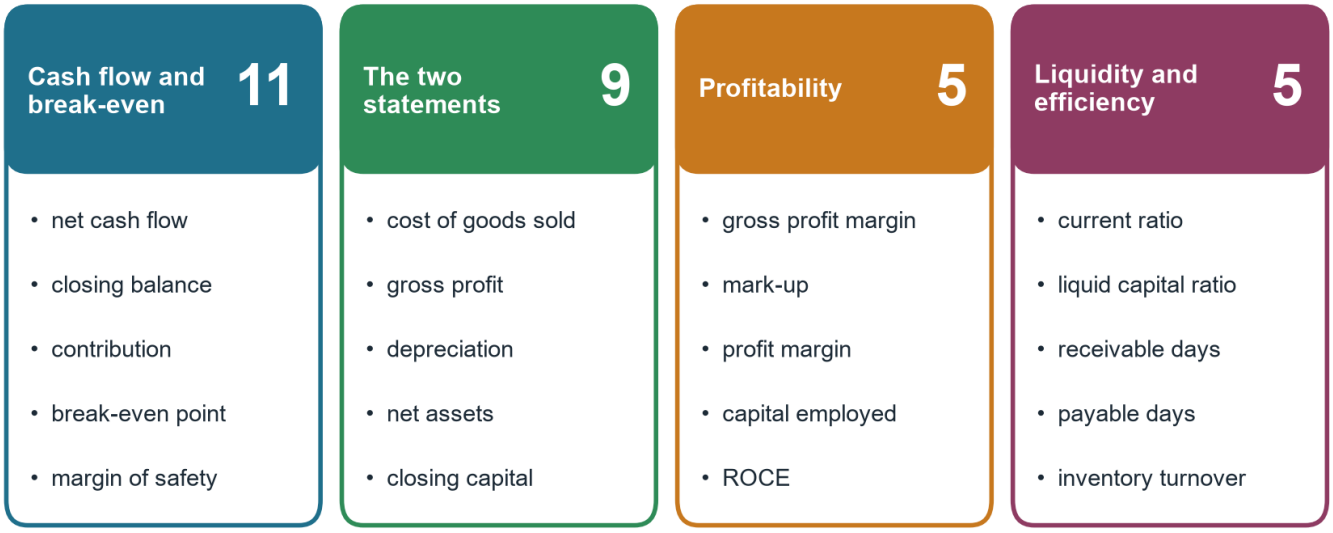
BTEC Unit 3: 30 formulas the exam will not give you

Recall pack for learners preparing for the external assessment. Pearson BTEC Level 3 National Business (2016), Unit 3: Personal and Business Finance, content areas E and F.

The specification says of topics E and F: "Formulas used in this topic will not be given in external assessment." So every formula has to come from memory. This pack helps learners to learn the 30 formulas, test themselves and then use each formula on one small business.



Part	Pages	What learners do
1 Formula sheet	2 to 3	Read and learn the 30 formulas, grouped by topic.
2 Recall test	4 to 5	Write every formula from memory, then mark it against the sheet. Print this part again each week.
3 Name the chart	6	Label seven parts of a break-even chart.
4 Use the formulas	7 to 11	Answer 26 short questions about one sole trader, Tarrowby Candles.
5 Answers	12 to 14	Check every answer and its working.
6 Four-week plan	15	A short revision plan for the four weeks before the exam.

For teachers: use a part as a 10-minute starter, as homework or as a timed recall test. The answers are on pages 12 to 14, so remove those pages before you hand the pack out if you want to mark it yourself. Timings are estimates and have not been trialled in a classroom.

Tarrowby Candles and all its figures are fictional. This pack is not endorsed by Pearson. The answers are indicative guidance, not an exam board mark scheme.

Part 1: Formula sheet (formulas 1 to 16)

Cash flow, break-even and the statement of comprehensive income.

No.	Topic	What you need	Formula
1	E1 Cash flow	Net cash flow	total inflows − total outflows
2	E1 Cash flow	Closing balance	opening balance + net cash flow
3	E2 Break-even	Total revenue	selling price per unit × units sold
4	E2 Break-even	Total costs	fixed costs + total variable costs
5	E2 Break-even	Contribution per unit	selling price per unit − variable cost per unit
6	E2 Break-even	Total contribution	contribution per unit × units sold
7	E2 Break-even	Break-even point (units)	fixed costs ÷ contribution per unit
8	E2 Break-even	Break-even point (sales value)	break-even units × selling price per unit
9	E2 Break-even	Margin of safety (units)	actual or budgeted sales units − break-even units
10	E2 Break-even	Margin of safety (value)	margin of safety in units × selling price per unit
11	E2 Break-even	Profit or loss	total revenue − total costs (also total contribution − fixed costs)
12	F1 Income	Cost of goods sold	opening inventories + purchases − closing inventories
13	F1 Income	Gross profit	revenue − cost of goods sold
14	F1 Income	Profit for the year	gross profit + other income − expenses
15	F1 Income	Straight-line depreciation (per year)	cost × %
16	F1 Income	Reducing-balance depreciation (per year)	(cost − depreciation to date) × %

Round a break-even point UP to the next whole unit. For example, 262.4 units means 263 units must be sold.

Part 1: Formula sheet (formulas 17 to 30)

The statement of financial position and the ratios. The statements in this unit are for sole traders.

No.	Topic	What you need	Formula
17	F2 Position	Net book value	cost − depreciation to date
18	F2 Position	Net current assets	current assets − current liabilities
19	F2 Position	Net assets	non-current assets + net current assets − non-current liabilities
20	F2 Position	Closing capital (total equity)	opening capital + profit for the year − drawings
21	F3 Profitability	Gross profit margin	(gross profit ÷ revenue) × 100
22	F3 Profitability	Mark-up	(gross profit ÷ cost of sales) × 100
23	F3 Profitability	Profit margin	(profit ÷ revenue) × 100
24	F3 Profitability	Capital employed	total assets − current liabilities, or non-current liabilities + total equity
25	F3 Profitability	Return on capital employed (ROCE)	(profit ÷ capital employed) × 100
26	F4 Liquidity	Current ratio	current assets ÷ current liabilities
27	F4 Liquidity	Liquid capital ratio	(current assets − inventory) ÷ current liabilities
28	F5 Efficiency	Trade receivable days	(trade receivables ÷ credit sales) × 365
29	F5 Efficiency	Trade payable days	(trade payables ÷ credit purchases) × 365
30	F5 Efficiency	Inventory turnover (days)	(average inventory ÷ cost of sales) × 365

Formulas 21 to 30 are written as they appear in the specification (Issue 14, April 2023, printed page 42). Inventory turnover in this unit is measured in days. Average inventory = (opening inventories + closing inventories) ÷ 2.

In this pack give percentages and days to 1 decimal place and ratios to 2 decimal places (for example 1.88:1). In the exam, always follow the rounding the question asks for.

Part 2: Recall test (formulas 1 to 16)

Cover the formula sheet. Write each formula from memory. Then mark it yourself and tick the ones you got right. Score: _____ out of 16.

No.	Topic	What you need	Write the formula from memory
1	E1 Cash flow	Net cash flow	
2	E1 Cash flow	Closing balance	
3	E2 Break-even	Total revenue	
4	E2 Break-even	Total costs	
5	E2 Break-even	Contribution per unit	
6	E2 Break-even	Total contribution	
7	E2 Break-even	Break-even point (units)	
8	E2 Break-even	Break-even point (sales value)	
9	E2 Break-even	Margin of safety (units)	
10	E2 Break-even	Margin of safety (value)	
11	E2 Break-even	Profit or loss	
12	F1 Income	Cost of goods sold	
13	F1 Income	Gross profit	
14	F1 Income	Profit for the year	
15	F1 Income	Straight-line depreciation (per year)	
16	F1 Income	Reducing-balance depreciation (per year)	

Part 2: Recall test (formulas 17 to 30)

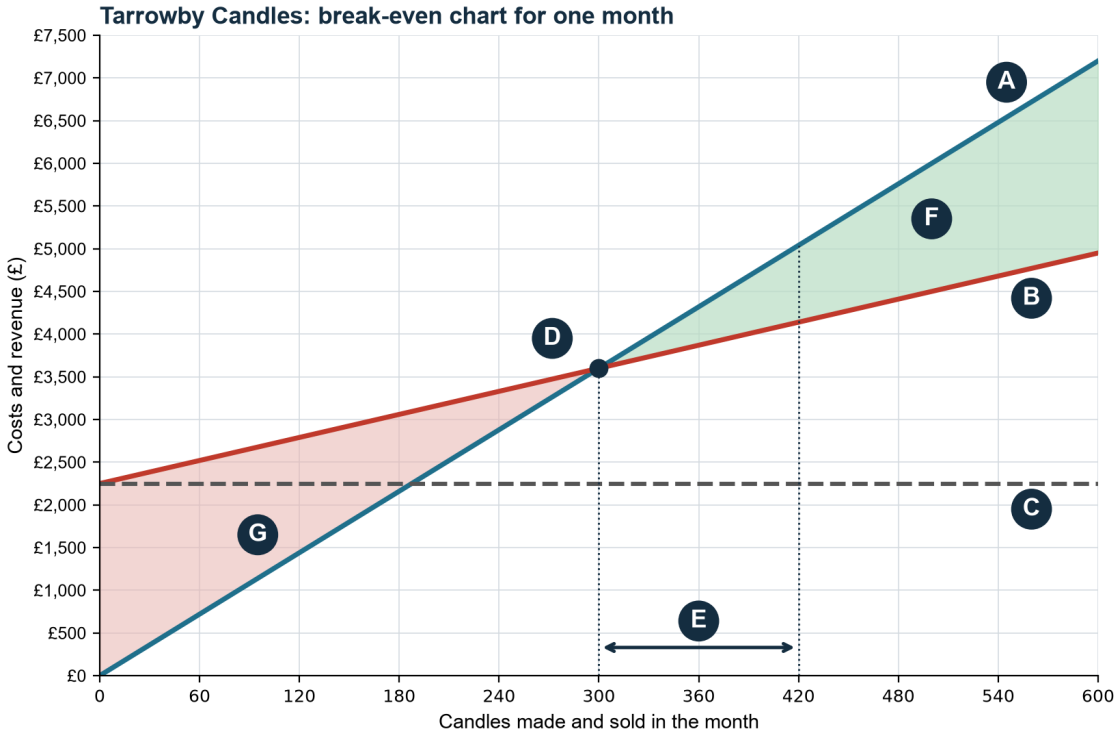
Cover the formula sheet. Write each formula from memory. Then mark it yourself and tick the ones you got right. Score: _____ out of 14.

No.	Topic	What you need	Write the formula from memory
17	F2 Position	Net book value	
18	F2 Position	Net current assets	
19	F2 Position	Net assets	
20	F2 Position	Closing capital (total equity)	
21	F3 Profitability	Gross profit margin	
22	F3 Profitability	Mark-up	
23	F3 Profitability	Profit margin	
24	F3 Profitability	Capital employed	
25	F3 Profitability	Return on capital employed (ROCE)	
26	F4 Liquidity	Current ratio	
27	F4 Liquidity	Liquid capital ratio	
28	F5 Efficiency	Trade receivable days	
29	F5 Efficiency	Trade payable days	
30	F5 Efficiency	Inventory turnover (days)	

Total score: _____ out of 30. Copy the numbers of the formulas you got wrong here and learn those first:

Part 3: Name the chart

Tarrowby Candles is a sole trader that makes scented candles. Each candle sells for £12. The variable cost is £4.50 a candle and fixed costs are £2,250 a month. The owner plans to make and sell 420 candles in November.



Letter	What is it? Choose from: fixed costs, total costs, total revenue, break-even point, margin of safety, area of profit, area of loss
A	
B	
C	
D	
E	
F	
G	

Read from the chart. How many candles must be sold to break even? Then write the total revenue at that point.

Part 4: Use the formulas (questions 1 to 8)

Tarrowby Candles sells each candle for £12. The variable cost is £4.50 a candle. Fixed costs are £2,250 a month. Budgeted sales in November are 420 candles.

1. Show your working on the lines and write the formula first. Calculate the contribution per candle.

2. Calculate the break-even point in candles for one month.

3. Calculate the break-even point as a sales value.

4. Calculate the margin of safety in candles for November.

5. Calculate the margin of safety as a sales value.

6. Calculate the total contribution from the 420 candles in November.

7. Calculate the profit for November if 420 candles are sold.

8. In March the opening bank balance is £1,200, total inflows are £5,040 and total outflows are £5,900. Calculate the net cash flow for March and the closing bank balance.

Part 4: Use the formulas (questions 9 to 13)

The statement of comprehensive income for the year. Tarrowby Candles is a sole trader. Show your working and write the formula first.

Figure for the year	Amount
Revenue	£60,000
Opening inventories	£3,000
Purchases	£23,500
Closing inventories	£4,000
Expenses (including depreciation)	£27,000
Equipment at cost (bought two years ago)	£20,000

9. Calculate the cost of goods sold.

10. Calculate the gross profit.

11. Calculate the profit for the year. There is no other income.

12. Equipment is depreciated by 20% a year, straight line. Calculate the depreciation for one year and the net book value after two years.

13. Suppose the owner had used the reducing-balance method at 25% instead. Calculate the depreciation for year 1 and for year 2.

Part 4: Use the formulas (questions 14 to 16)

The statement of financial position at the end of the same year. Show your working and write the formula first.

Figure at the year end	Amount
Equipment: net book value (from question 12, check yours)	£12,000
Current assets: inventories £4,000, trade receivables £1,500, bank £900	£6,400
Current liabilities: trade payables £3,000, accruals £400	£3,400
Bank loan (non-current liability)	£5,000
Opening capital	£8,500
Profit for the year (from question 11, check yours)	£10,500
Drawings	£9,000

14. Calculate the net current assets.

15. Calculate the net assets.

16. Calculate the closing capital. What do you notice when you compare it with your answer to question 15?

Part 4: Use the formulas (questions 17 to 20)

Ratios for the year. These figures come from pages 7 to 9, so check them against your own. Percentages and days to 1 decimal place, ratios to 2 decimal places. Write the formula first.

Figure	Amount	Figure	Amount
Revenue	£60,000	Current assets	£6,400
Cost of sales	£22,500	Closing inventories	£4,000
Gross profit	£37,500	Opening inventories	£3,000
Profit for the year	£10,500	Current liabilities	£3,400
Non-current assets (net book value)	£12,000	Non-current liabilities	£5,000
Total equity	£10,000	Trade receivables	£1,500
Credit sales	£18,250	Trade payables	£3,000
Credit purchases	£21,900		

17. Gross profit margin.

18. Mark-up.

19. Profit margin.

20. Capital employed, calculated both ways, and then the return on capital employed (ROCE).

Part 4: Use the formulas (questions 21 to 26)

The figures you need, repeated from page 10: current assets £6,400, closing inventories £4,000, opening inventories £3,000, current liabilities £3,400, trade receivables £1,500, credit sales £18,250, trade payables £3,000, credit purchases £21,900, cost of sales £22,500.

21. Current ratio.

22. Liquid capital ratio.

23. Trade receivable days.

24. Trade payable days.

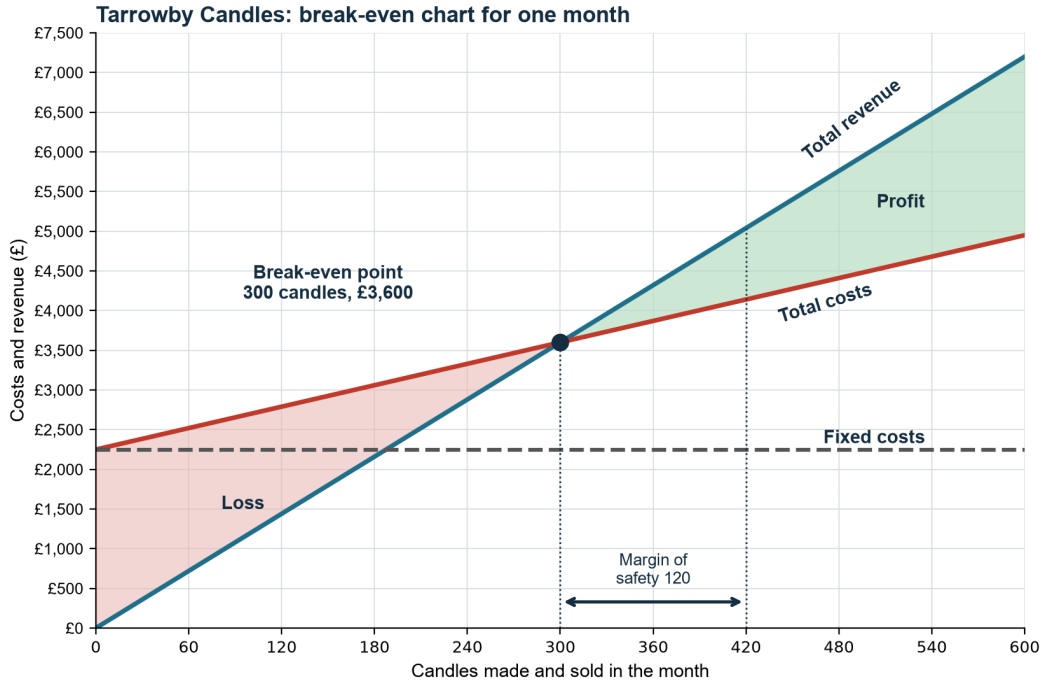
25. Inventory turnover in days. Calculate the average inventory first.

26. Explain one limitation of using only these ratios to judge how well Tarrowby Candles is doing. Write about 30 words.

Part 5: Answers

Part 2, recall test: mark against the formula sheet on pages 2 and 3.

Part 3, name the chart: A total revenue. B total costs. C fixed costs. D break-even point. E margin of safety. F area of profit. G area of loss. Break-even is 300 candles, where total revenue is £3,600.



Total costs start at £2,250 because fixed costs are paid even when no candles are made. The margin of safety runs from 300 candles to the budgeted 420 candles.

Part 5: Answers to questions 1 to 16

No.	Working	Answer
1	£12 − £4.50	£7.50
2	£2,250 ÷ £7.50	300 candles
3	300 × £12	£3,600
4	420 − 300	120 candles
5	120 × £12	£1,440
6	£7.50 × 420	£3,150
7	£3,150 − £2,250 (or revenue £5,040 − total costs £4,140)	£900 profit
8	£5,040 − £5,900 = −£860; then £1,200 − £860	Net cash flow −£860; closing balance £340
9	£3,000 + £23,500 − £4,000	£22,500
10	£60,000 − £22,500	£37,500
11	£37,500 − £27,000	£10,500
12	£20,000 × 20% = £4,000 a year; £20,000 − (2 × £4,000)	£4,000; net book value £12,000
13	Year 1: £20,000 × 25%. Year 2: (£20,000 − £5,000) × 25%	£5,000 and £3,750
14	£6,400 − £3,400	£3,000
15	£12,000 + £3,000 − £5,000	£10,000
16	£8,500 + £10,500 − £9,000	£10,000. It equals net assets, so the statement balances.

Teacher note for question 12: after two years the depreciation to date is £8,000. Question 13 is a "what if" and is not used in the later questions.

Part 5: Answers to questions 17 to 26

No.	Working	Answer
17	(£37,500 ÷ £60,000) × 100	62.5%
18	(£37,500 ÷ £22,500) × 100	166.7%
19	(£10,500 ÷ £60,000) × 100	17.5%
20	Total assets £12,000 + £6,400 = £18,400; £18,400 − £3,400 = £15,000. Or £5,000 + £10,000 = £15,000. ROCE: (£10,500 ÷ £15,000) × 100	£15,000 both ways; ROCE 70.0%
21	£6,400 ÷ £3,400	1.88:1
22	(£6,400 − £4,000) ÷ £3,400	0.71:1
23	(£1,500 ÷ £18,250) × 365	30.0 days
24	(£3,000 ÷ £21,900) × 365	50.0 days
25	Average inventory (£3,000 + £4,000) ÷ 2 = £3,500; (£3,500 ÷ £22,500) × 365	56.8 days

26. Example answer: The ratios cover only one year, so they show no trend. The year-end figures may not be typical for a seasonal business like candles, and there is no competitor to compare with.

Teacher note: accept any limitation that is applied to this business, for example that ratios use past figures, that they do not show why a figure changed, or that a sole trader's profit is before the owner takes any pay. The ROCE looks very high for that last reason.

Learners who get a different answer should first check the formula they wrote, then the figures they picked, then the arithmetic.

Part 6: Four-week plan before the exam

Three short sessions a week are enough. Each one takes about 10 to 15 minutes (an estimate, not trialled). Check the date of your assessment on the current Pearson timetable or with your exams officer.

Week	Learn	Test yourself	Use
1	Formulas 1 to 11: cash flow and break-even	Recall test rows 1 to 11	Part 3 chart and questions 1 to 8
2	Formulas 12 to 20: the two statements	Recall test rows 12 to 20, plus the rows you got wrong in week 1	Questions 9 to 16
3	Formulas 21 to 30: the ratios	Recall test rows 21 to 30, plus earlier mistakes	Questions 17 to 26
4	Only the formulas you still get wrong	The whole recall test, all 30, from memory	Redo every question you got wrong, without the formula sheet

My recall scores. Week 1: _____ out of 11. Week 2: _____ out of 9. Week 3: _____ out of 10. Week 4: _____ out of 30.

Want full lessons on these topics?

This pack is free to copy for your own classes. The Business School also has free BTEC Unit 3 lessons and eight paid three-lesson packs that teach the whole unit, each with a learner workbook, a teacher guide and full worked answers, in PDF and editable Word.

Free lessons: thebusiness.school/resources Packs: thebusiness.school/shop

THE BUSINESS SCHOOL, TBS Education Ltd Oy. Specification referred to: Pearson BTEC Level 3 National Extended Certificate in Business, Issue 14, April 2023, Unit 3, printed pages 41 and 42. Centres should confirm the current issue.