

CAT 2026 · QUANT · ARITHMETIC

ThinkCAT Practice Book



The CAT Arithmetic Formula + Trap Book

13 topics · 78 formulas · 39 traps · 26 practice questions · 21 real CAT PYQs, one tap away

124

CAT Arithmetic questions analysed, 2021-25

39

traps that cost marks, each with the fix

26

practice questions with a scorecard

18 min

per topic: read, try, solve

INSIDE · TAP ANY TOPIC

01 ● Percentages	p.4	08 ● Time & Work	p.11
02 ● Profit, Loss & Discount	p.5	09 ● Pipes & Cisterns	p.12
03 ● Simple & Compound Interest	p.6	10 ● Boats & Streams	p.13
04 ● Ratio & Proportion	p.7	11 ● Partnership	p.14
05 ● Averages	p.8	12 ● Clocks	p.15
06 ● Mixtures & Alligation	p.9	13 ● Calendars	p.16
07 ● Time, Speed & Distance	p.10	★ Formula Wall (all 13 on one page)	p.17

Also:

[60-day plan p.2](#)
[What CAT tests p.3](#)
[Top 10 traps p.18](#)
[Answers p.19](#)
[Take a free full CAT mock ↗](#)

Two free full-length mocks in a TCS iON-style interface. No card required.

Prepping with friends? Send this book to your CAT group in one tap.

[WhatsApp](#)
[Telegram](#)


HOW TO USE THIS BOOK

18 minutes a topic. 60 days to CAT 2026.

1 Read the page

4 min. Formulas, the 60-second shortcut and the 3 traps.

2 Solve the Try-its

4 min. Two questions a topic; answers and a scorecard on p.19.

3 Tap the real PYQs

10 min. Two official CAT questions a topic on thinkcat.in.

TOPIC TAGS · HOW OFTEN CAT ASKED IT, 2021-25

TOP 6

96 of 124 Qs (77%)

CORE

21 Qs (17%)

OCCASIONAL

5 Qs

RARE IN CAT

2 Qs

THE 60-DAY ARITHMETIC PLAN

CAT 2026: Sunday, 29 November 2026

Days to go	Dates	Phase	What to do	Go
60 → 47	Wed 30 Sep to Tue 13 Oct	Repair	One topic page a day, TOP 6 first (start with Time & Work, p.11). Try-its + both PYQs.	p.11
46 → 32	Wed 14 Oct to Wed 28 Oct	PYQ sprint	All 124 CAT 2021-25 Arithmetic PYQs, 8-9 a day, newest paper first.	Slot 3 ↗
31 → 15	Thu 29 Oct to Sat 14 Nov	Mock mode	A full mock every 3-4 days. Re-read the Top 10 traps (p.18) before each one.	Mock ↗
14 → 1	Sun 15 Nov to Sat 28 Nov	Sharpen	Formula Wall (p.17) every morning and the Daily CAT Challenge every day.	Daily ↗
0	Sun 29 Nov	CAT day. The last 9 slots each had 8 Arithmetic questions.		

Starting late? Keep the order and shrink each phase. **Ahead?** Run the PYQ sprint again on the CAT 2017-2020 papers.

EVERY TOPIC PAGE, TOP TO BOTTOM

Formulas



Shortcut



Trap box



Worked example



Try it



Real PYQs



WHAT CAT ACTUALLY ASKS

124 Arithmetic questions, by topic

38%

124 of 330 QA questions were Arithmetic

8 of 22

Arithmetic in each of the last 9 slots

77%

came from the six TOP 6 topics

35%

were TITA: no negative marks

#	Topic	2021	2022	2023	2024	2025	Total	TITA	Page
1=	● Time & Work	5	3	3	3	3	17		9 p.11
1=	● Averages	4	6	2	3	2	17		7 p.8
3=	● Profit, Loss & Discount	3	2	4	4	3	16		6 p.5
3=	● Mixtures & Alligation	4	3	3	3	3	16		5 p.9
5=	● Ratio & Proportion	1	3	4	4	3	15		5 p.7
5=	● Time, Speed & Distance	3	4	2	3	3	15		4 p.10
7	● SI & CI	2	3	2	3	2	12		3 p.6
8	● Percentages	4	.	1	1	3	9		3 p.4
9	● Pipes & Cisterns	1	.	1	.	1	3		0 p.12
10	● Boats & Streams	.	.	1	.	1	2		1 p.13
11=	● Partnership	1	.	.	.	.	1		0 p.14
11=	● Clocks	.	.	1	.	.	1		0 p.15
13	● Calendars	.	.	.	.	.	0		0 p.16
All Arithmetic		28	24	24	24	24	124	43	

Questions per year: ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

Tap a topic to open its page

3 THINGS THIS MAP SAYS

- 1 Arithmetic is the steadiest block in QA:** exactly 8 of 22 questions in each of the last 9 slots.
- 2 Time & Work and Averages lead with 17 each.** Add P&L, Mixtures, Ratio and TSD and you cover 96 of 124 questions.
- 3 Pipes, Boats, Partnership, Clocks and Calendars:** 7 questions in 5 years between them. Revise them last.

Source: official CAT QA papers 2021–2025 in ThinkCAT's PYQ archive (15 slots × 22 = 330 questions), topic-tagged and re-checked question by question. 2021–2025 is used because every slot since 2021 has the same 22-question QA section.



TOPIC 01 OF 13

CORE

Percentages

9x in CAT 2021-25
rank #8



CORE FORMULAS

- 1 % change = $(\text{New} - \text{Old}) \div \text{Old} \times 100$. The base is the **starting** value.
- 2 Up $x\%$: $\times (1 + x/100)$. Down $x\%$: $\times (1 - x/100)$.
- 3 Successive $a\%$ and $b\%$: $a + b + ab/100$ (falls are negative).
- 4 Reverse: Original = Final $\div$ multiplier. ₹600 after +20% came from ₹500.
- 5 A is $x\%$ more than B $\Rightarrow$ B is $100x/(100 + x)\%$ less than A.
- 6 Price up $r\% \Rightarrow$ cut use by $100r/(100 + r)\%$ to keep spend flat.

60-SECOND SHORTCUT

Think in fractions

$1/6 = 16.67\%$, $1/7 = 14.28\%$, $1/8 = 12.5\%$, $1/9 = 11.11\%$, $1/11 = 9.09\%$, $1/12 = 8.33\%$. So +25% then -20% = $5/4 \times 4/5 =$ **no change**, and +12.5% then +11.11% = $9/8 \times 10/9 =$ **+25%**.

REMEMBER

Multiply the multipliers. Never add the percentages.

TRAP BOX

✗ LOOKS LIKE

+20% then -20% cancels out

Rate 10% $\rightarrow$ 12% is a 2% rise

A is 25% above B, so B is 25% below A

✓ ACTUALLY

$1.2 \times 0.8 = 0.96$: a **4% fall**

2 percentage points, but a **20% rise**

$25 \div 125$: B is **20% below** A

WORKED EXAMPLE

TARGET 60 s

A town's population rose 10%, fell 10%, then rose 20% to 1,18,800. What was it at the start?

$\rightarrow$ Net multiplier = $1.1 \times 0.9 \times 1.2 = 1.188$

$\rightarrow$ Start = $1,18,800 \div 1.188$

Answer: 1,00,000

TRY IT

ANSWERS P.19 ↗

Q1. Sugar gets 25% dearer. By what % must a family cut its use to keep the sugar bill the same?

Q2. In a two-candidate election, 20% of listed voters did not vote. The winner got 60% of votes cast and won by 3,200. How many voters were listed?

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2025 Slot 2

Q17 · Easy · MCQ



CAT 2025 Slot 1

Q19 · Moderate · TITA



Solve all 24 CAT Percentages PYQs, free ↗



TOPIC 02 OF 13 TOP 6

Profit, Loss & Discount

16× in CAT 2021-25
rank #3 (tied)


CORE FORMULAS

- 1 Profit % is on CP. Discount % is on MP.
- 2 $SP = CP \times (1 + p/100) = MP \times (1 - d/100)$
- 3 Mark up $m\%$, then discount $d\%$: profit % = $m - d - md/100$
- 4 Two discounts d_1, d_2 = one discount of $d_1 + d_2 - d_1d_2/100$
- 5 Same SP, one at $+x\%$, one at $-x\%$ $\Rightarrow$ net **loss** of $x^2/100\%$
- 6 False weight: G grams sold as 1 kg $\Rightarrow$ profit % = $(1000 - G)/G \times 100$

60-SECOND SHORTCUT

Mark-up in one division

$MP/CP = (1 + p/100) \div (1 - d/100)$. Want a 20% profit after a 25% discount? $1.2 \div 0.75 = 1.6$, so mark up **60%** above cost.

REMEMBER

Profit sits on CP. Discount sits on MP.

TRAP BOX

✗ LOOKS LIKE

20% profit on SP = 20% profit

20% + 10% discounts = 30% off

₹990 each at +10% and -10%: no loss

✓ ACTUALLY

SP 100, CP 80: **25% on cost**
 $0.8 \times 0.9 = 0.72$: **28% off**

CPs ₹900 + ₹1,100 = ₹2,000 vs ₹1,980: **1% loss**

WORKED EXAMPLE

TARGET 60 s

A trader marks goods 50% above cost, gives a 20% discount and uses an 800 g weight for 1 kg. Find his profit %.

$\rightarrow$ He charges $1.5 \times 0.8 = 1.2 \times$ the cost of 1 kg

$\rightarrow$ He hands over 0.8 kg, which costs 0.8

$\rightarrow$ Profit = $1.2 \div 0.8 - 1$

Answer: 50%

TRY IT

ANSWERS P.19 ↗

Q1. After a 12.5% discount, a shirt sells for ₹1,400 at a 12% profit. By what % was it marked above cost?

Q2. A shop runs 'buy 3, get 1 free' and takes a further 10% off the bill. What is the effective discount?

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2025 Slot 1

Q22 · Moderate · TITA

CAT 2025 Slot 3

Q12 · Moderate · MCQ

Work through all 31 CAT Profit & Loss PYQs ↗



TOPIC 03 OF 13 **CORE**

Simple & Compound Interest

12× in CAT 2021-25
rank #7

CORE FORMULAS

- 1 $SI = P \times R \times T / 100$
- 2 CI amount: $A = P(1 + R/100)^n$
- 3 Half-yearly: $R/2$ per period, $2n$ periods.
Quarterly: $R/4$, $4n$ periods.
- 4 CI - SI: 2 years = $P(R/100)^2$. 3 years = $P(R/100)^2(3 + R/100)$.
- 5 Effective yearly rate, half-yearly compounding
= $R + R^2/400$
- 6 Two equal yearly instalments x repay P : $P = x/(1+r) + x/(1+r)^2$

60-SECOND SHORTCUT
Successive % beats powers

2 years at $R\%$: $2R + R^2/100$. 3 years: $3R + 3R^2/100 + R^3/10,000$. At 10%: **21%** and **33.1%**, no powers needed.

REMEMBER

Rule of 72: money doubles in about $72 \div R$ years.

TRAP BOX
X LOOKS LIKE

12% compounded quarterly = 12% a year

SI doubles money in 5 years $\Rightarrow \times 4$ in 10

10% depreciation for 2 years = 20%

✓ ACTUALLY

$1.03^4 = 1.1255$: **12.55%** a year

$\times 4$ means +300% at 20% a year: **15 years**

$0.9^2 = 0.81$: **19%** lost

WORKED EXAMPLE
TARGET 45 s

CI and SI on a sum for 3 years at 10% differ by ₹310. Find the sum.

$$\rightarrow CI - SI = P \times 0.1^2 \times (3 + 0.1) = 0.031P$$

$$\rightarrow P = 310 \div 0.031$$

Answer: ₹10,000

TRY IT
ANSWERS P.19

Q1. Find the CI on ₹6,250 for 1 year at 8% a year, compounded half-yearly.

Q2. A ₹2,100 loan is repaid in two equal yearly instalments at 10% CI. Find each instalment.

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2024 Slot 1

Q6 · Moderate · MCQ

CAT 2024 Slot 3

Q6 · Moderate · TITA

Take the free 12-question SI & CI starter set



TOPIC 04 OF 13 TOP 6

Ratio & Proportion

CORE FORMULAS

- 1 $A:B = 3:5 \Rightarrow$ write $A = 3k$, $B = 5k$ and solve for k
- 2 Split Q in $a:b:c \Rightarrow A$ gets $Q \times a/(a + b + c)$, and so on
- 3 Chain $A:B$ and $B:C$ by making B equal (use the LCM)
- 4 Componendo-dividendo: $a/b = c/d \Rightarrow (a + b)/(a - b) = (c + d)/(c - d)$
- 5 Direct: $y = kx$. Inverse: $xy = k$. Joint: $y = kxz$.
- 6 Mean proportional of $a, c = \sqrt{(ac)}$. Third proportional to $a, b = b^2/a$.

15x in CAT 2021-25
rank #5 (tied)



60-SECOND SHORTCUT

Match the difference

Ages 3:5 now and 5:7 in 10 years. Both ratios differ by 2 parts, so each age grew 2 parts = 10 years $\Rightarrow$ 1 part = 5. Ages **15 and 25** (check: $25:35 = 5:7$).

REMEMBER

Ratio means parts. Put k in, take the answer out.

TRAP BOX

X LOOKS LIKE

Add 2 to both terms: 3:5 stays 3:5

$A:B = 2:3$, $B:C = 4:5 \Rightarrow A:B:C = 2:3:5$

$1/2 : 1/3 : 1/4 = 2:3:4$

✓ ACTUALLY

It becomes 5:7. Equal additions **change** a ratio

Make B equal: **8:12:15**

Multiply by the LCM 12: **6:4:3**

WORKED EXAMPLE

TARGET 45 s

Milk and water in a can are 5:3. Adding 16 L of water makes it 5:7. How much milk is in the can?

$\rightarrow$ Milk stays 5 parts; water goes from 3 to 7 parts

$\rightarrow$ 4 parts = 16 L $\Rightarrow$ 1 part = 4 L

$\rightarrow$ Milk = 5×4 L

Answer: 20 L

TRY IT

ANSWERS P.19 [↗](#)

Q1. If $(a + b)/(a - b) = 9/5$, find $a:b$.

Q2. ₹5,600 is shared among A, B and C with $A:B = 3:4$ and $B:C = 6:7$. Find C's share.

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2025 Slot 1

Q1 · Moderate · MCQ [↗](#)

CAT 2025 Slot 3

Q20 · Moderate · TITA [↗](#)

Take the free 12-question Ratio & Proportion set [↗](#)



TOPIC 05 OF 13 TOP 6

Averages

CORE FORMULAS

- 1 Total = Average $\times$ Count. Convert to totals first.
- 2 Combined average = $(n_1A_1 + n_2A_2) \div (n_1 + n_2)$
- 3 Replace x by y among n items: the average moves by $(y - x)/n$
- 4 A newcomer lifts the average of n by $d \Rightarrow$ newcomer = old average + $(n + 1)d$
- 5 Equally spaced values: average = middle term = $(\text{first} + \text{last})/2$
- 6 Add k to every value: average + k . Multiply by k : average $\times k$.

17 $\times$

in CAT 2021-25
rank #1 (tied)


60-SECOND SHORTCUT

Deviation method

47, 52, 49, 58, 54 with base 50: deviations -3, +2, -1, +8, +4 add up to +10. Average = $50 + 10/5 = 52$. No big sums.

REMEMBER

Every average question is a total question in disguise.

TRAP BOX

✗ LOOKS LIKE

60 (20 people) and 80 (30 people): 70

10 numbers average 40; add 62: $462 \div 10$

Add 5 to each, then double: $2A + 5$

✓ ACTUALLY

$3,600 \div 50 = 72$. Weight by count

The count is now 11: $462 \div 11 = 42$

$(A + 5) \times 2 = 2A + 10$

WORKED EXAMPLE

TARGET 30 s

30 marks average 60. A 45 was entered as 75, and a 72 as 27. Find the correct average.

→ Correction = $(45 - 75) + (72 - 27) = +15$

→ Average = $60 + 15/30$

Answer: 60.5

TRY IT

ANSWERS P.19 ↗

Q1. 11 results average 50. The first 6 average 49 and the last 6 average 52. Find the 6th result.

Q2. A batsman scores 87 in his 17th innings and lifts his average by 3. What is his new average?

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2025 Slot 3

Q11 · Moderate · MCQ

CAT 2024 Slot 1

Q3 · Moderate · TITA

Tied #1 in CAT 2021-25. Drill every Arithmetic PYQ ↗



TOPIC 06 OF 13 TOP 6

Mixtures & Alligation

CORE FORMULAS

- 1 Mean = $(q_1v_1 + q_2v_2) \div (q_1 + q_2)$, a weighted average
- 2 Alligation: cheaper : dearer = $(D - M) : (M - C)$
- 3 Draw x from V and refill with water, n times:
pure left = $V(1 - x/V)^n$
- 4 Replace a fraction k with water: strength $\times (1 - k)$. With pure: $c(1 - k) + k$.
- 5 Mixing solutions: alligate on the % of the **same** ingredient
- 6 Selling price given? Strip the profit first, then alligate on cost.

16x in CAT 2021-25
rank #3 (tied)



60-SECOND SHORTCUT

Cross the differences

20% and 50% acid to make 30%:
 $(50 - 30) : (30 - 20) = 2 : 1$,
weaker : stronger. The one closer to 30% gets the bigger share.

REMEMBER

The ingredient nearer the mean gets the bigger share.

TRAP BOX

✗ LOOKS LIKE

20% and 50% make 30% in 20:50 = 2:5

Two 10 L swaps from 100 L milk: 80 L left

Sold at ₹150 at 25% profit: alligate on 150

✓ ACTUALLY

$(50 - 30) : (30 - 20) = 2 : 1$

$100 \times 0.9^2 = 81$ L: each draw takes water too

Mean cost = $150 \div 1.25 = ₹120$

WORKED EXAMPLE

TARGET 45 s

Tea at ₹120/kg and ₹200/kg is mixed and sold at ₹180/kg for a 20% profit. Find the mixing ratio.

→ Cost of the mix = $180 \div 1.2 = ₹150$

→ Ratio = $(200 - 150) : (150 - 120) = 50 : 30$

Answer: 5 : 3

TRY IT

ANSWERS P.19 ↗

Q1. From 40 L of milk, 4 L is drawn and replaced with water, 3 times in all. How much milk is left?

Q2. How much water must be added to 30 L of a 25% acid solution to make it 15% acid?

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2024 Slot 1

Q11 · Easy · MCQ

CAT 2024 Slot 3

Q14 · Moderate · TITA

Practise every CAT Mixtures PYQ in the Arithmetic hub ↗



TOPIC 07 OF 13 TOP 6

Time, Speed & Distance

15× in CAT 2021-25
rank #5 (tied)


CORE FORMULAS

- $D = S \times T$. Same distance $\Rightarrow$ time $\propto 1/\text{speed}$.
 $\text{km/h} \times 5/18 = \text{m/s}$.
- Average speed = total distance $\div$ total time.
Equal distances: $2ab/(a + b)$.
- Relative speed: $a + b$ opposite ways, $a - b$ same way
- Trains crossing: $(L_1 + L_2) \div$ relative speed
- A beats B by x m in a D m race $\Rightarrow A : B = D : (D - x)$
- Circular track L : first meeting after $L/(a - b)$ same way, $L/(a + b)$ opposite

60-SECOND SHORTCUT

The ✓ meeting rule

Two start together from opposite ends, meet, then take t_1 and t_2 to finish. Speeds $A : B = \sqrt{t_2} : \sqrt{t_1}$, and they met after $\sqrt{(t_1 t_2)}$. 4 h and 9 h $\Rightarrow$ **3 : 2**, met after **6 h**.

REMEMBER

Fix one of D , S and T ; the other two move in a clean ratio.

TRAP BOX

✗ LOOKS LIKE

30 km/h out, 60 km/h back: average 45

200 m train, 300 m platform, 72 km/h:
10 s

600 m track, 5 and 3 m/s same way:
75 s

✓ ACTUALLY

$2 \times 30 \times 60 \div 90 =$ **40 km/h**

500 m at 20 m/s = **25 s**

Relative speed 2 m/s: **300 s**

WORKED EXAMPLE

TARGET 30 s

In a 1 km race, A beats B by 100 m and B beats C by 100 m. By how much does A beat C?

- $\rightarrow$ A runs 1,000 m while B runs 900 m
- $\rightarrow$ B runs 900 m while C runs $900 \times 0.9 = 810$ m
- $\rightarrow$ A beats C by $1,000 - 810$

Answer: 190 m

TRY IT

ANSWERS P.19 ↗

Q1. Trains 150 m and 250 m long run towards each other at 54 km/h and 90 km/h. How long do they take to cross?

Q2. Two cars leave P and Q together, towards each other. After meeting, they take 16 min and 25 min to reach Q and P. Find the ratio of their speeds.

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2025 Slot 3

Q17 · Moderate · TITA

CAT 2024 Slot 3

Q4 · Moderate · MCQ

Race through all 49 CAT TSD PYQs ↗



TOPIC 08 OF 13 TOP 6

Time & Work

17× in CAT 2021-25
rank #1 (tied)


CORE FORMULAS

- 1 A finishes in a days $\Rightarrow$ A's rate = $1/a$ per day.
Rates add; days don't.
- 2 A and B together: $ab/(a+b)$ days
- 3 Man-days: $M_1D_1H_1/W_1 = M_2D_2H_2/W_2$
- 4 Efficiency $\propto 1/\text{time}$. Twice as efficient $\Rightarrow$ half the time.
- 5 LCM method: total work = LCM of the days;
rates in units per day
- 6 Alternate days: do one full cycle, then finish the remainder

60-SECOND SHORTCUT

LCM units, zero fractions

A takes 12 days, B takes 18. Work = LCM
36 units: A does 3 a day, B does 2.
Together 5 a day $\Rightarrow 36 \div 5 = 7.2$ days.

REMEMBER

Rates add. Days never do.

TRAP BOX

✗ LOOKS LIKE

10-day A + 15-day B: 12.5 days together

50% more efficient $\Rightarrow$ 50% less time

A (4 days), B (6 days) on alternate days: 4.8

✓ ACTUALLY

 $10 \times 15 \div 25 = 6$ days

Time $\times 2/3$: 33.3% less

5/6 done in 4 days; A needs 2/3 day: 4 2/3 days

WORKED EXAMPLE

TARGET 30 s

12 men working 8 h a day finish a job in 10 days.
How many days will 16 men working 6 h a day
take for a job twice as big?

$$\rightarrow 12 \times 10 \times 8 \div 1 = 16 \times D \times 6 \div 2$$

$$\rightarrow 960 = 48D$$

Answer: 20 days

TRY IT

ANSWERS P.19 ↗

Q1. A and B finish a job in 12 days, B and C in 15, and C and A in 20. How long will A take alone?

Q2. A is twice as efficient as B. Together they finish a job in 14 days. How long will A take alone?

You're past halfway. Forward this book to one friend
revising Arithmetic this week.

WhatsApp

Telegram

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2025 Slot 2

Q10 · Moderate · TITA

CAT 2025 Slot 3

Q7 · Moderate · MCQ

Clear all 36 CAT Time & Work PYQs before your next mock ↗



TOPIC 09 OF 13

OCCASIONAL

Pipes & Cisterns

CORE FORMULAS

- 1 Inlet fills in x h $\Rightarrow +1/x$ per hour. Outlet empties in y h $\Rightarrow -1/y$.
- 2 Net rate = sum of signed rates. Time = $1 \div$ net rate.
- 3 Fills in x , empties in y ($y > x$), both open $\Rightarrow xy/(y - x)$ hours
- 4 A leak turns fill time x into $t \Rightarrow$ leak alone empties in $xt/(t - x)$ hours
- 5 LCM trick: tank = LCM of the times, so rates become whole units
- 6 Pipes opened or shut at different times: add the work of each phase

3x in CAT 2021-25
rank #9

60-SECOND SHORTCUT

Signed units

A fills in 6 h, B in 8 h, C empties in 12 h.
Tank = 24 units: $+4 +3 -2 = +5$ an hour, so it fills in $24 \div 5 = \mathbf{4.8\ h}$.

REMEMBER

Inlets plus, outlets minus. The rest is Time & Work.

TRAP BOX

X LOOKS LIKE

Fill 4 h, leak 12 h: $12 - 4 = 8\ h$

3 h and 6 h pipes together: 4.5 h

Fill 6 h, drain 4 h, both open: 12 h

✓ ACTUALLY

$1/4 - 1/12 = 1/6$: **6 h**

$1/3 + 1/6 = 1/2$: **2 h**

Net $-1/12$ an hour: it **never fills**

WORKED EXAMPLE

TARGET 40 s

Pipe A fills a tank in 10 h, pipe B in 15 h. Both are opened, and B is shut after 3 h. When is the tank full?

$\rightarrow$ Tank = 30 units: A fills 3 an hour, B fills 2

$\rightarrow$ 3 h together = 15 units; A adds the last 15 in 5 h

$\rightarrow$ Total = 3 + 5

Answer: 8 h

TRY IT

[ANSWERS P.19 ↗](#)

Q1. A pipe fills a tank in 8 h. With a leak it takes 10 h. How long would the leak take to empty a full tank?

Q2. A fills a tank in 12 h and B in 15 h; C empties it in 20 h. All three are opened together. When is it full?

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2025 Slot 3

Q13 · Moderate · MCQ

CAT 2021 Slot 2

Q12 · Moderate · MCQ

Pipes hide inside Time & Work on CAT. Practise all 36 PYQs ↗



TOPIC 10 OF 13

OCCASIONAL

Boats & Streams

2× in CAT 2021-25
rank #10

CORE FORMULAS

- 1 Downstream $D = b + s$. Upstream $U = b - s$.
- 2 Boat $b = (D + U)/2$. Stream $s = (D - U)/2$.
- 3 Round trip of d km each way: time = $2db/(b^2 - s^2)$
- 4 Average speed for the round trip = $(b^2 - s^2)/b$
- 5 Upstream takes k times as long $\Rightarrow b : s = (k + 1) : (k - 1)$
- 6 A floating object drifts at the stream speed s

60-SECOND SHORTCUT

The time-ratio rule

Upstream takes k times as long as downstream $\Rightarrow b : s = (k + 1) : (k - 1)$. $k = 2 \Rightarrow$ the boat is **3×** the stream. $k = 3 \Rightarrow$ **2×**.

REMEMBER

Find D and U first. The rest is half-sums and half-differences.

TRAP BOX

✗ LOOKS LIKE

The stream adds speed both ways

Round-trip average = boat speed, 10 km/h

Up 8, down 12 $\Rightarrow$ stream 4 km/h

✓ ACTUALLY

$b = 10, s = 2$: **12 down, 8 up**

$(b^2 - s^2)/b = 96/10 =$ **9.6 km/h**

$(12 - 8)/2 =$ **2 km/h**

WORKED EXAMPLE

TARGET 90 s

A boat goes 24 km upstream and 36 km downstream in 6 h, and 36 km upstream and 24 km downstream in 6.5 h. Find the boat and stream speeds.

$\rightarrow$ With $u = 1/U, v = 1/D$: $24u + 36v = 6$ and $36u + 24v = 6.5$

$\rightarrow$ Add and subtract: $u + v = 5/24, u - v = 1/24$

$\rightarrow u = 1/8, v = 1/12 \Rightarrow U = 8, D = 12$

Answer: Boat 10 km/h, stream 2 km/h

TRY IT

ANSWERS P.19

Q1. A boat goes 30 km downstream in 2 h and comes back in 3 h. Find the boat and stream speeds.

Q2. A boat takes 3 times as long upstream as downstream over the same distance. The stream flows at 4 km/h. Find the boat's speed in still water.

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2025 Slot 2

Q7 · Moderate · TITA

All 49 TSD PYQs

Boats are tagged TSD

Boats sit inside TSD on CAT. Practise all 49 TSD PYQs



TOPIC 11 OF 13 RARE IN CAT

Partnership

CORE FORMULAS

- 1 Profit share $\propto$ capital $\times$ time
- 2 C_1 for T_1 months vs C_2 for $T_2 \Rightarrow$ ratio $C_1T_1 : C_2T_2$
- 3 Capital changes midway: add capital $\times$ months for each period
- 4 Same time $\Rightarrow$ split by capital. Same capital $\Rightarrow$ split by time.
- 5 Working partner: pay the salary first, then split the rest
- 6 Time ratio from profit and capital: $T_1 : T_2 = P_1/C_1 : P_2/C_2$

1× in CAT 2021-25
rank #11 (tied)

60-SECOND SHORTCUT

Think in lakh-months

₹40,000 for 12 months vs ₹60,000 for 8:
 $0.4 \times 12 = 4.8$ and $0.6 \times 8 = 4.8$
lakh-months. Profit splits **1:1**.

REMEMBER

Money $\times$ months, always.

TRAP BOX

✗ LOOKS LIKE

₹40,000 vs ₹60,000 $\Rightarrow$ profit 2 : 3

Withdraws half after 6 months: 12C

Split all the profit by capital

✓ ACTUALLY

Weight by months. 12 vs 8 months: **1:1**

$6C + 6 \times C/2 = 9C$

Pay the working partner's **salary first**

WORKED EXAMPLE

TARGET 45 s

A starts a business with ₹60,000. B joins after 3 months with ₹80,000, and C joins 6 months after B with ₹1,20,000. The year's profit is ₹1,08,000. Find C's share.

$\rightarrow$ Lakh-months: A $0.6 \times 12 = 7.2$, B $0.8 \times 9 = 7.2$, C $1.2 \times 3 = 3.6$

$\rightarrow$ Ratio 2 : 2 : 1 $\Rightarrow$ C gets 1/5

Answer: ₹21,600

TRY IT

ANSWERS P.19 [↗](#)

Q1. A and B invest in the ratio 3 : 5. A pulls out after 8 months; B stays the year. The profit is ₹35,000. Find A's share.

Q2. A invests ₹50,000 and runs the business for 10% of the profit as salary. B invests ₹75,000. The profit is ₹50,000. What does A get in all?

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2021 Slot 2

Q3 · Moderate · MCQ [↗](#)

Free Ratio set

12 questions · Easy [↗](#)

Partnership is ratio in disguise. Take the free 12-question Ratio set [↗](#)



TOPIC 12 OF 13

RARE IN CAT

Clocks

CORE FORMULAS

- Minute hand 6° a minute, hour hand $0.5^\circ \Rightarrow$ the gap changes 5.5° a minute
- Angle at $h:m = |30h - 5.5m|$. Over 180° ? Take 360° minus it.
- Angle θ between h and $h + 1$: $m = 2(30h \pm \theta)/11$ minutes past h
- Hands meet every $65 \frac{5}{11}$ min: 11 times in 12 h, 22 times a day
- Right angle 22 times in 12 h (44 a day). Opposite 11 times (22 a day).
- Hands meet every T min ($T < 65 \frac{5}{11}$) $\Rightarrow$ the clock gains $65 \frac{5}{11} - T$ min per T min

1× in CAT 2021-25
rank #11 (tied)

60-SECOND SHORTCUT

Overlap in one step

Between h and $h + 1$ the hands meet at **60h/11** min past h . 3 o'clock $\Rightarrow 16 \frac{4}{11}$ min past 3. 7 o'clock $\Rightarrow 38 \frac{2}{11}$ min past 7.

REMEMBER

The minute hand gains 55 minute-spaces every hour.

TRAP BOX

✗ LOOKS LIKE

At 3:15 the hands overlap

The hands meet 24 times a day

Right angles: 2 an hour, 48 a day

✓ ACTUALLY

The hour hand has moved 7.5° : angle **7.5°**

None between 11 and 1 except 12: **22**

3:00 and 9:00 serve two hours each: **44**

WORKED EXAMPLE

TARGET 45 s

At what times between 4 and 5 o'clock are the hands at right angles?

$$\rightarrow m = 2(30h \pm \theta)/11 \text{ with } h = 4, \theta = 90$$

$$\rightarrow m = 2(120 - 90)/11 = 5 \frac{5}{11} \text{ or } 2(120 + 90)/11 = 38 \frac{2}{11}$$

Answer: 4:05 $\frac{5}{11}$ and 4:38 $\frac{2}{11}$

TRY IT

ANSWERS P.19 ↗

Q1. Find the angle between the hands of a clock at 7:20.

Q2. The hands of a faulty clock meet every 64 minutes of true time. How much does the clock gain in a day?

SOLVE THE REAL ONES

Official CAT questions on thinkcat.in

CAT 2023 Slot 1

Q8 · Moderate · MCQ

SNAP simulator

Clocks & Calendars drills

Sitting SNAP too? Practise Clocks & Calendars in the SNAP simulator ↗



TOPIC 13 OF 13

RARE IN CAT

Calendars

CORE FORMULAS

- 1 Odd days = days left after whole weeks.
Ordinary year 1, leap year 2; months in the grid below.
- 2 Leap year: divisible by 4; a century year only if divisible by 400
- 3 Odd days in 100, 200, 300, 400 years: 5, 3, 1, 0
- 4 Day codes: 0 Sun, 1 Mon, 2 Tue, 3 Wed, 4 Thu, 5 Fri, 6 Sat
- 5 Calendar repeats: ordinary year after 6 or 11 years (2026 → 2037); leap year after 28

Jan	3	Feb	0/1	Mar	3	Apr	2	May	3	Jun	2
Jul	3	Aug	3	Sep	2	Oct	3	Nov	2	Dec	3

0x

 in CAT 2021–25
rank #13

60-SECOND SHORTCUT

Same date, next year

The same date next year moves **+1** weekday, or **+2** if a 29 Feb falls in between. 26 Jan 2026 was a Monday ⇒ 26 Jan 2027 is a **Tuesday**.

REMEMBER

Count odd days, then count forward from Sunday = 0.

TRAP BOX

X LOOKS LIKE

1900 was a leap year (it divides by 4)

Same date next year, same weekday

1 Jan to 8 Jan is 8 days

✓ ACTUALLY

Century years need 400: **365 days**

It moves **+1** (+2 across 29 Feb)

7 days pass. Don't count both ends

WORKED EXAMPLE

TARGET 90 s

What day of the week was 15 August 1947?

→ 1600 years: 0. 1601–1900: 1

→ 1901–1946: 46 years + 11 leap days = $57 \equiv 1$

→ Jan–Jul 1947: 212 days $\equiv 2$. 15 Aug $\equiv 1$

→ Total $0 + 1 + 1 + 2 + 1 = 5$

Answer: Friday

TRY IT

ANSWERS P.19 ↗

Q1. 1 January 2026 was a Thursday. On what day is CAT 2026, 29 November 2026?

Q2. 26 January 2024 was a Friday. What day was 26 January 2025?

0 CAT PYQs SINCE 2021

Train it for SNAP instead

SNAP simulator

Clocks & Calendars drills ↗

Free CAT mock

TCS iON-style · no card ↗

0 CAT questions in 15 slots. Taking SNAP? Practise it there ↗



SCREENSHOT THIS PAGE

The Arithmetic Formula Wall

Tap any topic to open its page

01 Percentages [p.4 ↗](#)

- Up/down $x\%$: $\times (1 \pm x/100)$
- Successive: $a + b + ab/100$
- Reverse: Final $\div$ multiplier
- $x\%$ more $\Rightarrow 100x/(100 + x)\%$ less

02 Profit, Loss & Discount [p.5 ↗](#)

- $SP = CP(1 + p/100) = MP(1 - d/100)$
- Mark-up then discount: $m - d - md/100$
- Equal SP at $\pm x\%$: loss $x^2/100\%$
- False weight: $(1000 - G)/G \times 100$

03 Simple & Compound Interest [p.6 ↗](#)

- $SI = PRT/100$; $A = P(1 + R/100)^n$
- CI - SI: $P(R/100)^2$ for 2 years, $\times (3 + R/100)$ for 3
- Effective rate, half-yearly: $R + R^2/400$
- At 10%: 2 years = 21%, 3 years = 33.1%

04 Ratio & Proportion [p.7 ↗](#)

- $A:B = 3:5 \Rightarrow A = 3k, B = 5k$
- Chain ratios: equalise the middle term
- C-D: $(a + b)/(a - b) = (c + d)/(c - d)$
- Mean proportional $\sqrt{(ac)}$; third b^2/a

05 Averages [p.8 ↗](#)

- Total = Average $\times$ Count
- Replace x by y : average moves $(y - x)/n$
- Newcomer = old average + $(n + 1)d$
- Equally spaced: average = middle term

06 Mixtures & Alligation [p.9 ↗](#)

- Cheaper : dearer = $(D - M) : (M - C)$
- Repeated replacement: $V(1 - x/V)^n$
- Selling price given? Alligate on cost
- Nearer the mean $\Rightarrow$ bigger share

07 Time, Speed & Distance [p.10 ↗](#)

- Equal distances: average speed $2ab/(a + b)$
- Relative: $a + b$ opposite, $a - b$ same way
- Race: $A : B = D : (D - x)$
- Meeting rule: $A : B = \sqrt{t_2} : \sqrt{t_1}$

08 Time & Work [p.11 ↗](#)

- Together: $ab/(a + b)$
- $M_1D_1H_1/W_1 = M_2D_2H_2/W_2$
- Total work = LCM of the days
- Efficiency $\propto 1/\text{time}$

09 Pipes & Cisterns [p.12 ↗](#)

- Inlet $+1/x$, outlet $-1/y$
- Fill x , empty y : $xy/(y - x)$
- Leak alone: $xt/(t - x)$

10 Boats & Streams [p.13 ↗](#)

- $D = b + s, U = b - s$
- $b = (D + U)/2, s = (D - U)/2$
- $k \times \text{time upstream} \Rightarrow b : s = (k + 1) : (k - 1)$

11 Partnership [p.14 ↗](#)

- Share $\propto$ capital $\times$ months
- Working partner: salary first, then split

12 Clocks [p.15 ↗](#)

- Angle = $|30h - 5.5m|$
- Overlap every $65 \frac{5}{11}$ min: 22 a day
- Right angles 44 a day; opposite 22

13 Calendars [p.16 ↗](#)

- Odd days: ordinary year 1, leap year 2
- 100 / 200 / 300 / 400 years: 5 / 3 / 1 / 0
- Months: 3 0 3 2 3 2 3 3 2 3 2 3 (leap Feb: 1)

SHARE THE WALL Post it in your CAT group.

WhatsApp

Telegram



PERCENTILE KILLERS

Top 10 Arithmetic traps

Each one feels right in the exam hall. Cover the right column and test yourself.

	X LOOKS LIKE	✓ ACTUALLY	PAGE
1	30 km/h out, 60 km/h back: average speed 45	Equal distances: $2 \times 30 \times 60 \div 90 =$ 40 km/h	p.10
2	+20% then -20% brings you back to the start	$1.2 \times 0.8 = 0.96$: down 4%	p.4
3	Discounts of 20% and 10% add up to 30%	$0.8 \times 0.9 = 0.72$: 28% off	p.5
4	20% profit on SP is a 20% profit	SP 100 means CP 80: 25% on cost	p.5
5	Average of 60 (20 people) and 80 (30 people) is 70	Weight by count: $3,600 \div 50 =$ 72	p.8
6	A (10 days) and B (15 days) together take 12.5 days	Add rates: $1/10 + 1/15 = 1/6$, so 6 days	p.11
7	20% and 50% make 30% in the ratio 20:50	$(50 - 30) : (30 - 20) =$ 2:1	p.9
8	Two 10 L swaps from 100 L of milk leave 80 L	$100 \times 0.9^2 =$ 81 L	p.9
9	Interest rate 10% → 12% is a 2% rise	2 points , and a 20% rise	p.4
10	A 200 m train passes a 300 m platform: use 200 m	Use $200 + 300 = 500$ m: 25 s at 72 km/h	p.10

How many did you fall for? Find out under exam pressure, in a full-length mock.

Free CAT mock ↗



ANSWER KEY

Answers + scorecard

1 mark per Try-it question, 26 in all. Tap a topic to jump back to its page.

Topic	Q1	Q2
01 Percentages	20% Price $\times 5/4$, so use $\times 4/5$	20,000 Margin = $0.2 \times 0.8V = 0.16V = 3,200$
02 Profit, Loss & Discount	28% MP = $1,400 \div 0.875 = 1,600$; CP = $1,400 \div 1.12 = 1,250$	32.5% Pay 3 of 4 = 0.75; $\times 0.9 = 0.675$
03 Simple & Compound Interest	₹510 $6,250 \times (1.04^2 - 1) = 6,250 \times 0.0816$	₹1,210 $x/1.1 + x/1.21 = 2,100 \Rightarrow 2.1x/1.21 = 2,100$
04 Ratio & Proportion	7:2 $a/b = (9 + 5)/(9 - 5) = 14/4$	₹2,240 A:B:C = 9:12:14; $5,600 \times 14/35$
05 Averages	56 $6 \times 49 + 6 \times 52 - 11 \times 50 = 294 + 312 - 550$	39 $16A + 87 = 17(A + 3) \Rightarrow A = 36$; new = 39
06 Mixtures & Alligation	29.16 L 40×0.9^3	20 L 7.5 L acid is 15% of 50 L; $50 - 30$
07 Time, Speed & Distance	10 s $400 \text{ m} \div 40 \text{ m/s}$ ($144 \text{ km/h} \times 5/18$)	5:4 $\sqrt{25} : \sqrt{16}$
08 Time & Work	30 days Pairs sum $\div 2 = 1/10$; A = $1/10 - 1/15 = 1/30$	21 days A does $2/3$ of $1/14$ a day = $1/21$
09 Pipes & Cisterns	40 h $8 \times 10 \div (10 - 8)$	10 h LCM 60: $5 + 4 - 3 = 6$ units an hour
10 Boats & Streams	12.5 and 2.5 km/h D = 15, U = 10	8 km/h $b : s = (3 + 1) : (3 - 1) = 2 : 1$
11 Partnership	₹10,000 $3 \times 8 : 5 \times 12 = 2 : 5$; $35,000 \times 2/7$	₹23,000 ₹5,000 salary + $2/5$ of ₹45,000
12 Clocks	100° $ 30 \times 7 - 5.5 \times 20 = 210 - 110 $	32 8/11 min Gains $16/11$ min per 64 min, 22.5 times a day
13 Calendars	Sunday 332 days after 1 Jan = 47 weeks + 3; Thu + 3	Sunday 29 Feb 2024 falls in between: Fri + 2

22-26 Exam-ready basics

Move to full papers. Start with the CAT 2025 Slot 3 QA section.

[CAT 2025 Slot 3 ↗](#)

14-21 Close the gaps

Re-read the trap box for every miss, then drill the Arithmetic PYQ hub.

[Arithmetic hub ↗](#)

0-13 Start with the big two

Time & Work (p.11) and Averages (p.8) gave CAT 34 questions in 5 years.

[Time & Work PYQs ↗](#)

Post your score in your CAT group and dare them to beat it.

[WhatsApp](#)
[Telegram](#)


YOUR NEXT STEP

You've revised it. Now sit the real paper.

FREE · NO CARD REQUIRED

Two free full-length CAT mocks (CAT 2024 Slots 1 and 2) in a TCS iON-style interface: 66 questions, 120 minutes, 40-minute section locks and an on-screen calculator.



Scan with your phone camera

Start the free CAT mock ↗

Every CAT Arithmetic PYQ

Official 2017–2025 questions with solutions and difficulty filters.

Open ↗

Daily CAT Challenge

One official question a day, timed against peer averages.

Open ↗

Score vs percentile

See what your mock score means in percentile terms.

Open ↗

Know someone who still averages 30 and 60 km/h and gets 45? Send them this book.

WhatsApp

Telegram

NEXT BOOKS

Algebra · Number System · Geometry · Modern Maths

Find them here ↗

PYQ counts: ThinkCAT analysis of official CAT QA papers, 2021–2025 (15 slots, 330 questions). CAT 2026: Sunday, 29 November 2026. Version 2.0 · September 2026.