**Linear Laws**

“Suitable manipulation of variables enables you to manipulate many equations into straight line graphs of the form $y=mx+c$”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Original Equation | Rearrange To | X Variable | Y Variable | Gradient |
| $$y=\frac{k}{x}$$ | $$y=k\frac{1}{x}$$ | $$\frac{1}{x}$$ | $$y$$ | $$k$$ |
| $$y=x^{2}$$ | $$logy=2logx$$ | $$logx$$ | $$logy$$ | 2 |
| $$y^{3}=ax^{3}+bx^{2}$$ | $$\frac{y^{3}}{x^{2}}=ax+b$$ | $$x$$ | $$\frac{y^{3}}{x^{2}}$$ | $$a$$ |
| $$y=ax^{2}+b$$ | (none required) | $$x^{2}$$ | $$y^{3}$$ | $$a$$ |
| $$\frac{1}{x}+\frac{1}{y}=k$$ | $$\frac{1}{y}=-\frac{1}{x}+k$$ | $$\frac{1}{x}$$ | $$\frac{1}{y}$$ | $$-1$$ |
| $$y=ax^{n}$$ | $$logy=nlogx+loga$$ | $$logx$$ | $$logy$$ | $$n$$ |
| $$y= ab^{x}$$ | $$logy=xlogb+loga$$ | $$x$$ | $$logy$$ | $$logb$$ |

Process for completing linear laws questions:

1. Rearrange into format $Y=mX+c$
2. Add data rows for $X$ and $Y$ as necessary
3. Plot $X$ against $Y$
4. Gradient is $m$ value
5. $Y$ intercept is $c$ value