

Illinois IAR Grade 7 Math Summer Workbook

Practice Pages, Quick Review & Weekly Reviews

Dr. A. Nazari

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SUMMER PRACTICE

Grade 7 Math Summer Review Workbook

Quick Review, Workbook Practice, Weekly Reviews, and Answers

This workbook keeps Grade 7 math fresh with short review lessons and plenty of practice. Each week builds from focused skills to a mixed Friday review, so students can remember, practice, and check their thinking.

- ✓ Read the Quick Review.
- ✎ Work through the practice problems.
- ✓ Use Friday for mixed review.
- 💡 Study the answer explanations after trying first.

A little math each week keeps skills strong.



How to Use This Workbook

Use one short lesson at a time, then check and learn from mistakes.

The Weekly Routine

- Monday-Thursday** *Read the Quick Review, then complete the workbook practice for one topic.*
- Friday** *Complete the weekly mixed review to bring the week's skills together.*
- After practice** *Check answers and read the explanations for any problem that felt tricky.*

For students

Try the problems before looking at the answer key. If you miss a problem, read the explanation, fix your work, and mark it as a problem to try again later.

For parents and teachers

The workbook pages are designed for steady practice. Use the Quick Review for a short reteach, and use the answer explanations as the teaching step after a mistake.

Best practice habit

Show your thinking. Grade 7 math gets easier when you write the operation, draw a quick model, label units, or explain how you know.

Goal

By the end of 8 weeks, students will have reviewed the major Grade 7 skills with workbook-style practice and mixed weekly review.

What's Inside?

An 8-week workbook plan for Grade 7 summer math practice.

Week 1	<i>Unit rates, constants of proportionality, graphs, percent problems, and proportions.</i>
Week 2	<i>Percent change, discounts, tips, commissions, simple interest, percent error, and integers.</i>
Week 3	<i>Integer operations, rational-number operations, decimal forms, and real-world rational problems.</i>
Week 4	<i>Expressions, equivalent forms, combining like terms, distribution, factoring, and two-step equations.</i>
Week 5	<i>Multi-step equations, inequalities, scale drawings, geometric drawings, and triangle conditions.</i>
Week 6	<i>Cross-sections, angle relationships, circles, composite area, surface area, and volume.</i>
Week 7	<i>Samples, inferences, comparing populations, theoretical probability, and experimental probability.</i>
Week 8	<i>Compound events, simulations, financial literacy, and final Grade 7 mixed review.</i>

Quick Reviews

Each topic begins with a compact review of the skill students need before starting the practice.

Weekly Reviews

Friday pages mix the week's skills so students can practice choosing the right method.

Workbook Practice

Practice sets include computation, word problems, tables, graphs, models, and short written reasoning.

Answers

The answer key includes explanations that show how to think through the problem, not just the final answer.

Read. Practice. Review. Correct. Grow.

My Summer Workbook Progress

Check off each lesson and write your Friday review score.

This workbook belongs to: _____

Week	Mon	Tue	Wed	Thu	Friday Review
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____ / ____

Reflection

One skill I improved this week: _____

One skill I want to practice again: _____

Keep going. Finished pages are proof of progress.



★ *Table of Contents* ★

Your 8-week summer review plan

★ Week 1	<i>Proportional Relationships and Percents</i>	1
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A little review each day keeps math fresh!



WEEK

1

Proportional Relationships and Percents

This Week's Days

Week 1 Day 2: Constant of Proportionality and Equations . **2**

Week 1 Day 4: Percent Problems and Proportions **5**



Day 2 Constant of Proportionality and Equations

SKILL SNAPSHOT

In a proportional relationship, the **constant of proportionality** is the number k in $y = kx$. It is also the unit rate.

- ✓ From a table, divide $y \div x$ and check that every row matches.
- ✓ From a graph, use a point on the line: $k = \frac{y}{x}$.
- ✓ From words, a phrase such as "\$8 per hour" often gives k directly.
- ✓ Once you know k , write the equation as $y = kx$.
- ✓ To find a missing value, substitute into the equation and multiply or divide.



Remember: The units of k matter because they tell what one unit of x produces.

Find the constant from tables and points.

- 1 Find k for the table.

x	3	6	11
y	12	24	44

- 2 Find k for the table.

x	2	5	8
y	7	17.5	28

- 3 A proportional relationship passes through (9, 63). Find k . _____

- 4 A proportional relationship passes through (12, 45). Find k . _____



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Write equations.

- 5 Use the table. Apples cost \$2.40 per pound. Write an equation for total cost y and pounds x . _____

Pounds x	Cost y
1	\$2.40

Minutes	Bottles
3	18

- 6 Use the table. Write an equation for bottles b after m minutes. _____

- 7 A dog walks 2.5 miles per hour. Write an equation for miles d after h hours. _____

- 8 A table has $y = 18$ when $x = 4$. If the relationship is proportional, write the equation. _____

Use equations to find missing values.

- 9 In $y = \frac{3}{4}x$, find y when $x = 28$.

- 11 In $c = 14h$, find h when $c = 98$.

- 10 In $y = 6.2x$, find y when $x = 5$.

- 12 In $p = 0.8n$, find n when $p = 40$.

Graphs, tables, and reasoning.

- 13 Use the graph to find k and write the equation.



- 14 Complete the table for $y = 1.5x$.

x	2	4	6	10
y	_____	_____	_____	_____

- 15 True or False: If $y = 9x$, then the constant of proportionality is 9.

True False



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- 16 Use the table. A tutoring service charges proportionally. What is the equation and the cost for 8 hours?

Hours	3	8
Cost	\$42	_____

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Day 4 Percent Problems and Proportions

SKILL SNAPSHOT

Percent means “per 100.” Every percent problem connects a part, a whole, and a percent.

- ✓ To find a part, multiply: $\text{part} = \text{percent} \times \text{whole}$.
- ✓ To find a whole, divide: $\text{whole} = \text{part} \div \text{percent}$.
- ✓ To find a percent, divide $\frac{\text{part}}{\text{whole}}$ and convert to a percent.
- ✓ The proportion method is $\frac{\text{part}}{\text{whole}} = \frac{p}{100}$.
- ✓ Convert percents to decimals before multiplying, such as $35\% = 0.35$.



Remember: Ask what is missing first: the part, the whole, or the percent.

Find the part.

- 1 What is 35% of 240? _____
- 2 What is 18% of 150? _____
- 3 Use the table. If 24% of the club volunteered, how many members volunteered? _____

Total members	Percent volunteered
125	24%

- 4 A store sold 65% of 80 water bottles. How many bottles were sold? _____

Find the whole or the percent.

- 5 45 is 60% of what number? _____
- 6 18 is what percent of 72? _____
- 7 32 students are 40% of the grade. How many students are in the grade? _____
- 8 In a survey, 28 out of 80 students chose art club. What percent chose art club? _____



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Use proportions and tables.

- 9 Solve with a proportion: what is 42% of 250?

$$\frac{x}{250} = \frac{42}{100}$$

- 10 Complete the percent table.

Whole	100	100	100
Percent	15	30	75
Decimal	_____	_____	_____

- 11 Use the table. What percent of the students chose soccer?

Sport	Students
Soccer	18
Basketball	12
Track	10

- 12 Which proportion can find 30% of 90?

A. $\frac{x}{30} = \frac{90}{100}$

B. $\frac{x}{90} = \frac{30}{100}$

C. $\frac{90}{x} = \frac{30}{100}$

D. $\frac{30}{90} = \frac{x}{100}$

Percent word problems.

- 13 Use the table. What percent of the questions were correct?

Correct	Total
27	30

- 14 Use the progress table. What percent of the goal did students collect?

Cans collected	Goal
420	500

- 15 True or False: 15% of 200 is the same as 30% of 100.

 True

 False

- 16 Use the table. A library has 72 mystery books, which is 16% of all books in a display. How many books are in the display?



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Part	Percent	Whole
72	16%	_____

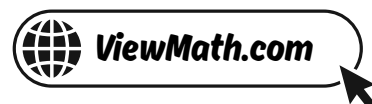
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WEEK

2

Percent Applications and Integers

This Week's Days

Week 2 Day 2: Percent Error 9



Day 2 Percent Error

SKILL SNAPSHOT

Percent error measures how far an estimate or measurement is from the actual value. The actual value goes in the denominator.

- ✓ Formula: percent error = $\frac{|\text{estimate} - \text{actual}|}{|\text{actual}|} \times 100\%$.
- ✓ The numerator is the absolute difference, so the error is never negative.
- ✓ The denominator is the actual value, not the estimate.
- ✓ Overestimates and underestimates can have the same percent error.
- ✓ Percent error is useful for measurements, predictions, and experiments.



Remember: Use units while subtracting, then report the final error as a percent.

Find percent error.

- 1 Use the table. Find the percent error.

Estimate	Actual
92 people	100 people

- 2 Use the table. What is the percent error?

Measured length	Actual length
48 cm	50 cm

- 3 A store predicted 600 visitors, but 750 visitors came. What is the percent error?

- 4 A scientist estimates a mass as 46 g, but the actual mass is 40 g. What is the percent error?

Use measurements and tables.

- 5 A measured distance is 12 m, but the actual distance is 12.5 m. Find the percent error.
- 6 Use the table. Compare the percent errors for Box A and Box B.



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Object	Estimate	Actual
Box A	54 g	60 g
Box B	88 g	80 g

- 7 Use the number line. The estimate was 36 and the actual value was 40. What is the percent error?



- 8 True or False: Percent error compares the error to the estimate.

 True

 False

Overestimates and underestimates.

- 9 An estimate is 72 and the actual value is 80. Is it an overestimate or underestimate? Find the percent error.
- _____

- 11 Which has a percent error of 25% when the actual value is 80?

A. 60 B. 65
C. 90 D. 100

- 10 An estimate is 126 and the actual value is 120. Is it an overestimate or underestimate? Find the percent error.
- _____

- 12 A weather forecast predicted 2 inches of rain, but 2.5 inches fell. Find the percent error. _____

Compare errors.

- 13 Student A measures 98°C for a true value of 100°C . Student B measures 103.5°C . Who has the lower percent error, and by how much?
- 14 A recipe should use 250 g of flour. One cook uses 240 g and another uses 265 g. Which measurement has the smaller percent error?



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WEEK

5

Equations, Inequalities, and Geometry Foundations

This Week's Days

*Week 5 Day -3: Distributive Property Equations and Multi-
Step Problems* **12**



Day -3 Distributive Property Equations and Multi-Step Problems
SKILL SNAPSHOT

Some equations need distribution or a careful real-world setup before you solve. Keep each algebra step balanced and check the solution in the original equation or story.

$$\begin{array}{c}
 \boxed{3(2n + 1) = 45} \xrightarrow{\text{distribute}} \boxed{6n + 3 = 45} \\
 \downarrow \text{subtract 3} \\
 \boxed{6n = 42} \xrightarrow{\text{divide by 6}} \boxed{n = 7}
 \end{array}$$

- ✓ Distribute to every term inside parentheses, including negative signs.
- ✓ Combine like terms before using inverse operations.
- ✓ Sometimes dividing first is cleaner, but distribution always works if you are careful.
- ✓ In word problems, define the variable and write what the total represents.
- ✓ Substitute your answer back into the original situation to check it.

Remember: Multi-step problems are easier when each operation has a reason. Write one clean equation before solving.

☰ Distribute, then solve.

- 1 Solve $3(x + 4) = 30$. _____
- 2 Solve $5(y - 2) = 35$. _____
- 3 Solve $-4(a + 3) = 20$. _____
- 4 Solve $2(3n - 5) = 28$. _____

☰ Combine like terms.

- 5 Solve $4x + 3x - 14 = 35$. _____
- 6 Solve $6(p - 1) + 2p = 26$. _____
- 7 Solve $9 - 2(q + 5) = 17$. _____
- 8 Solve $3(2r + 1) - r = 23$. _____

☰ Write equations from situations.

- 9 A rectangle has width w meters and length $w + 5$ meters. Its perimeter is 42 meters. Write and solve an equation for the width. _____
- 10 Four students split the cost of 6 notebooks after using a \$2 coupon. Each student pays \$7. What is the price of one notebook? _____



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- 11 A gym charges a \$12 sign-up fee plus \$8 per class. Maya paid \$76 total. How many classes did she take? _____

 **Use tables and choices.**

- 12 The table shows steps for solving an equation. What equation belongs in the blank row?

Step	Equation
Start	$2(4x - 3) = 34$
Distribute	_____
Add 6	$8x = 40$
Divide	$x = 5$

- 13 Which equation represents "three less than twice a number is 19"?

A. $3 - 2x = 19$

B. $2x - 3 = 19$

C. $3(x - 2) = 19$

D. $2(x - 3) = 19$

- 14 True or False: $2(x + 7) = 2x + 7$.

True

False

- 15 A student solves $5(m - 4) = 15$ by writing $5m - 4 = 15$. Explain the mistake and solve correctly.
- _____



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ANSWER KEY

Answer Key & Explanations

Use the answers to check your work, then read the explanations to learn the method.

✔ **How to review**

First compare your final answer. If it does not match, read the explanation slowly and redo the problem beside it. The goal is to understand the move that gets you from the question to the final answer.

📅 Week 1 Day 2: Constant of Proportionality and Equations

✓ Answers

1 $k = 4$

2 $k = 3.5$

3 $k = 7$

4 $k = 3.75$

5 $y = 2.40x$

6 $b = 6m$

7 $d = 2.5h$

8 $y = 4.5x$

9 21

10 31

11 7

12 50

13 $k = 2; y = 2x$

14 3, 6, 9, 15

15 True

16 $y = 14x; \$112$

💡 Explanations

1 Divide each y -value by its x -value. $\frac{12}{3} = 4$, $\frac{24}{6} = 4$, and $\frac{44}{11} = 4$, so the constant of proportionality is 4.

2 Use $k = \frac{y}{x}$. The ratios are $\frac{7}{2} = 3.5$, $\frac{17.5}{5} = 3.5$, and $\frac{28}{8} = 3.5$, so $k = 3.5$.

3 For a proportional relationship, $k = \frac{y}{x}$ for any nonzero point. Using $(9, 63)$ gives $k = \frac{63}{9} = 7$.

4 Divide the output by the input. $\frac{45}{12} = 3.75$, so the constant of proportionality is 3.75.

5 The phrase "per pound" gives the constant $k = 2.40$. Total cost equals the unit price times pounds, so $y = 2.40x$.

6 Find the bottles per minute: $18 \div 3 = 6$. The number of bottles is 6 times the number of minutes, so $b = 6m$.

7 The constant of proportionality is 2.5 miles per hour. Distance equals rate times time, so $d = 2.5h$.

8 First find the constant: $18 \div 4 = 4.5$. Then use the proportional form $y = kx$, which gives $y = 4.5x$.

9 Substitute 28 for x : $y = \frac{3}{4} \times 28$. Since $28 \div 4 = 7$ and $7 \times 3 = 21$, $y = 21$.

10 Substitute 5 into the equation. $y = 6.2 \times 5 = 31$, so the output is 31.

11 The equation means c is 14 times h . To work backward, divide 98 by 14, which gives $h = 7$.

12 The equation says $40 = 0.8n$. Divide by 0.8 to undo the multiplication: $40 \div 0.8 = 50$.



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- 13 Use the labeled point to find the constant: $k = \frac{10}{5} = 2$. The graph is proportional, so the equation is $y = 2x$.
- 14 Multiply every x -value by 1.5. The products are $1.5(2) = 3$, $1.5(4) = 6$, $1.5(6) = 9$, and $1.5(10) = 15$.
- 15 A proportional equation has the form $y = kx$. In $y = 9x$, the multiplier attached to x is 9, so $k = 9$.
- 16 The hourly rate is $42 \div 3 = 14$, so the equation is $y = 14x$. For 8 hours, $y = 14 \times 8 = \$112$.

📅 Week 1 Day 4: Percent Problems and Proportions

✓ Answers

- 1 84 2 27 3 30 members 4 52 bottles 5 75 6 25% 7 80 students
- 8 35% 9 105 10 0.15, 0.30, 0.75 11 45% 12 B 13 90% 14 84% 15 True
- 16 450 books

💡 Explanations

- 1 Convert 35% to 0.35, then multiply by the whole. $0.35 \times 240 = 84$, so the part is 84.
- 2 Use the decimal form $18\% = 0.18$. Then $0.18 \times 150 = 27$, so 18% of 150 is 27.
- 3 Convert 24% to 0.24 and multiply by the whole number of members. $0.24 \times 125 = 30$, so 30 members volunteered.
- 4 The whole is 80 bottles and the percent is $65\% = 0.65$. Multiply $0.65 \times 80 = 52$, so 52 bottles were sold.
- 5 The part is 45 and the whole is unknown. Divide by the percent as a decimal: $45 \div 0.60 = 75$.
- 6 Divide the part by the whole: $\frac{18}{72} = \frac{1}{4} = 0.25$. Convert 0.25 to 25%.
- 7 The whole is missing, so divide the part by the percent. $32 \div 0.40 = 80$, so the grade has 80 students.



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- 8 Divide the part by the whole: $\frac{28}{80} = 0.35$. As a percent, $0.35 = 35\%$.
- 9 Cross-multiply to get $100x = 250 \times 42 = 10,500$. Divide by 100 to get $x = 105$.
- 10 A percent is out of 100, so divide each percent by 100. That gives $15\% = 0.15$, $30\% = 0.30$, and $75\% = 0.75$.
- 11 First find the whole: $18 + 12 + 10 = 40$ students. Soccer is $\frac{18}{40} = 0.45$, which is 45%.
- 12 The part-over-whole setup is $\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{100}$. Since the whole is 90 and the percent is 30, the correct proportion is $\frac{x}{90} = \frac{30}{100}$.
- 13 Divide correct answers by total questions: $\frac{27}{30} = 0.9$. Convert 0.9 to 90%.
- 14 Compare the part collected to the whole goal. $\frac{420}{500} = 0.84$, so students collected 84% of the goal.
- 15 Compute both parts to compare them. $0.15 \times 200 = 30$ and $0.30 \times 100 = 30$, so the statement is true.
- 16 The whole is unknown, so divide the part by the decimal percent. $72 \div 0.16 = 450$, so the display has 450 books.

📅 Week 2 Day 2: Percent Error

✓ Answers

- 1 8% 2 4% 3 20% 4 15% 5 4% 6 They are equal; both are 10%
- 7 10% 8 False 9 Underestimate; 10% 10 Overestimate; 5% 11 A 12 20%
- 13 Student A by 1.5 percentage points 14 240 g

💡 Explanations

- 1 The difference is $|92 - 100| = 8$. Divide by the actual value: $\frac{8}{100} = 0.08 = 8\%$.
- 2 The measurement is 2 cm away from the actual length. $\frac{2}{50} = 0.04$, so the percent error is 4%.



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- 3 The difference is $|600 - 750| = 150$. Divide by the actual value: $\frac{150}{750} = 0.20 = 20\%$.
- 4 The difference is $|46 - 40| = 6$ g. Since the actual value is 40 g, $\frac{6}{40} = 0.15 = 15\%$.
- 5 The absolute error is $|12 - 12.5| = 0.5$ m. Divide by 12.5: $\frac{0.5}{12.5} = 0.04 = 4\%$.
- 6 Box A has error $\frac{|54-60|}{60} = \frac{6}{60} = 10\%$. Box B has error $\frac{|88-80|}{80} = \frac{8}{80} = 10\%$, so the percent errors are equal.
- 7 The number line shows an absolute error of 4. Divide by the actual value: $\frac{4}{40} = 0.10 = 10\%$.
- 8 Percent error compares the absolute error to the actual value. The estimate is used to find the difference, but the denominator is the actual value.
- 9 The estimate is below the actual value, so it is an underestimate. The error is 8, and $\frac{8}{80} = 0.10 = 10\%$.
- 10 The estimate is above the actual value, so it is an overestimate. The error is 6, and $\frac{6}{120} = 0.05 = 5\%$.
- 11 A 25% error of an actual value of 80 is $0.25 \times 80 = 20$. The estimate 60 is 20 away from 80, so choice A works.
- 12 The absolute error is $|2 - 2.5| = 0.5$ inch. Divide by the actual rainfall: $\frac{0.5}{2.5} = 0.20 = 20\%$.
- 13 Student A's error is $\frac{2}{100} = 2\%$, and Student B's error is $\frac{3.5}{100} = 3.5\%$. Student A is lower by $3.5\% - 2\% = 1.5$ percentage points.
- 14 The 240 g measurement is 10 g away, so its error is $\frac{10}{250} = 4\%$. The 265 g measurement is 15 g away, so its error is $\frac{15}{250} = 6\%$, making 240 g smaller.

📅 Week 5 Day -3: Distributive Property Equations and Multi-Step Problems

✓ Answers

1 $x = 6$

2 $y = 9$

3 $a = -8$

4 $n = \frac{19}{3}$

5 $x = 7$

6 $p = 4$

7 $q = -9$

8 $r = 4$

9 $2w + 2(w + 5) = 42; w = 8$ m

10 \$5

11 8 classes

12 $8x - 6 = 34$



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13 B

14 False

15 They did not distribute to -4 ; $m = 7$  Explanations

- 1 Distribute to get $3x + 12 = 30$, then subtract 12 from both sides. Divide 18 by 3 to get $x = 6$, and $3(6 + 4) = 30$ checks.
- 2 Distribute to get $5y - 10 = 35$. Add 10 and divide by 5, so $5y = 45$ and $y = 9$.
- 3 Divide both sides by -4 to get $a + 3 = -5$. Subtract 3 from both sides, giving $a = -8$.
- 4 Distribute first: $6n - 10 = 28$. Add 10 to get $6n = 38$, then divide by 6 to get $n = \frac{19}{3}$.
- 5 Combine like terms to make $7x - 14 = 35$. Add 14 to get $7x = 49$, so $x = 7$.
- 6 Distribute to get $6p - 6 + 2p = 26$, then combine to get $8p - 6 = 26$. Add 6 and divide by 8, so $p = 4$.
- 7 Distribute the -2 to get $9 - 2q - 10 = 17$, which simplifies to $-2q - 1 = 17$. Add 1 and divide by -2 , so $q = -9$.
- 8 Distribute to get $6r + 3 - r = 23$, then combine like terms to get $5r + 3 = 23$. Subtract 3 and divide by 5, so $r = 4$.
- 9 Perimeter adds two widths and two lengths, so $2w + 2(w + 5) = 42$. This simplifies to $4w + 10 = 42$, so $w = 8$ meters.
- 10 Let n be the notebook price and write $\frac{6n-2}{4} = 7$. Multiply by 4 to get $6n - 2 = 28$, so $6n = 30$ and $n = 5$.
- 11 The total cost is sign-up fee plus class cost, so $12 + 8c = 76$. Subtract 12 to get $8c = 64$, so $c = 8$ classes.
- 12 Distribute 2 to both terms inside the parentheses. That gives $2 \cdot 4x = 8x$ and $2 \cdot (-3) = -6$, so the equation is $8x - 6 = 34$.
- 13 Twice a number is $2x$, and three less than that means subtract 3. The equation is $2x - 3 = 19$, which is choice B.



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- 14 The 2 must multiply every term inside the parentheses. The correct distributed form is $2x + 14$, not $2x + 7$.
- 15 The 5 must multiply both m and -4 , so the equation becomes $5m - 20 = 15$. Add 20 and divide by 5 to get $m = 7$.

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THANK YOU

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The complete book includes:

- ✓ *All chapters and topics*
- ✓ *Hundreds of practice problems*
- ✓ *Complete answer key with explanations*
- ✓ *Colorful visuals and step-by-step examples*
- ✓ *Reference sheets and progress trackers*

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