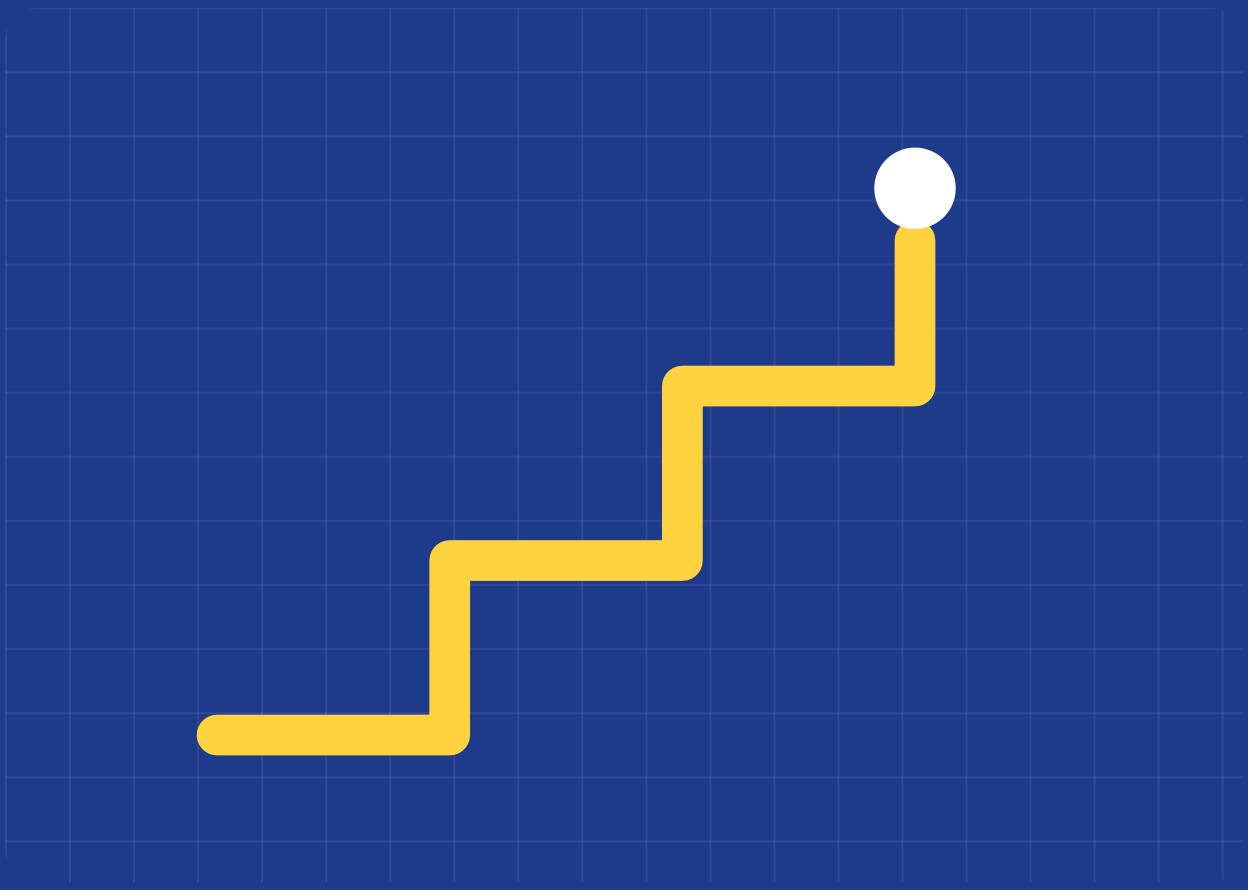
UpOnly Learning



GRADE 7

FREE SAMPLE WORKBOOK

Math Grade 7

One step at a time. · Ages 12–13 · Free sample: 1 of 9 topics

UO-MATH-7

OUR STORY

One step at a time

I'm Dr. Evan J. Hasson. I've run a specific chiropractic practice for over twelve years, and I'm a dad of three. My work is about alignment: get the structure right, and everything else works better.

At home, nothing was aligned. I was spending thousands a month on tutors, extracurriculars and programs, and when I asked about enrolling a second or third child the answer was always the same: that'll be double, that'll be triple. The charter school had a waiting list. The good public school had a waiting list. The private schools had the kind of list where it helps to know someone, or to give generously first.

And underneath all of it, the same quiet threat: if you don't pay for this, your child will fall behind. Not sold with evidence. Sold with fear.

So I did my own research, and here is what I found: none of it is secret. The standards are published. The order a child should learn in is written down and freely available. It is just scattered. Nobody had done the work of pulling it together, putting it in order and handing it over. So I did.

When every step has its place, confusion has nowhere to hide.

I built this for my own kids. I'm giving it to yours.

Dr. Evan J. Hasson, DC
Founder and dad of three

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No guaranteed results, and mistakes happen. Every student learns differently. We write and review every question and answer key carefully, and we still get things wrong — an answer key can be wrong, and a question can be worded badly or have two defensible answers. Check the answer key before you hand it over, and trust your own judgment over ours. Found a problem? **Photograph the page and email it to support@uponlylearning.com** — the picture tells us more than a description, and we fix it for every family.

Safety. Some activities use household items such as scissors, coins or food. An adult should supervise and skip anything unsafe for the student.

Not professional advice. This workbook does not replace an evaluation by a qualified educator or specialist. The founder is a Doctor of Chiropractic; UpOnly Learning does not provide medical or health advice.

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INTRODUCTION

How to use this workbook

Each topic follows the same steps, so your student always knows what comes next.

① **Quick Check.** 10 questions before you teach. Read them aloud for younger students. A high score means you can move faster.

② **Learn It.** Key words, step-by-step teaching with lines you can read aloud, worked examples and the mistakes to watch for.

③ **We Do It Together.** 10 questions you do side by side. The answer and the "why" are printed right after each question, so you can talk it through.

④ **You Try.** 10 questions your student does alone.

Answers with short explanations for every question are in the **Answer Key** at the end of each topic, so students can work without peeking. Go over each wrong answer together using the explanation.

This workbook is printed in full color. To save ink, choose "Black and white" or "Grayscale" in your printer settings; every page still works in black and white.

Want online checks that score themselves and track each student's progress? Visit uponlylearning.com.

GRADE 7

CONTENTS · UO-MATH-7

Math: Grade 7

Free Sample Workbook · Ages 12–13 · 1 of 9 topics, with a Quick Check, a lesson, We Do It Together, You Try and an answer key

Our story

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How to use this workbook

Topic 1 · Proportional relationships

Constant of proportionality; percent problems 7 . RP

Quick Check · Learn It · We Do It Together · You Try · Answer Key

TOPIC 1 · 7.RP

↑ CONTENTS

Proportional relationships

The student will find the constant of proportionality in tables, graphs, equations and word problems, explain the points (0, 0) and (1, r) on a proportional graph, and solve multi-step percent problems (discounts, tax, tips, percent change).

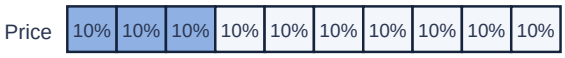
① Quick Check

Do this before the lesson. It shows what your student already knows. Score: ____ / 10

1. A proportional relationship has a graph that is a straight line through which point?

A (1, 1) **B** (0, 1) **C** (0, 0)

2. The tape is the whole price. The shaded part is the 30% taken off. What percent of the original price do you pay?



A 3% **B** 130% **C** 30% **D** 70%

3. Each row of the table gives y for x = 1, 2 and 3. In which row is y proportional to x?

x	1	2	3
Row A: y	3	6	10
Row B: y	2	3	4
Row C: y	4	8	12
Row D: y	5	7	9

A Row A **B** Row B **C** Row C **D** Row D

4. In the equation y = 6x, what is the constant of proportionality?

A y **B** 6 **C** x **D** 1/6

5. A recipe uses 3 cups of flour for every 2 cups of sugar. How much flour goes with 5 cups of sugar?

A 3.33 cups **B** 7.5 cups **C** 8 cups **D** 10 cups

6. A $120 coat is 35% off. What is the sale price?

A $78 **B** $85 **C** $42 **D** $155

7. The table shows pay for hours worked. What is the constant of proportionality?

Hours	2	4	6
Pay ($)	27	54	81

A 13.5 **B** 2 **C** 27

8. Sneakers cost $60 and are 15% off. What is the sale price?

A $9 **B** $45 **C** $75 **D** $51

9. A receipt shows a total of $26.50 with 6% sales tax included. What was the price before tax?

A $26.44 **B** $24.91 **C** $25 **D** $25.50

10. An $80 item is 20% off, then an extra 10% off the new price. What is the final price?

A $57.60 **B** $72.00 **C** $56.00 **D** $64.00

② Learn It

Key words

- **proportional relationship**: Two quantities that always grow or shrink by the same multiplier, so y ÷ x is always the same number.
- **constant of proportionality (k)**: The fixed multiplier in y = kx. It is the unit rate: how much y you get for 1 of x.
- **unit rate**: A rate per one unit, like 3 dollars per pound or 2 miles per hour.
- **percent**: Per hundred. 18% means 18 out of every 100, or 0.18.
- **percent change**: How much something grew or shrank compared to where it started: (change ÷ original) × 100.

Warm-up

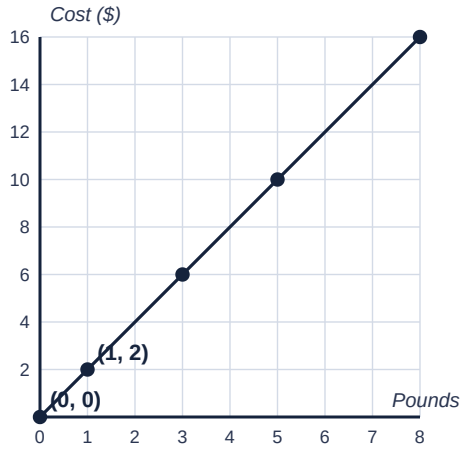
1. Write this on paper: 3 pounds of apples cost $6. 5 pounds cost $10. 8 pounds cost $16.
2. Ask: How much does 1 pound cost? (2 dollars.) How did you figure it out?
3. Ask: How much would 20 pounds cost? (40 dollars.)
4. Point out that every cost is the number of pounds times 2. Tell them that 2 is the secret multiplier we are hunting today.

> *Every price on this list follows one hidden rule. If you can find the rule, you can predict any price without even going to the store.*

Teach

1. Make a table: x = pounds (3, 5, 8) and y = cost (6, 10, 16). Add a third column for y ÷ x. Every row gives 2.
2. Explain: when y ÷ x is the same in every row, the relationship is proportional. That constant number is called k, the constant of proportionality, and the equation is y = kx. Here, y = 2x.
3. Show a table that is NOT proportional: a taxi charges $3 to start plus $2 per mile. 1 mile costs $5, 2 miles cost $7. 5 ÷ 1 = 5 but 7 ÷ 2 = 3.5, so the ratios do not match. Also, 0 miles costs $3, not $0. A proportional graph is a straight line through (0, 0).
4. Read two special points on a proportional graph. The point (0, 0) means 0 of x gives 0 of y: 0 pounds of apples cost $0. The point (1, r) shows the unit rate: on the apple graph, (1, 2) means 1 pound costs $2, so r = k = 2.
5. Show a fraction unit rate: Sam walks 1/2 mile in 1/4 hour. k = (1/2) ÷ (1/4) = 2 miles per hour. Dividing fractions works exactly like dividing whole numbers here.
6. Switch to percents. Explain that a percent is a constant of proportionality too: the tax is always 0.06 times the price, a tip is always 0.18 times the bill.
7. Teach the multiplier shortcut: 25% off means you pay 100% - 25% = 75%, so multiply by 0.75. Adding 6% tax means you pay 106%, so multiply by 1.06.
8. Teach percent change: percent change = (new - original) ÷ original × 100. Always divide by the ORIGINAL amount.

Pounds (x)	3	5	8
Cost (y)	6	10	16
y ÷ x	2	2	2



> *A proportional relationship is like a recipe with one magic number. Once you know k, you just multiply. Percents are the same idea, with the magic number written out of 100.*

Guided practice

1. Pull out a receipt or flyer. Pick one item and its price together.

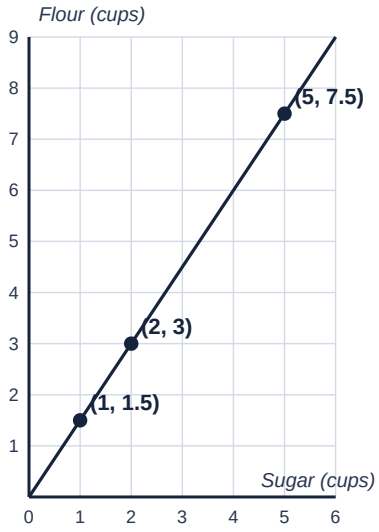
2. Work through: the item is 30% off. Ask the student what percent they actually pay (70%), then multiply the price by 0.70.
3. Now add 7% sales tax to the sale price by multiplying by 1.07. Round to the nearest cent.
4. Give a table: hours worked 2, 4, 6 and pay $27, $54, $81. Have the student find k (13.50) and write the equation y = 13.5x.
5. Ask them to explain in a sentence what 13.5 means in the story (dollars earned per hour).
6. Work through the two examples in this lesson together, with the student doing the writing and you asking the questions.

Hours (x)	2	4	6
Pay in $ (y)	27	54	81

> *You be the cashier and I will be the customer. Tell me what I really owe after the discount and the tax.*

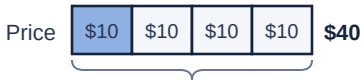
Worked examples

A recipe uses 3 cups of flour for every 2 cups of sugar. Write an equation for cups of flour (y) in terms of cups of sugar (x), and find the flour needed for 5 cups of sugar.



k = 3 ÷ 2 = 1.5, so y = 1.5x. For x = 5, y = 1.5 × 5 = 7.5 cups of flour.

A jacket costs $40. It is 25% off, and then 6% sales tax is added. What is the final price?



Pay 75% of the price: 40 × 0.75 = $30. Add tax by multiplying by 1.06: 30 × 1.06 = $31.80.

Watch for these mistakes

Mistake: Any table where both columns go up is proportional.
Fix: Have the student divide y by x in every row. If the answers are not all the same, or if x = 0 does not give y = 0, it is not proportional. The taxi with a starting fee goes up but is not proportional.

Mistake: If a price goes up 20% and then down 20%, it ends up back where it started.
Fix: Try it with $100: up 20% is 100 × 1.2 = $120, down 20% is 120 × 0.8 = $96. The second percent is taken of a bigger number, so the result is lower. Always ask: percent of WHAT?

③ We Do It Together: 10 questions

> *Do these side by side. Read each question together, let your student answer, then read the answer and the "why" right below it and talk it through.*

1. Maya earns $9 per hour. Which equation gives her pay y for x hours?

A y = x + 9 **B** y = 9x **C** y = 9 + x **D** x = 9y

> **Answer: B** y = 9x
> **Why:** Pay is a constant 9 dollars per hour times the hours, so y = 9x.

2. The equation y = 2.5x relates miles y to hours x. How far is it in 4 hours?

A 6.5 miles **B** 1.6 miles **C** 8 miles **D** 10 miles

> **Answer: D** 10 miles
> **Why:** Substitute x = 4: 2.5 × 4 = 10.

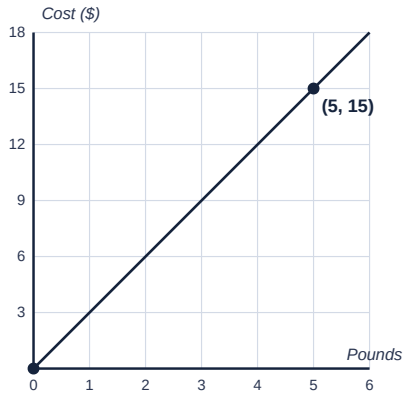
3. An $80 jacket is 10% off. The shaded part is the discount. What is the sale price?



A $72 **B** $8 **C** $88 **D** $70

> **Answer: A** $72
> **Why:** Pay 90%: 0.9 × 80 = 72. The $8 is the discount, not the price.

4. The graph shows the cost of grapes. Five pounds cost $15. What is the price per pound?



A $20 **B** $3 **C** $75 **D** $10

> **Answer: B** $3
> **Why:** Unit price = 15 ÷ 5 = 3 dollars per pound.

5. Mateo walks 1/2 mile in 1/4 hour. What is his speed?

A 2 miles per hour **B** 1/8 miles per hour **C** 4 miles per hour

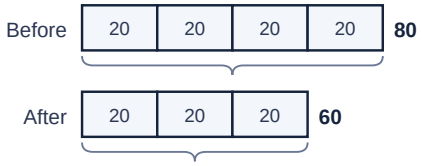
> **Answer: A** 2 miles per hour
> **Why:** Speed = (1/2) ÷ (1/4) = 1/2 × 4 = 2 miles per hour.

6. A $64 meal gets a 20% tip. What is the total paid?

A $84.00 **B** $12.80 **C** $65.20 **D** $76.80

> **Answer: D** $76.80
> **Why:** Tip = 0.2 × 64 = 12.80, so the total is 64 + 12.80 = 76.80.

7. A team's score drops from 80 to 60, as the tape diagram shows. What is the percent decrease?



A 20% **B** 25% **C** 33%

> **Answer: B** 25%
> **Why:** The change is 20, divided by the original 80, gives 25%.

8. Priya used 3 gallons of paint to cover 1,050 square feet. Use the table. How many square feet will 8 gallons cover?

Gallons	1	3	8
Square feet	?	1,050	?

A 2,800 square feet **B** 1,058 square feet **C** 350 square feet

> **Answer: A** 2,800 square feet
> **Why:** 1 gallon covers 1,050 ÷ 3 = 350 square feet, so 8 gallons cover 2,800.

9. A price goes up 20% and then down 20%. What is the net percent change?

A A 4% increase **B** A 40% decrease **C** A 4% decrease **D** No change

> **Answer: C** A 4% decrease
> **Why:** Start at 100: 100 × 1.2 = 120, then 120 × 0.8 = 96. That is 4 less than 100.

10. The number 12 is 5% of what number?

A 60 **B** 240 **C** 0.6 **D** 17

> **Answer: B** 240
> **Why:** 12 ÷ 0.05 = 240. Check: 0.05 × 240 = 12.

④ You Try: 10 questions

Now your student works alone. Check answers in the Answer Key at the end of this topic. Score: ____ / 10

1. Twelve apples cost $6. What is the cost of one apple?

A $6.00 **B** $2.00 **C** $0.50

2. What is 10% of 50?

A 40 **B** 10 **C** 500 **D** 5

3. A price goes from $20 to $25. What is the percent change?

A 5% **B** 20% **C** 25%

4. A phone loses 10% of its $1,400 value in a year. What is it worth then?

A $1,390 **B** $140 **C** $1,540 **D** $1,260

5. A worker earning $2,000 a month gets a 5% raise. What is the new monthly pay?

A $2,005 **B** $2,100 **C** $2,500

6. A runner goes 3/4 mile in 1/2 hour. What is her speed?

A 2 miles per hour **B** 1.5 miles per hour **C** 3/8 miles per hour

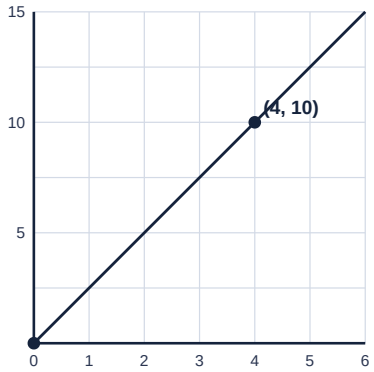
7. A town grows from 800 to 1,000 people. What is the percent increase?

A 125% **B** 25% **C** 200% **D** 20%

8. Car A goes 150 miles in 3 hours. Car B goes 220 miles in 4 hours. How many miles per hour faster is Car B?

A 1 mile per hour **B** 10 miles per hour **C** 70 miles per hour **D** 5 miles per hour

9. The graph of a proportional relationship passes through (4, 10). What is y when x = 10?



A 25 **B** 20 **C** 16

10. Yuki puts $800 in an account that pays 3.5% simple interest each year. What is her balance after 4 years?

A $828 **B** $1,200 **C** $112 **D** $912

Proportional relationships: Answers and explanations

① Quick Check

1. A proportional relationship has a graph that is a straight line through which point?
   C (0, 0)
   If x is 0, then y must be 0 in y = kx, so the line passes through the origin.

2. The tape is the whole price. The shaded part is the 30% taken off. What percent of the original price do you pay?
   D 70%
   You pay 100% - 30% = 70% of the price.

3. Each row of the table gives y for x = 1, 2 and 3. In which row is y proportional to x?
   C Row C
   Only row C (4, 8, 12) has the same y ÷ x every time: 4. The other rows go up, but not by a constant multiplier.

4. In the equation y = 6x, what is the constant of proportionality?
   B 6
   In y = kx, k is the number multiplied by x. Here k = 6.

5. A recipe uses 3 cups of flour for every 2 cups of sugar. How much flour goes with 5 cups of sugar?
   B 7.5 cups
   k = 3 ÷ 2 = 1.5, so y = 1.5x. With x = 5, y = 7.5 cups.

6. A $120 coat is 35% off. What is the sale price?
   A $78
   Pay 65%: 0.65 × 120 = 78. The $42 is the discount.

7. The table shows pay for hours worked. What is the constant of proportionality?
   A 13.5
   27 ÷ 2 = 54 ÷ 4 = 81 ÷ 6 = 13.5 dollars per hour.

8. Sneakers cost $60 and are 15% off. What is the sale price?
   D $51
   Pay 85%: 0.85 × 60 = 51. The $9 is the discount.

9. A receipt shows a total of $26.50 with 6% sales tax included. What was the price before tax?
   C $25
   The total is 106% of the price: 26.50 ÷ 1.06 = 25.

10. An $80 item is 20% off, then an extra 10% off the new price. What is the final price?
    A $57.60
    80 × 0.8 = 64, and 64 × 0.9 = 57.60. The two discounts are not added to 30%.

④ You Try

1. Twelve apples cost $6. What is the cost of one apple?

   C $0.50

   Unit rate = 6 ÷ 12 = 0.50 dollars per apple.

2. What is 10% of 50?

   D 5

   10% = 0.1, and 0.1 × 50 = 5.

3. A price goes from $20 to $25. What is the percent change?

   C 25%

   Change = 5, and 5 ÷ original 20 = 0.25, which is 25%. Divide by the original.

4. A phone loses 10% of its $1,400 value in a year. What is it worth then?

   D $1,260

   It keeps 90%: 0.9 × 1,400 = 1,260. The $140 is the loss.

5. A worker earning $2,000 a month gets a 5% raise. What is the new monthly pay?

   B $2,100

   Multiply by 1.05: 2,000 × 1.05 = 2,100. A 5% raise is 5% of 2,000, which is $100.

6. A runner goes 3/4 mile in 1/2 hour. What is her speed?

   B 1.5 miles per hour

   (3/4) ÷ (1/2) = 3/4 × 2 = 1.5 miles per hour.

7. A town grows from 800 to 1,000 people. What is the percent increase?

   B 25%

   The change is 200, and 200 ÷ 800 = 0.25, so 25%. Dividing by the new amount would give 20%.

8. Car A goes 150 miles in 3 hours. Car B goes 220 miles in 4 hours. How many miles per hour faster is Car B?

   D 5 miles per hour

   A: 150 ÷ 3 = 50 mph. B: 220 ÷ 4 = 55 mph. The difference is 5.

9. The graph of a proportional relationship passes through (4, 10). What is y when x = 10?

   A 25

   k = 10 ÷ 4 = 2.5, so y = 2.5 × 10 = 25. Adding 6 to both gives 16.

10. Yuki puts $800 in an account that pays 3.5% simple interest each year. What is her balance after 4 years?

    D $912

    Interest each year is 0.035 × 800 = 28, so 4 years is 112. The balance is 800 + 112 = 912.

THE FULL WORKBOOK

Keep going with the full Math workbook

You just tried one topic. The full Grade 7 workbook has every topic below, each with a Quick Check, a lesson, We Do It Together, up to 90 You Try questions, Show What You Know and a full answer key.

1. Proportional relationships 7.RP
2. Rational number operations 7.NS
3. Multi-step equations and inequalities 7.EE
4. Multi-step problems with rational numbers 7.EE.B.3
5. Scale drawings 7.G.A
6. Cross-sections of solids 7.G.A.3
7. Circles, angles, area and volume 7.G.B
8. Sampling and probability 7.SP
9. Comparing two groups 7.SP.B

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One step at a time.

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