Quantitative Sales Forcasting – Moving averages

1	**Key Idea**	A moving average takes a data series and "smoothes" the fluctuations in data to show an average. The aim is to take out the extremes of data from period to period. Moving averages are often calculated on a quarterly or weekly basis.
2	**Key Idea**	Three period moving average – Add the sales data for the three periods and divide by three
3	**Key Idea**	Four period moving average – Add the sales data for the four periods and divide by four

Quantitative Sales Forcasting – Scatter graphs and lines of best fit

1	**Key Idea**	Extrapolation involves the use of trends established by historical data (i.e. past data) to make predictions about future values. The basic assumption of extrapolation is that the pattern will continue into the future unless evidence suggests otherwise.
2	**Key Idea**	The moving average helps point out the growth trend (expressed as a percentage growth rate), and it is this which extrapolation would use first to predict the path of future sales. This could be done mathematically using a spreadsheet. Alternatively, an extrapolated trend can simply be drawn on the chart as a rough estimate.

Quantitative Sales Forecasting – evaluation

1	**Pros**	• A simple method of forecasting • Not much data required, only need sales data for last few years • Quick and cheap for the business to do • Not very technical
2	**Cons**	• Unreliable if there are significant fluctuations in historical data • Assumes past trend will continue into the future – unlikely in many competitive business environments • Ignores qualitative factors (e.g. changes in tastes & fashions)

Investment Appraisal

1	**Key Idea**	All businesses require capital equipment (fixed assets) such as machinery, premises and vehicles. The purchase of such assets is known as capital investment and is undertaken for various reasons such as replace existing equipment, expand capacity of the business, reduce production costs, produce new products. Capital investment, like all other business activities, involves an element of uncertainty, because expenditure is incurred today in order to produce some benefit in the future. Investment appraisal techniques are designed to aid decision-making regarding such investment projects.
2	**Investment appraisal techniques**	There are 3 methods which can be used to appraise any investment project: 1. The Payback method 2. The Average Rate of Return (A.R.R) method 3. The Net Present Value (N.P.V) method.
3	**Payback method**	The payback period is the time taken for the equipment, (machinery etc.), to generate sufficient net cash flow to pay for itself.
4	**ARR method**	1. Add up the total forecasted net cash flow 2. Deduct the capital outlay from this 3. Divide the resulting figure by the expected life (in years) of the capital 4. Express this annual figure as a percentage of the capital outlay
5	**NPV method**	The return on an investment comes in the form of a stream of earnings in the future. The N.P.V. method of investment appraisal takes into account the size of the cash inflows over the life of the equipment, but also makes adjustment for the timing of the money. A greater weighting (or importance) is given to the inflows of cash in the earlier years. The weighting can be calculated from the following formula: $\text{NPV} = \frac{A}{(1+r)^n}$ A = the actual sum of money concerned r = the rate of discount (called the 'Discount factor') n = the number of years

Vocabulary

	Centring	A method used in the calculation of a moving average where the average is platted or calculated in relation to the central figure
2	Correlation	The relationship between 2 different sets of variables
3	Correlation coefficient	A measure of the extent of the relationship between 2 sets of variables
4	Moving average	A succession of averages derived from successive segments (typically of constant size and overlapping) of a series of values
5	Scatter graph	A graph showing the performance of one variable against another independent variable on a variety of occasion. It is used to show whether a correlation exists between the variables
6	Time series analysis	A method that allows a business to predict future levels from past figures
7	Average Rate of Return (ARR)	ARR is a method of investment appraisal that measures the net return per annum as a percentage of the initial spending
8	Capital Cost	The amount of money spent when setting up a new venture
9	Discounted Cash Flow	A method of investment appraisal that take interest rates in to account by calculating the present value of future income
10	Investment	The purchase of capital goods
11	Investment Appraisal	The evaluation of an investment project to determine whether or not it is likely to be worthwhile
12	Net Cash Flow	Cash Inflows – Cash Outflows
13	Net Present Value (NPV)	The present value of future income from an investment project, minus the cost
14	Payback Period	The amount of time it takes to recover the cost of an investment project
15	Present Value	The value today of a sum of money available in the future

Decision Trees

1	**Key Idea**	This is a decision making tool, tracing the alternative outcomes of any decision. The likely results can be compared so that businesses can find the most profitable alternative. The outcomes of decisions are expressed as numbers.
2	**Key Idea**	There are a number of features on a decision tree. There are: • Decision Points • Outcomes • Probability or Chance • Expected Monetary Value (EMV)
3	**Key Idea**	It is important to recognise that once a particular course of action has been chosen, the profit or revenue generated by that choice is not the same as the expected value.
4	**Cons**	• The information which the technique 'throws out' is not exact. Much of it is based on probabilities • Decision are not always concerned with quantities and probabilities, they often involve peoples opinion, and can be influenced by legal constraints • Time lags occur • It is time consuming to construct • It can be bias • They do not take in to consideration the dynamic nature of business
5	**Pros**	• May show possible courses of action not previously considered • The involve placing numerical values on decisions • They force management to take account of the risks involved with decisions

Critical Path Analysis (CPA)

1	**Key Idea**	This is an established method used to improve the management or time and other resources. The technique, which uses Network diagrams can be used to calculate the minimum time needed to complete a project. It can also identify possible delays
2	**Key Idea**	Businesses often have to complete large projects, which involved a series of complicated task or activities which must be carried out in a certain order.
3	**Key Idea**	It is vital that a business knows the minimum length of time a project will take to complete, so before any project starts Network Diagrams must be completed. This involves tasks to take place, how long each will take, and the order in which they must happen.
4	**Network Diagram**	The diagram must calculate: • the earliest start time • the latest finish time From this the business can identify the critical path
5	**Cons**	The information used is all based on estimates Changes occur throughout the life of the project CPA identifies times but resources may not be available CPA can become very complex for really big projects

Links

To demonstrate your synoptic skills when discussing critical path analysis in an exam you could make relevant links to a number of areas in the specification. For example, critical path analysis is used to improve efficiency and reduce waste in a business. Therefore it could be linked to Production, productivity and efficiency (Unit 37), Capacity utilisation (Unit 38) and lean production in Stock control (Unit 39). Remember also that critical path analysis can be used to manage a wide range of projects in business, such as planning marketing strategy, planning a product launch or relocating premises, for example.

Free float: The free float is the amount of time by which a task can be delayed without affecting the following task. It can be calculated by:

EST start of next task – EST start of this task – duration

So for Task C it would be:

9 – 1 – 8 = 0 days

Table 1 Float

(days)

Task/activity	LFT	EST	Duration	Total float	EST next	EST this	Duration	Free float
A	1	0	1	0	1	0	1	0
B	5	1	4	0	5	1	4	0
C	11	1	8	2	9	1	8	0
D	19	5	2	12	19	5	2	12
E	19	5	14	0	19	5	14	0
F	19	9	8	2	19	9	8	2
G	22	19	3	0	22	19	3	0
H	26	22	1	3	23	22	1	0
I	28	23	2	3	28	23	2	3
J	28	22	6	0	28	22	6	0

Vocabulary

1	Decision Tree	A Technique which shows all possible outcomes of a decision.
2	Earliest Start Time	How soon a task in a project can begin. It is influenced by the length of time taken by tasks which must be completed before it can begin
3	Critical Path	The tasks involved in a project which if delayed could delay the project
4	Critical Path Analysis (CPA)	A method of calculating the minimum time required to complete a project, identifying delays which could be critical to its completion
5	Free Float	The time by which a task can be delayed without affecting the following task
6	Latest finish time	The latest time that a task in a project can finish
7	Network diagram	A chart showing the order of the tasks involved in completing a project containing information about the times taken to complete the tasks
8	Nodes	Positions in a network diagram which indicates the start and finish times of a task
9	Total Float	The time by which a task can be delayed without affecting the project

Network showing latest finishing times for the cottage renovation