

## Gear Ratio Worksheet:

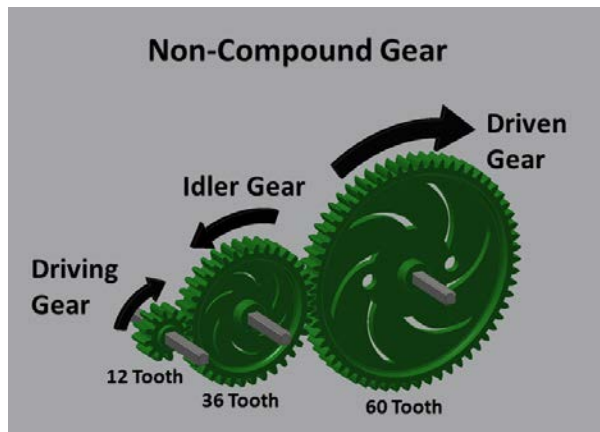
Name: \_\_\_\_\_

Gear ratios are written **Driven** gear to **Driving** gear. Always remember to reduce to the lowest common denominator.

**In all of the following examples Gear A is the driving gear and Gear B is the driven gear.**

| # of teeth  | RATIO | HOW MANY TIMES                          |
|-------------|-------|---|
| A= 10; B=20 | _____ | If A turns one time, B will turn _____. |
| A= 40; B=10 | _____ | If A turns one time, B will turn _____. |
| A= 36; B=60 | _____ | If B turns one time, A will turn _____. |
| A= 12; B=60 | _____ | If A turns one time, B will turn _____. |
| A= 84; B=36 | _____ | If A turns one time, B will turn _____. |

### Multiple Gears in a Train:



In gear-trains in a line the ratio will change from set to set, but ends as a ratio from the first to the last.  
 Example: A has 10 teeth; B has 50 teeth; C has 40 teeth; the ratio for A:B is 5:1; the ratio for B:C is 4:5.  
 Multiply 5:1 x 4:5 and you have 4:1. *Simpler to ignore all idler gears. C:A - 4:1*

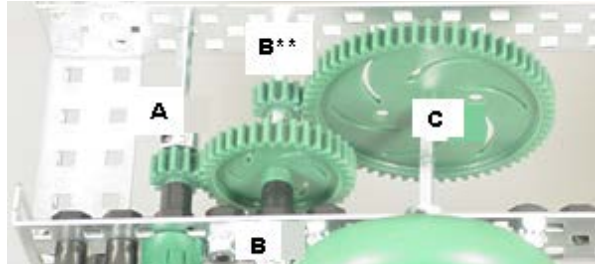
**In all of the following examples Gear A is the driving gear, Gear B is the idler, Gear C is the driven gear.**

| # of teeth        | RATIO | HOW MANY TIMES                          |
|-------------------|-------|---|
| A= 10; B=20; C=10 | _____ | If A turns one time, C will turn _____. |
| A= 10; B=40; C=5  | _____ | If A turns one time, C will turn _____. |
| A= 12; B=36; C=60 | _____ | If C turns one time, A will turn _____. |
| A= 84; B=12; C=36 | _____ | If B turns one time, C will turn _____. |
| A= 36; B=60; C=84 | _____ | If A turns one time, C will turn _____. |

What are the purposes of an idler gear?

In Gear-trains with multiple gears the ratio will change from set to set. If there are two sets of gears on a given shaft, *both spin at the same RPM*. The ratio from gear set to gear set is calculated separately then multiplied together.

Example: A has 8 teeth; B has 36 teeth; the ratio for the A:B is 9:2. B\*\* has 8 teeth; C has 60; the ratio for B\*\*:C is 15:2. Multiply 9:2 x 15:2. The net gear ratio is 9135:4



**RATIO**

**HOW MANY TIMES**

A= 10; B=20; B\*\*= 5;C=10 \_\_\_\_\_

If A turns one time, C will turn \_\_\_\_\_.

A= 10; B=40; B\*\*= 5; C=5 \_\_\_\_\_

If A turns one time, C will turn \_\_\_\_\_.

A= 36; B=12; B\*\*= 36; C=3 \_\_\_\_\_

If C turns one time, A will turn \_\_\_\_\_.

A= 10; B=60; B\*\*= 5; C=60 \_\_\_\_\_

If B turns one time, C will turn \_\_\_\_\_.

A= 12; B=48; B\*\*= 8; C=6 \_\_\_\_\_

If A turns one time, C will turn \_\_\_\_\_.

**Finding the Speed in a Gear Train**

A motor drives a shaft with a 36 tooth gear moving at 120 RPM. The driven gear has the number of teeth listed below.

Driven gear – 36 tooth      How fast is the second gear turning? \_\_\_\_\_

Driven gear – 60 tooth      How fast is the second gear turning? \_\_\_\_\_

Driven gear – 84 tooth      How fast is the second gear turning? \_\_\_\_\_

Driven gear – 12 tooth      How fast is the second gear turning? \_\_\_\_\_

**Finding the Torque in a Gear Train**

A motor turns a shaft with a 36 tooth gear that has a torque of 1.5 Nm. That gear is meshed to a gear having the number of teeth listed below.

Driven gear – 36 tooth      What is the torque on the second gear? \_\_\_\_\_

Driven gear – 60 tooth      What is the torque on the second gear? \_\_\_\_\_

Driven gear – 84 tooth      What is the torque on the second gear? \_\_\_\_\_

Driven gear – 12 tooth      What is the torque on the second gear? \_\_\_\_\_