

Throughput versus local utilization

Calculate throughput contribution per constraint-minute, apply demand and commitment limits, and distinguish the resulting teaching comparison from a complete profit or investment decision.



Equal contribution, different use of the constraint

Fictional product comparison: A sells for 100 monetary units with 40 truly variable cost and consumes 10 minutes of the verified binding constraint. B sells for 90 with 30 truly variable cost and consumes five constraint-minutes. Analyst Noor compares the use of scarce time rather than rewarding every department for staying busy.

Your role and the reference condition

Operations planner working with the accountable finance and commercial owners.

Normal: The selected feasible work supports sold throughput and commitments under the system's real constraints.

Gap: Both products show a 60-unit contribution per sale, so the team assumes either mix uses the constraint equally well.

Work within these conditions

1. One verified binding constraint and comparable time/cost definitions are supplied teaching assumptions.
2. Demand, commitments, operating-expense changes and other constraints must be checked before an actual mix decision.

Fictional teaching case. Supplied observations support the exercise; proposed actions are not verified customer results.

See how the method works

For a bounded decision, compare the effect on the system rather than local output alone. Financial throughput depends on sales and truly variable costs over a period; producing unsold stock does not create that throughput. In the single-constraint illustration, products A and B each provide 60 monetary units per sale, but use ten and five constraint-minutes respectively. Their rates are therefore six and twelve per constraint-minute. This helps frame a choice, but demand limits, other capacity, operating expenses and commitments still matter. Have finance validate definitions. Mission-led services should state their goal units instead of inventing a monetary proxy.

monetary units per constraint-minute

A	6
B	12

Product	Price	Truly variable cost	Constraint min	Rate
A	100	40	10	6
B	90	30	5	12

Introductory comparison with one verified binding constraint; not a complete product-mix solution. Each product contributes 60 monetary units per sale.

Method exhibit: Product A, Product B, System decision.

Follow the evidence and decisions

Inspect the supplied case inputs

Product	Price	Truly variable cost	Constraint time
A	100 monetary units	40	10 min/unit
B	90 monetary units	30	5 min/unit
Difference to calculate	Price minus truly variable cost	Per sold unit	Divide by constraint minutes

01 / Verify what the cost represents

Noor confirms the supplied truly variable cost is defined for the decision and sale, rather than an allocated share of unchanged overhead. She keeps operating-expense effects separate.

Why: A misleading cost basis can reverse the comparison. The teaching values are supplied, not a rule that every organization has only one kind of variable cost.

Evidence / check: A: 100 minus 40; B: 90 minus 30 monetary units per sale.

02 / Calculate contribution per sale

Both products contribute 60 monetary units before operating expense under the stated definition. Record the same result without assuming equal use of the constraint.

Why: Per-unit contribution describes a sale, not the rate at which limited capacity generates that contribution.

Evidence / check: A = 60; B = 60 monetary units per sold unit.

03 / Divide by the scarce time

A uses ten minutes, yielding $60 / 10 =$ six monetary units per constraint-minute. B uses five, yielding $60 / 5 = 12$.

Why: The denominator must be the verified limiting resource, not whichever machine is easiest to time.

Evidence / check: B has twice the supplied rate: 12 versus 6.

04 / Apply demand and commitment limits

Use the rate to inform a feasible comparison only after checking how many units can be sold, which commitments must be met, and whether another resource or cost changes.

Why: Producing unsold B does not create the same goal outcome as selling it. A ranking alone is not a complete product-mix solution.

Evidence / check: Demand caps, minimum commitments and other constraints remain explicit decision inputs.

05 / Check the system outcome

Review actual accepted sales, constraint use and relevant expense/investment consequences with the responsible owners. Do not claim profit from a local utilization increase.

Why: The rate is an introductory decision aid. Unchanged overhead, incremental expenses and real commitments still matter to the full decision.

Evidence / check: A documented feasible alternative and whole-system outcome replace an unsupported profit claim.

Completed introductory rate comparison

Product	Contribution per sale	Constraint time	Rate
A	$100 - 40 = 60$	10 min	6 monetary units/min
B	$90 - 30 = 60$	5 min	12 monetary units/min
Interpretation	Equal per-unit contribution	Different scarce-time use	Check demand and commitments

There is no additional demand for B

All currently sellable B demand is already covered. A still has confirmed demand.

Decision

Do not make more B merely because its calculated rate is higher. Evaluate eligible A demand and the real remaining constraints.

Reasoning

The rate does not turn unwanted inventory into sold throughput.

What would change the decision?

The decision records the B demand cap and the remaining feasible sales opportunity.

Practise with a changed case

A rate preference meets a minimum commitment

Separate fictional one-constraint exercise: C has price 120, truly variable cost 50 and 14 constraint-minutes per unit; D has price 105, cost 45 and six minutes. Available constraint time is 120 minutes. At least six C are committed; at most eight D can be sold. All units are indivisible and both products have sufficient eligible inputs.

Input	Value
C	120 – 50; 14 min/unit; minimum 6 units
D	105 – 45; 6 min/unit; demand cap 8
Constraint availability	120 min
Model limits	One constraint; no additional expense effects supplied

Your task

1. Calculate both rates.
2. Allocate the six committed C first, then calculate how many D fit.
3. Reconcile time and contribution and explain why simply scheduling eight D first can violate the commitment.

Use the next page to record your reasoning before reading the answer.

Your practice worksheet

A rate preference meets a minimum commitment

Contribution and rate

Minimum commitments / demand caps

Integer quantities

Constraint minutes used

Contribution versus full profit

Complete your reasoning before turning to the answer. Use the separate learner workbook for group practice.

Check your reasoning and transfer it

1. C contributes 70 per sale and 5 per constraint-minute. D contributes 60 and 10 per constraint-minute.
2. Six C consume 84 minutes, leaving 36; six D fit. This meets the C minimum and stays below the D cap.
3. The mix uses 120 minutes and contributes $6 \times 70 + 6 \times 60 = 780$ monetary units before operating expense. Eight D would use 48 minutes and leave only 72, enough for five C, violating the six-C minimum.

Suggested completed record

Allocation	Constraint use	Contribution / conclusion
C	$6 \times 14 = 84$ min	$6 \times 70 = 420$
D	$6 \times 6 = 36$ min	$6 \times 60 = 360$
Feasible total	120 min	780 before operating expense
Eight-D-first	Only 5 C fit	Minimum commitment violated

Plausible wrong turns

1. Highest rate does not override sold-demand limits or commitments.
2. Contribution before operating expense is not net profit.

Evidence of a sound answer

1. Use the correct scarce-time denominator.
2. Reconcile integer units, time and commitments.
3. State the incomplete scope of the financial conclusion.

Take the learning back to work

Commitment	Agreed follow-through
Owner	System/planning owner with finance and commercial authority
Record	Decision assumptions, feasible mix comparison and observed sold outcome
Review	Before committing a real mix and after material demand/capacity/cost changes
Verification evidence	Accepted sales, relevant expense effects and constraint/commitment compliance
If unresolved	Rebuild the comparison when constraints or assumptions change; obtain the missing decision data.

Help someone else apply the method

Prepare

1. Product data cards, 120-minute capacity grid and calculator
2. A separate minimum-commitment card

Minutes	Activity and coaching prompt
4	Define the comparison Which costs and scarce time are actually supplied?
7	Compute A and B Why does equal contribution not imply equal rate?
10	Allocate C and D How does the commitment change a rate-only preference?
4	State the limitation What is missing before anyone can call this profit?

Debrief

1. Require units on both rate calculations.
2. Ask learners to test the tempting eight-D-first answer against the C commitment.

Individual or remote practice

Calculate each rate, write constraints separately, then audit the feasible quantities before checking the solution.

Connect the method and check its boundaries

Before application

1. Finance-validated cost definitions
2. Known binding capacity

Outside this lesson

1. Throughput is not gross output
2. Simple ranking is not a universal product-mix optimizer

TOCICO: Throughput Accounting Basics

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Totally variable cost definition

Method reference; original OPEX scenario and diagram are synthetic teaching content, not source case results.

TOCICO Dictionary, first edition

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Throughput is rate of goal units; sold rather than merely produced units; global T//OE measures. Historical terminology source.

Method reference; original OPEX scenario and diagram are synthetic teaching content, not source case results.

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