Make brief notes (we will double cover this next lesson) on the following relating to MPP and MRP that determined the demand for labour curve. Then read the case study afterwards and answer the 8 mark question (remember you ideally need 2 well applied and analysed points with a sprinkle of evaluation at the end of each)

The demand for labour is a derived demand

The first point to note is that the demand for labour is a **derived demand**. Labour is only demanded as an input into the production process. If the demand for the good in question changes then so will the demand for the labour that helps to make that product.

In the product market, the demand curve is downward sloping. As the price of a good falls, one would expect its demand to rise, **ceteris paribus.** One would expect this to be the case in the labour market too. If the price of labour falls (i.e. the wage rate falls) one would expect a firm's demand for labour to rise, ceteris paribus. If the price of labour were falling relative to, say, capital, then it would make sense for the firm to substitute labour for capital.

Of course, in the short run we assume that the amount of capital is fixed, but given the **law of diminishing marginal returns** (see the topic on 'Costs and revenues' for details), eventually, additional workers will be worth less to the firm than previous workers, and so their wage will be lower to reflect this fact. So looking at it from a different angle, one would expect lower wage rates at higher employment levels; again the demand curve for labour ought to be downward sloping.

We need to look at this in more detail. We can derive the demand curve for labour using something called **Marginal revenue product** theory.

Marginal revenue product theory

Marginal physical product (MPP): This is the extra physical output produced by one extra worker.

Marginal revenue product (MRP): This is the extra revenue gained by the firm as a result of employing one more worker. If an extra worker adds 10 units to total output (his MPP), and they are sold for £5 each, then the MRP will be £50.

Hopefully you can see, then, that the following formula follows:

MRP = MPP times marginal revenue (MR)

So for the example of the worker who produces 10 units, each sold for £5:

£50 = 10 times £5

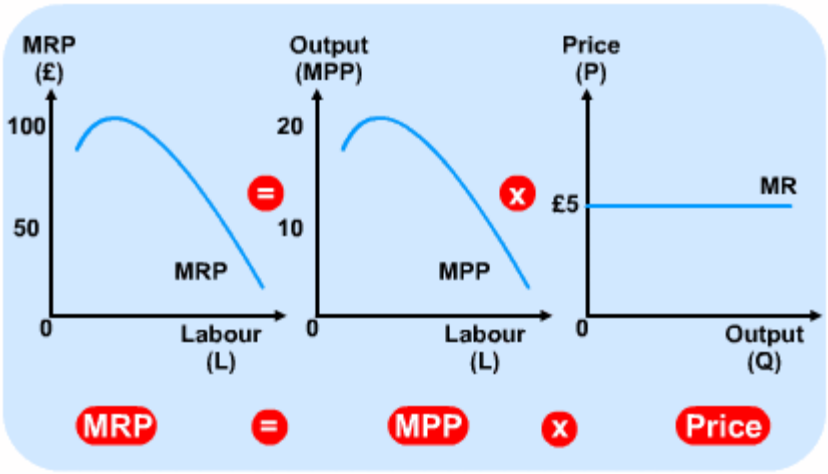
In the analysis that follows, I will hopefully convince you that the **marginal revenue product** curve is the firm's demand curve for labour. But first, as usual, we need to make some assumptions. As with **perfect competition** in the product market, some of these assumptions are fairly unrealistic.

1. Workers are homogenous. They have identical skills. This is a bit like the assumption of homogenous goods in the perfect competition model.
2. Firms are operating in a perfectly competitive product market. The importance of this assumption is that, just as they have no control over the price they set, they also have no buying power when demanding labour. They are price takers in the product market and 'wage' takers in the labour market. Also, in perfectly competitive product markets, marginal revenue is constant and equal to price. So the formula above becomes: MRP = MPP times price (which is constant).
3. For the time being, we assume that there are no trade unions. We are assuming that the labour market is competitive. Trade unions distort this competitive labour market just as powerful firms (in monopoly or oligopoly) would with their superior buying power (buying labour, that is).

Deriving the demand curve for labour

We mentioned the law of diminishing marginal returns earlier. Remember that this 'law' stated that, in the short run, "if a firm increases output by adding variable labour to fixed capital then eventually diminishing marginal returns (physical product of labour) will set in." In other words, at some point an extra worker will add less output to the grand total than the previous worker.

So I think it is fair to say that the **marginal physical product** curve will look exactly the same as the **marginal returns** curve that we used in the 'Costs and revenues' topic They are, basically, the same thing. We can now derive the MRP curve.

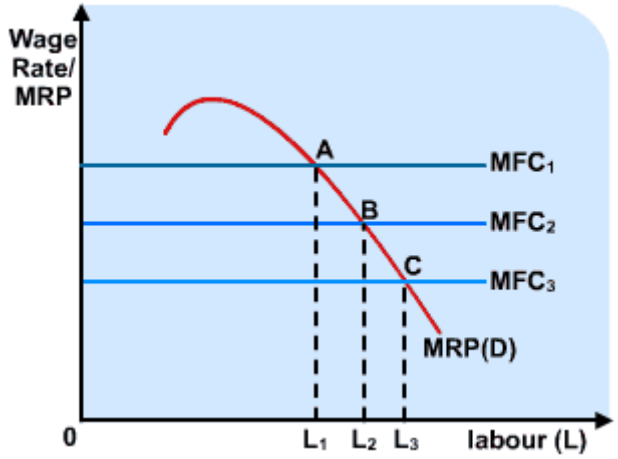


Notice in the diagram above that the shape of the MRP curve is exactly the same as the shape of the MPP curve. The only difference is the scale on the y-axis. Every value for the output in the middle diagram has been multiplied by £5 (given in the diagram on the right) to give the values on the y-axis in the diagram on the left.

So, the MRP curve is derived from the MPP curve, which is derived from the law of diminishing marginal returns.

Now, why is the MRP curve the demand curve for labour for each of these perfectly competitive firms?

Earlier, we assumed that the labour market that we are dealing with is competitive. This means that the wage is constant. Firms can employ as many workers as they want at the given wage, just like they can sell as many goods as they want at the given price in perfectly competitive product markets. We can call the wage the **marginal factor cost (MFC).** Factor, meaning **factor of production** (in this case, labour). So the MFC is the extra cost to the firm of employing one more worker.



Look at the diagram above. I've drawn an MRP curve and three MFC curves. Firms in product markets maximise profits at the level of output where marginal cost = marginal revenue (MC = MR). If you can't remember why this is the case, I seriously advise you to look at the 'Costs and revenues' topic. The same concept can be applied in the labour market. Firms will employ labour up to and including the point where the extra revenue gained from the last unit of labour is the same as the extra cost of employing it. In other words, where MRP = MFC.

So, when the given wage is W_1, this occurs at point A, giving an employment level of L_1. At wage rate W_2, MRP = MFC occurs at point B, giving an employment level of L_2, and at W_3, for the same reason, L_3 units of labour will be employed. At each given price (wage rate) the firm reads his demand (for labour) from the MRP curve. This is a pretty good definition of a demand curve! The MRP curve **is** the demand curve for labour.

What if the firm is not operating in a perfectly competitive goods market?

In the analysis above, we assumed that the firm was operating in a perfectly competitive goods market. This meant that its marginal revenue curve was constant and equal to its price. Hence, the formula MRP = MPP times MR became MRP = MPP times price.

But most firms operate in an imperfectly competitive goods market (particularly oligopoly and monopoly). This means that they face a downward sloping demand curve in the product market. Seeing as the marginal revenue curve must be **below** a falling demand curve (which is the average revenue curve, remember) and falling twice as fast, this will affect the MRP formula quite a lot. Luckily, it does not affect the fact that the MRP curve is downward sloping. In fact, it just means that the MRP curve is even steeper. MRP = MPP times MR. If MPP is falling (due to diminishing marginal returns) and MR is falling, then MRP **must** be falling too.

Hence, the firm's demand curve for labour will be downward sloping **whatever** type of goods market the firm happens to be involved with.