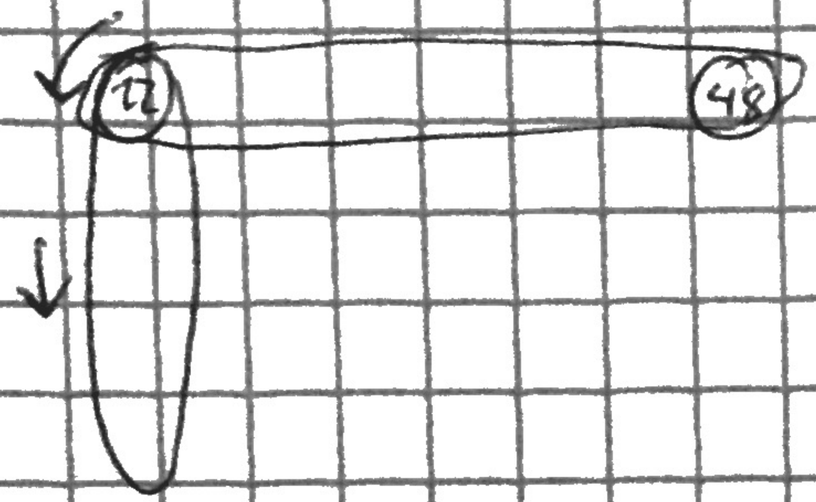



9. $\frac{d_{out}}{d_{in}} = \frac{\omega_{in}}{\omega_{out}}$ $\frac{x}{15} = \frac{1500}{1750} = 12.56:n$

10. $\frac{x}{15} = \frac{1500}{2000} = 11.25:n$

11. $\frac{x}{15} = \frac{1500}{3250} = 6.9:n$

12.




13. $\frac{GR}{1} = \frac{n_{out}}{n_{in}}$ $\frac{48}{22}$ 2.18:1