

Agile planning and metrics

Five formulas for agile planning, each with its own worked example, then the three model sheets. They serve IPMA, PMI and APM exams alike; for APM's PMQ exam, know what each measure tells you.

FORMULAS

Velocity

velocity = story points (relative size units) of accepted work per sprint, averaged over recent sprints

A forecast for one team, never a target. Teams size points their own way: never add up or compare velocities across teams.

Example: Recent sprints of 20, 24 and 22 points: $(20 + 24 + 22) \div 3 = 22$ points a sprint

The ideal line of a burndown chart

ideal work left after sprint k = total – $k \times$ (total $\div$ planned sprints)

Above the line is behind; below is ahead. A jump up is added scope; a burnup chart, which counts work done up towards a total, shows it as a step in the total.

Example: 200 points in 8 sprints: $200 \div 8 = 25$ a sprint, so after 4 sprints the line is at 100. With 120 left: 20 points behind

Release forecast as a range (fixed scope)

sprints needed = work left $\div$ velocity, rounded up, at the slowest and the fastest recent pace

Give a range, not one date. The pace that would hold the date = work left $\div$ sprints left.

Example: 120 points left at 20 to 24 a sprint: 5 sprints ($120 \div 24$) to 6 ($120 \div 20$), where 4 remain. Holding the date needs $120 \div 4 = 30$ a sprint

What fits by a fixed date (fixed time)

points that fit = sprints left $\times$ velocity, slowest to fastest

The date holds, so scope flexes: the must-haves go in the low end, the rest in a later release.

Example: 5 sprints left at 15 to 19 points a sprint: 75 (5×15) to 95 (5×19) fit. With 110 left, 15 to 35 must move

Cycle time, throughput and Little's law (Little, 1961)

average cycle time = average work in progress $\div$ average throughput

Cycle time runs from start to finish; throughput is items finished a week. For long-run averages in a steady system: less work in progress, shorter waits.

Example: 12 items in progress, 4 finished a week: $12 \div 4 = 3$ weeks each. Limit work in progress to 8 at the same 4 a week: $8 \div 4 = 2$ weeks

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Sources: IPMA ICB4 (2015); PMI, PMBOK® Guide, 8th ed.; PMI, PMP® Examination Content Outline (2026); APM Body of Knowledge, 8th ed.; APM, PMQ handbook (v6, 2026); IPMA International Certification Regulations (ICR) v4.4 (2025); Schwaber & Sutherland, The 2020 Scrum Guide™; Anderson, Kanban (2010); Little (1961), Little's law

Key: IPMA = International Project Management Association; ICB4 = IPMA's Individual Competence Baseline; PMI = Project Management Institute; PMBOK® Guide = PMI's body-of-knowledge guide; PMP® = PMI's Project Management Professional; APM = Association for Project Management; PMQ = APM's Project Management Qualification; ICR = IPMA's International Certification Regulations. Unofficial study material for IPMA®, PMI® and APM exams. Not affiliated with, endorsed by or approved by IPMA, PMI or APM, and not an accredited or endorsed training provider. IPMA® and IPMA ICB® are registered trademarks of IPMA in Switzerland and other countries. PMI, PMP, CAPM and PMBOK are registered marks of Project Management Institute, Inc. APM is a trade mark of the Association for Project Management. Other marks belong to their owners. PMP® exam facts are from PMI's public PMP® Examination Content Outline (2026); check the current version on pmi.org. APM's qualifications are its own; this series is not an APM Accredited Provider or APM Endorsed. Examples use a fictional city and its projects.



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The Scrum cycle

Deliver in short, fixed cycles, and after each one inspect and adapt.



Our own drawing of the Scrum Guide's events (Schwaber and Sutherland, 2020).

WHAT IT IS

Scrum is a framework by **Ken Schwaber and Jeff Sutherland**, set out in the free Scrum Guide (2020, Creative Commons); our summary. The **product owner** orders the product backlog for value. The **developers** plan the sprint in a sprint backlog and build a usable increment. The **scrum master** helps the team use Scrum. None is the project manager. Work counts only when it meets the **definition of done**, the checklist for finished work.

HOW IT WORKS

- 01 Planning: a sprint goal, and the items to reach it.
- 02 Daily scrum: 15 minutes on progress to the goal.
- 03 Review: show the increment; adapt the backlog.
- 04 Retrospective: pick one way to work better.

MID-LEVEL · WORKED EXAMPLE

Apply it well

The situation: A city team has eight months to move resident parking permits online. A supplier's team of five builds the resident screens in two-week sprints.

The city's business analyst is product owner and orders the backlog; reviews show working screens to service-desk staff. The project manager is not the scrum master: she keeps the gates, the contract and the steering group.

In the exam: Name the accountabilities and events in your own words, and show where the project manager's role sits beside them.

SENIOR · WORKED EXAMPLE

Design and lead it

The situation: A city is joining 14 online services under one login over 30 months, with a platform supplier and several teams building groups of services.

The teams' sprints end on the same day, so reviews and dependencies line up. The project manager agrees one definition of done with the supplier, with accessibility checks, and keeps the gates and contracts.

In the exam: Explain how Scrum fitted your governance: who was product owner, one definition of done across suppliers, and what stayed with the board.

WHERE IT SITS

IPMA · ICB4	PMI · PMBOK® GUIDE 8 · PMP® EXAM	APM · BOK 8 · PMQ EXAM
4.5.4: time boxing (p. 112); only the current iteration in detail (4.5.4.1); 4.5.10: sprint planning (p. 136)	Guide: sprints or iterations in adaptive schedules (p. 55); glossary: sprint. Exam outline: Process tasks 3, 8	BoK (APM's Body of Knowledge) §2.5.2: sprints, a daily scrum; §3.5.3 gates in step with the cycles. PMQ (APM's Project Management Qualification) 1a; 2b (product owner)

Sources: Schwaber & Sutherland, The 2020 Scrum Guide™; IPMA ICB4 (2015); PMI, PMBOK® Guide, 8th ed.; PMI, PMP® Examination Content Outline (2026); APM Body of Knowledge, 8th ed.; APM, PMQ handbook (v6, 2026)

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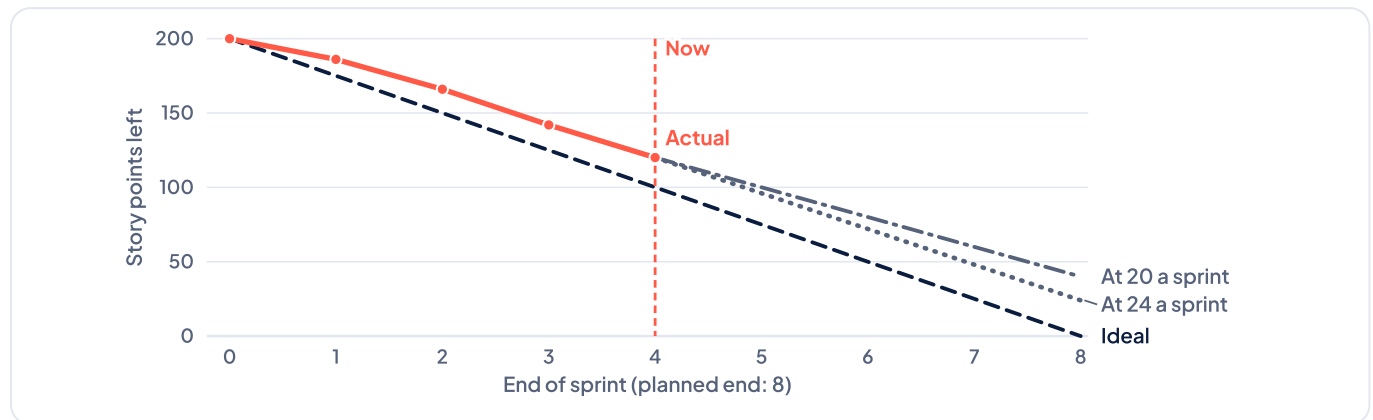
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Burn charts and velocity

Forecast, as a range, when a team will finish, and see whether a gap comes from its pace or from added scope.



Illustrative: 200 points in 8 sprints. After 4: 120 left (ideal 100). At the planned end, 24 to 40 are left: 1 to 2 more sprints.

WHAT IT IS

Velocity is the story points of accepted work one team finishes in a sprint; a story point is a relative size the team agrees. A **burndown** plots the work left against an **ideal line** from the total to zero: above it is behind. A **burnup** plots the work done and the total scope, so added scope shows as a step. The Scrum Guide (2020) names both charts.

HOW IT WORKS

- 01 Ideal line: total ÷ planned sprints, each sprint.
- 02 Each sprint, plot the work left, or done and scope.
- 03 Velocity: recent accepted points, slowest to fastest.
- 04 Forecast: work left ÷ velocity, rounded up.
- 05 Pace to hold the date: work left ÷ sprints left.

MID-LEVEL · WORKED EXAMPLE

Apply it well

The situation: A city team has eight months to move resident parking permits online. A supplier builds the resident screens: 96 points in 6 two-week sprints.

After 3 sprints of 12, 16 and 14 points, 54 are left (ideal: 48). The 3 sprints left fit 36 to 48 points (3×12 to 3×16), so the project manager and the product owner move 18 low-value points to after go-live.

In the exam: Say ahead or behind and why; give the velocity, its range and your options. Velocity is never a target.

SENIOR · WORKED EXAMPLE

Design and lead it

The situation: A city is joining 14 online services under one login over 30 months. Several teams build them in sprints, and a board releases funding at each gate.

The project manager never adds up or compares points across teams. Before each gate, she turns each team's burnup into a date range per service, so the board sees what is at risk.

In the exam: Show how team charts become board decisions: ranges with their confidence, the scope at risk, who may move it.

WHERE IT SITS

IPMA · ICB4	PMI · PMBOK® GUIDE 8 · PMP® EXAM	APM · BOK 8 · PMQ EXAM
4.5.4: iterative planning in time boxes (p. 112); 4.5.7: velocity analysis for forecasting (p. 124)	Guide: story points p. 146; burndown p. 175; velocity, burn charts pp. 211–213. Exam outline: Process tasks 8, 9	BoK (APM's Body of Knowledge) §5.5.4: burndown tracks completion; §5.5.1 timeboxes. PMQ (APM's Project Management Qualification) 20c, 21c

Sources: PMI, PMBOK® Guide, 8th ed.; APM Body of Knowledge, 8th ed.; IPMA ICB4 (2015); Schwaber & Sutherland, The 2020 Scrum Guide™; PMI, PMP® Examination Content Outline (2026); APM, PMQ handbook (v6, 2026)

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Kanban board and flow

Keep a flow of work moving and predictable, by showing all of it and limiting how much is in progress at once.

READY · MAX 4	BUILD · MAX 5	TEST · MAX 3	DONE
Address search	Receipt email	Fee table	Help page
Map zoom	Login message	Error texts	Print view
PDF export	Password reset	Date picker	
Contact form	Autosave		
	Search filter		

Illustrative. Build and Test are full ($5 + 3 = 8$ in progress), so nothing new starts. At 4 finished a week: $8 \div 4 = 2$ weeks each.

WHAT IT IS

David J. Anderson (2010) set out the Kanban method for knowledge work. There are no sprints: items flow across a board. Make the work **visible**, **limit work in progress** (WIP) in each column, and **manage the flow**. **Cycle time**: from start to finish. **Throughput**: items finished per week. **Little's law** (1961): in a steady system, average cycle time = WIP $\div$ throughput.

HOW IT WORKS

- 01 Map the real steps of the work as columns.
- 02 One card per item, so no work is hidden.
- 03 Write a WIP limit in each column's header.
- 04 Pull work only when a column has room.
- 05 Column full? Help finish before starting more.

MID-LEVEL · WORKED EXAMPLE

Apply it well

The situation: After a city moves resident parking permits online, a small team fixes the problems reported through January, when most residents renew: 10 fixes in progress, 5 finished a week.

Each fix takes $10 \div 5 = 2$ weeks on average. The project manager puts every fix on one board with limits of 3 in Fix and 2 in Test, so 5 are in progress. If 5 still finish a week, a fix takes $5 \div 5 = 1$ week.

In the exam: Sketch a small board with its WIP limits, say what happens when a column is full, and use Little's law to explain a waiting time.

SENIOR · WORKED EXAMPLE

Design and lead it

The situation: A city is joining 14 online services under one login over 30 months. Its 6 integration specialists serve every city project, and a portfolio meeting decides their work.

The project manager proposes one board for their work, with 6 items in progress at most, one each. The portfolio meeting orders the Ready column. At 2 finished a week, an item takes $6 \div 2 = 3$ weeks, so every project can plan with that.

In the exam: Explain a board shared across teams or projects: who orders the queue, how the limits were agreed, and what the flow data told the decision makers.

WHERE IT SITS

IPMA · ICB4	PMI · PMBOK® GUIDE 8 · PMP® EXAM	APM · BOK 8 · PMQ EXAM
4.5.4 Time: Kanban charts among the scheduling methods in its knowledge (p. 112)	Guide: Kanban boards limit work in progress; cycle and lead time (pp. 212–213); hybrids (p. 55). Exam outline: Process task 8	BoK (APM's Body of Knowledge) §3.5.2: work-in-progress reviews clear bottlenecks in iterative projects. PMQ (APM's Project Management Qualification) objective 21c

Sources: Anderson, Kanban (2010); Little (1961), Little's law; IPMA ICB4 (2015); PMI, PMBOK® Guide, 8th ed.; PMI, PMP® Examination Content Outline (2026); APM Body of Knowledge, 8th ed.; APM, PMQ handbook (v6, 2026)

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