

L3 Advanced Business Calculations

Overview of content

- 1 Business ownership /Profitability and liquidity
- 2 Depreciation of business assets
- 3 Investment appraisal and optimisation
- 4 Simple and compound interest
- 5 Indices and trends

GROUP 1 – SELECT FIVE (x4 marks each)

Qu1

Team Sports Ltd manufactures a range of soccer balls, tennis rackets and squash rackets. The manager of the shop estimates that the manufacturing overheads for this year will be £85,100. She forecasts that sales will reach 15,000 shorts, 6,000 tennis rackets and 2,000 squash rackets.

Using the estimated direct costs for each group of products shown in the table, calculate the overheads for each product and place the answers in the table.

	Soccer shorts (£)	Tennis rackets (£)	Squash rackets (£)
Direct materials	3.00	10.00	8.00
Direct labour	2.50	7.50	12.50
Overheads	[55,500]	[22,200]	[7,400]

INSERT VALUES 1 mark each but 4 for if all correct

Qu2

Team Sports Ltd manufactures a range of soccer balls, tennis rackets and squash rackets. The manager of the shop estimates that the manufacturing overheads for this year will be £85,100. She forecasts that sales will reach 15,000 pairs of shorts, 6,000 tennis rackets and 2,000 squash rackets.

Using the estimated direct costs for each group of products shown in the table, calculate the total manufacturing cost for each tennis racket and squash racket. Place your answers in the correct place in the table

	Soccer shorts (£)	Tennis rackets (£)	Squash rackets (£)
Direct materials	3.00	10.00	8.00
Direct labour	2.50	7.50	12.50
Total manufacturing cost (per unit)		[21.20]	[24.20]

INSERT VALUES 2 marks each

Qu3

Which of the following statements are true?

A	Fixed costs remain the same whatever the output within the relevant range.	✓
B	Contribution per unit is the selling price less the variable costs per unit of production.	✓
C	Variable costs vary in indirect proportion to the level of activity.	
D	The break-even point identifies the amount of profit made during the time period concerned.]	

MRQ 2 marks each but 2marks off for each incorrect answer

Qu4

Which of the following statements are true?

A	If a business has a high margin of safety, it is likely to be high risk	
B	If a product has a selling price of £15, with raw materials costs of £6 per unit and labour costs of £3 per unit, the contribution per unit will be £6.	✓
C	The break-even point is useful for decision-making purposes to help businesses know the point at which they are making no profit and no loss.	✓
D	An assumption of break-even analysis is that fixed costs remain the same over the relevant range.]	✓

MRQ 4 marks for three correct answers, 2 marks for two correct answers and 1 mark for one correct answer but 2 marks off for each incorrect answer. (Minimum score = zero)

Qu5

Newtown Golf Club is planning to provide a new practice driving range for its members. The land is already available within the existing club's grounds but there will be a number of costs involved. These have been identified as follows:

A full-time member of staff to run the facility will cost £22,000 per year.

Maintenance costs of £8,000 per year.

Electricity costs, to include lighting during the evenings, are estimated to be £6,000 per year.

The club will charge golfers £4.50 for a basket of golf balls and market research has indicated that the demand will be for 80 baskets to be used per day. The range will be open 350 days in each year.

The costs for the golf club are likely to be £1.50 per basket and each golfer will receive a free gift pack containing a set of branded golf tees and a bottled drink, costing the club 85p per pack.

Calculate the break-even point for the number of baskets that need to be sold.

[16,744]

INSERT VALUE

Qu6

Fill in the blanks in the passage.

Ordinary shares entitle their owners to receive an ordinary [dividend] from the company if one is to be paid. Ordinary shareholders are the owners of the company and are entitled to [vote] at a general meeting, which gives them [control] over the business.

Preference shares entitle their owners to receive dividends at a [fixed] rate before ordinary dividends can be paid. Preference shareholders are not generally have voting rights at a general meeting.

FILL IN BLANKS 1 mark each

Qu7

Match the definitions of the following categories of ratios to the correct descriptions.

[Profitability] [How successfully a business is trading]

[Liquidity] [How easy it is for the business to pay its way]

[Efficiency] [How effectively the short-term assets and liabilities of the business are managed]

MATCH ITEMS 1 mark each but 4 if all correct

Qu8

The summarised details of the profit and loss statement for a business operating in 2022 are shown below.

	Dollars (000's)	Dollars (000's)
Sales		6,500
Cost of sales		
Opening inventory	100	
Purchases	3,840	
Closing inventory	140	
		3,800
Gross profit		2,700
Wages	900	
Depreciation	460	
Rent	300	
Other expenses	740	
		2,400
Operating profit		300
Long-term capital employed	1,900	

Calculate the following ratios:

Return on capital employed = [15.8]%

Gross profit margin = [41.5]%

Operating profit margin = [4.6]%

Use of assets = [3.4] times

INSERT VALUES 1 mark each

GROUP 2– SELECT FIVE (x4 marks each)

Qu9

Fill in the blanks in the passage.

When a business purchases a [non-current] asset, it is shown as an asset on the statement of financial [position] as it will benefit the business over a number of years and enable it to generate profits. However, with the exception of [land], such assets will not last forever. To allow for the fact that these assets will benefit the business over a number of years, depreciation aims to [spread] the cost of those assets over the years in which the benefit will be held.

[non-current] [current] [position] [performance] [land] [vehicles] [machinery] [spread]
[support] [calculate]

PICK LIST

Qu10

A computer is bought by a company for £3,500. It is depreciated at a rate of 40% per year. Complete the table of values for the computer below.

	£
Cost of the computer at 1 st January 2020	3,500
First year's depreciation charge at 40%	
Net book value at 31 st December 2020	[2,100]
Second year's depreciation charge at 40%	
Net book value at 31 st December 2021	[1,260]
Third year's depreciation charge at 40%	
Net book value at 31 st December 2022	[756]

INSERT VALUES 1 mark each bit 4 marks if all correct

Qu11

A cafe owner buys a drinks cooler for \$830 but after a year it only has a net book value of \$630.

If he sells the cooler after one year of ownership for \$800, what would be the profit/loss arising from the disposal?

A	\$170	✓
B	\$200	
C	\$150	
D	\$130	

MCQ

Qu12X

A cafe owner buys a drinks cooler for \$830 but after a year it only has a net book value of \$630.

If he sells the cooler after one year of ownership for \$400, what would be the profit/loss arising from the disposal?

A	Loss of \$230	✓
B	Profit of \$230	
C	Profit of \$200	
D	Loss of \$200	

MCQ

Qu13X

A production company purchases a new machine for \$16,000. Using a reducing-balance depreciation of 30%, calculate the depreciation charge for year three.

[2,352]

INSERT VALUE

Qu14

A car hire company purchases a new vehicle for \$42,000. Using a reducing-balance depreciation of 40%, calculate the net book value of the car after two years.

[15,120]

INSERT VALUE

Qu15

Which of the following statements are true?

A	The straight-line method depreciation aims to spread the cost of a non-current asset evenly across its expected useful life.]	✓
B	The straight-line method depreciation applies a fixed depreciation rate to the net	

	book value of an asset each year.]	
C	The estimated useful life of an asset is related to its worth at the end of its life.]	
D	The residual value is the estimated amount that a current asset will be worth at the end of its useful life.]	

MRQ 4 mark for the correct answer but 2 marks off for each incorrect answer

Qu16

Fill in the blanks in the passage.

Charging depreciation on a [non-current] asset will reduce its value over its useful life in the business. This is shown on the statement of financial [position].

The depreciation [charge] represents the amount charged in one accounting period as an [expense] in the statement of profit or loss.

FILL IN BLANKS 1 mark each

GROUP 3 – SELECT FIVE (x4 marks each)

Qu17X

Accounting rate of return (ARR) is defined as which of the following?

A	The ratio of average annual profits, after depreciation, to the capital invested	✓
B	The ratio of average annual profits to the capital invested	
C	The ratio of sum of annual profits to the capital invested	
D	The ratio of average annual revenue to the capital invested	

MCQ

Qu18

Using the discount table below, calculate the net present value of an investment's income, valued at \$4m in three year's time using a discount rate of 8%.

	7%	7.5%	8%
Year 1	0.9346	0.9302	0.9259
Year 2	0.8734	0.8653	0.8573
Year 3	0.8163	0.8050	0.7938
Year 4	0.7629	0.7488	0.7350

Ans = [\$1,175,200]

INSERT VALUE

Qu19X

Robert has financed the purchase of his house, furniture and car as follows:

Mortgage: £80,000 at 7% p.a.

Bank loan: £30,000 at 8% p.a.

Credit cards £3,000 at 20% p.a.

What is his average cost of capital per year?

[7.6%]

INSERT VALUE

Qu20X

The expected cash flows for two projects are shown in the table. Find the payback periods (in months) for Project 1 and Project 2.

Years	Project 1 cash inflow/outflow £	Project 2 cash inflow/outflow £
0	(100,000)	(100,000)
1	20,000	15,000
2	40,000	20,000
3	40,000	25,000
4		30,000
5		30,000

Project 1 = [36] months

Project 2 = [51] months

INSERT VALUES 2 marks each

Qu21

ABC plc currently earns 18% on its capital employed. It intends to introduce a new product which will require the purchase of a new machine at a cost of £100,000, and additional working capital of £40,000. Sales of the product are expected to be £66,000 per annum, costs of manufacture £35,000 and other costs £ 3,000 per annum. Depreciation is 10% per annum on the cost of the machine.

Calculate the accounting rate of return for ABC plc.

A	31%	✓
B	35%	
C	38%	
D	28%	

MCQ

Qu22X

XYZ plc is considering whether to invest £50,000 in a new project. The projected net cash inflows are expected to be as follows:

Year 1	£7,000
Year 2	£25,000
Year 3	£30,000
Year 4	£5,000

Using the 10% discount factors in the table below, calculate the net present value the project.

Year	Discount factor 10% (£)
1	0.909
2	0.826
3	0.751
4	0.683

Ans = [52,958]

INSERT VALUE

Qu23X

A business wants to hire a photocopier to print leaflets for a marketing campaign. There are two suitable machines on offer:

Machine A costs \$120 a month to rent, occupies 2.5 sq m of floor space and can print 15,000 copies per day.

Machine B costs \$150 a month to rent, occupies 1.8 sq m of floor space and can print 18,500 copies per day.

The marketing department has budgeted up to \$1,200 per month for photocopiers within a room that has a total of 19.2 sq m of floor space.

Using A to represent the number of A machines to be rented and B to represent the number of B machines to be rented, which of the following are correct constraints for this situation?

A	$120A + 150B \leq 1200$	✓

B	$2.5A + 1.8B \leq 19.2$	✓
C	$120A + 150B \geq 1200$	
D	$2.5A - 1.8B \geq 19.2$	

MRQ 2marks each but 2 marks for each incorrect answer

Qu24X

What name is given to the area within a linear programming graph that satisfies all the constraint conditions?

A	Feasible region	✓
B	Central region	
C	Solution region	
D	Constraints region	

MCQ

GROUP 4 – SELECT FIVE (x4 marks each)

Qu25

What will be the value of £12,000 invested at 6% compound interest per year for five years? Give your answer to the nearest pound.

A	£16,059	✓
B	£15,600	
C	£16,509	
D	£16,056	

MCQ

Qu26X

How much money will need to be invested now to produce \$20,000 after five years, with a 10% compound interest rate? Give your answer to the nearest \$10.

A	\$12,420	✓
B	\$13,330	
C	\$12,335	
D	\$12,225	

MCQ

Qu27X

How many years will it take for a given sum of money to treble at a simple interest rate of 15%?

A	13.3	✓
B	7.9	
C	9.8	
D	10.2	

MCQ

Qu28X

How many years will it take for a given sum of money to treble at a compound interest rate of 15%?

A	7.9	✓
B	13.3	
C	6.6	
D	7.2	

MCQ

Qu29X

Some years ago, a couple bought an endowment insurance policy which has just matured. They have the option of taking \$20,000 now or \$40,000 in ten years' time. As they have retired and pay no income tax, they could invest the money that they could get now at a compound interest rate of 10% per year for the next ten years.

Which option should they take and by how much will they be better off?

A	Take \$20,000 now and invest at 10% to become \$11,875 better off	✓
B	Take \$20,000 now and invest at 10% to become \$10,000 better off	
C	Collect \$40,000 in ten years' time and be \$4,388 better off	
D	Collect \$40,000 in ten years' time and be \$1,875 better off	

MCQ

Qu30X

A company wants to invest money now into a fund to replace equipment in five years' time. The expected value of replacement equipment in five years' time is £100,000 and the compound interest rate is fixed at 10%.

How much should be invested now to ensure that the necessary funds are available in five years' time? Give your answer to the nearest ten pounds.

[£62,090]

INSERT VALUE

Qu31X

A plane flight from London to New York costs £458 but the flight back can be purchased for \$480. If there are 1.28 dollars to the pound, how much cheaper is it, to the nearest pound, to pay for all the flights in dollars?

A	\$83	✓
B	\$75	
C	\$78	

D	\$80	
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MCQ

Qu32

An apartment in Paris was bought by an American family for \$220,000. It is now valued at 225,000 euros. If the exchange rate is 1 euro = \$1.42, how much profit in dollars has been made on the purchase of this apartment?

A	\$99,500	✓
B	\$319,500	
C	\$72,640	
D	\$110,350	

MCQ

GROUP 5 – SELECT FIVE (x4 marks each)

Qu33

A company's annual turnover during six years is shown in the table, along with the retail price index values for each year.

Year	2018	2019	2020	2021	2022	2023
Turnover (\$m)	2.3	3.3	4.1	4.2	4.4	4.7
RPI	149.1	152.7	157.5	162.9	165.4	170.3

Calculate the equivalent turnover in real terms for 2019.

Ans = [\$3.22m]

INSERT VALUE

Qu34

A chocolate bar cost 25p in 2018 now costs 41p.

A two-bedroom semi-detached house cost £152,000 in 2018, now costs £288,000
What is the chocolate bar index value? What is the house price index value?

Chocolate bar = [164.0]

House price = [189.5]

INSERT VALUES 2 marks each

Qu35X

The number of machines manufactured in a factory for each of the past eight years is shown in the table as a set of index numbers. However, as can be seen, two different bases have been used – one from 2015 and one for 2019. You have been asked to convert all the index values to a common base of 2015.

	2015	2016	2017	2018	2019	2020	2021	2022
Index 1	100	138	162	196	220			
Index 2					100	125	140	165

What would be the values for 2020, 2021 and 2022, using 2015 as a base?

2019 = [220]

2020 = [275]

2021 = [308]

2022 = [363]

INSERT VALUES 1 mark each

Qu36

The prices of three resources for the manufacture of a component are shown in the table over a three-year period.

Item	2019	2020	2021
Paint	£0.25	£0.20	£0.18
Fibre	£0.16	£0.16	£0.20
Machine time cost per hour	£5.50	£5.85	£8.30

Further information about quantities of production of the components is provided in the second table.

Item	2019	2020	2021
Paint	50	48	48
Fibre	200	210	21.5
Machine time (hrs)	30	27	23

Calculate the value of Paasche's index for 2020.

Ans =[140.3]

INSERT VALUE

Qu37X

The set of data shown below has a base fixed at 2012, i.e. the index value equals 100 at 2012.

Jan 2020 287

Jan 2021 296

Jan 2022 302

Jan 2023 314

Jan 2024 324

What will be the conversion factor to change the base to 2021?

A	2.96	✓
B	2.87	
C	1.02	
D	1.13	

MCQ

Qu38

The prices of three resources for the manufacture of a component are shown in the table over a three-year period.

Item	2019	2020	2021
Paint	£0.25	£0.20	£0.18
Fibre	£0.16	£0.16	£0.20
Machine time cost per hour	£5.50	£5.85	£8.30

Further information about quantities of production of the components is provided in the second table.

Item	2019	2020	2021
Paint	50	48	48
Fibre	200	210	21.5
Machine time (hrs)	30	27	23

Calculate the value of Laspeyre's index for 2020.

Ans = [142.2]

INSERT VALUE

Qu39X

The quantities of a product sold by a company over a period of five years are shown in the table.

Calculate the quantity index values for the missing years, using 2001 as the base year.

Year	Quantity sold	Quantity index
2017	2,500	[100]
2018	3,500	140
2019	3,800	[152]

2020	2,000	[80]
2021	3,200	[128]

INSERT VALUES 1 mark each

Qu40X

The prices of a product sold by a company over a period of five years are shown in the table.

Calculate the price index values for the missing years, using 2017 as the base year.

Year	Price (\$)	Price index
2017	6.00	100
2018	6.20	[103]
2019	5.52	[92]
2020	6.95	[116]
2021	8.82	[147]

INSERT VALUES 1 mark each

MCQ GROUP – SELECT FIVE (x2 marks each)

Qu41X

A river boat company rents a total of ten small boats to tourists during 20 weeks of the summer period, operating on five days of each week. Each boat is rented at a cost of \$5,000 each per year.

Additional costs are stated as follows:

The annual maintenance cost for each boat is \$100.

The cost of staff to sell tickets is \$3,000 for the season, while other staff costs amount to \$45,000 per season.

Packed meals, including wine, are provided for each boat at a cost price of \$35, along with a tourist guide costing \$12, provided for each boat.

Mooring charges amount to \$2,600 for the year and staff uniforms come to \$600 each season.

Advertising costs amount to \$600 per year.

If each boat is charged to tourist at \$150 per trip, what is the break-even number of trips to ensure a profit, in dollars?

A	590	✓
B	600	
C	624	
D	578	

MCQ

Qu42X

A shoe manufacturer is investigating the cost of manufacturing a new style of hand-made bespoke sandal. He identifies the main costs associated with the production and finds the following:

Material costs are \$8.50 per pair, whilst labour costs are \$9.00 per hour, with the cutting department needing one person to produce materials for four pairs of sandals each hour. The sewing department can hand-sew two pairs of sandals per hour.

The cost of hiring the required machines is \$562.50 per month.

The target is to product 900 pairs of sandals in the first year.

Calculate the total cost of production of each pair of sandals.

A	\$22.75	✓
B	\$25.20	
C	\$21.85	
D	\$22.25	

MCQ

Qu43X

A piece of electrical equipment costs \$630 to buy and is expected to be used by a business for four years, after which it will have a scrap value of \$30.

If the value of the equipment is decreased by a uniform amount each year, what will be the loss of value each year?

A	\$150	✓
B	\$120	
C	\$210	
D	\$175	

MCQ

Qu44X

Non-current assets have a finite useful life and they will be used in a business to do which of the following?

A	Generate profits	✓
B	Save manpower	
C	Enable expansion	
D	Reduce losses	

MCQ

Qu45X

CW Products makes two products, X and Y. The contribution that can be obtained from these products are

X contributes \$20 per unit and B contributes \$30 per unit.

Using x for the number of units of X produced and y for the number of units of Y produced, what would be the objective function to maximise the contribution?

A	$20x + 30y$	✓
B	$20X + 30Y$	
C	$30x + 20y$	
D	$20X - 30Y$	

MCQ

Qu46X

As a method of investment appraisal, payback can be defined as which of the following?

A	The period of time taken for a project's net cash inflows to recoup the original investment	✓
B	The period of time taken for a project's net profit to recoup the original investment	
C	The period of time taken for a project's gross profit to recoup the original investment	
D	The period of time taken for a project's net cash inflows to recoup the annual investment	

MCQ

Qu47X

What will be the value of £10,000 invested at 5% simple interest per year for eight years? Give your answer to the nearest pound.

A	£14,000	✓
B	£14,775	
C	£15,125	
D	£14,625	

MCQ

Qu48X

I have \$320 and 78 euro in my wallet. If the conversion rates are

£1 = \$1.20 and £1 = 0.90 euros, how much do I have after converting all the money into pounds sterling. Give your answer to the nearest pound.

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A	£353	✓
B	£360	
C	£328	
D	£348	

MCQ

Qu49X

Which of the following indices weighs prices according to current period of usage?

A	Paasche price index	✓
B	Laspreye price index	
C	Aggregate price index	
D	Retail price index	

MCQ

Qu50X

A fire service recorded 127 emergency calls in 2021, 142 calls in 2022 and 116 calls in 2023. Using the first year as a base period, calculate the indices for the other two years.

A	1.12 and 0.91	✓
B	1.12 and 1.09	
C	0.81 and 0.91	
D	0.81 and 1.09	

MCQ

TOTAL MARKS AVAILABLE = 110