What is the difference between linearly, directly and inversely proportional relationships?

A relationship is a way of describing how one variable can affect another. If a relationship is linear, then a change in one variable will cause a change in another variable by a fixed amount. An example of this in physics is Force against the Extension of a spring (up until the limit of proportionality!). A directly proportional relationship is a special type of linear relationship. When one variable is equal to 0, the second variable will also have a value of 0. On a graph, there would be a straight line through going the "origin". An inversely proportional relationship is one where an increase in one variable will lead to a decrease in another but how quickly this occurs may vary. An example of this would be Gravitational field strength and distance from the centre of a planet. As the distance increases, the strength of gravity decreases.

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