Proportional Reasoning with Scale Models

Explore ideas and representations

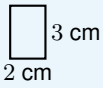
Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

A $1 : k$ scale model preserves every length ratio: actual length $= k$ times model length. At $1 : 20$, a 3 cm model wing represents 60 cm, and a 100 cm wing needs 5 cm. Compare lengths in the same units.

Worked example

A model has scale $1 : 10$. Its rectangular base is 2 cm by 3 cm. Find the actual dimensions in cm.



1. The scale means actual/model $= 10$.

2. $2 \times 10 = 20$ cm and $3 \times 10 = 30$ cm are the actual sides.

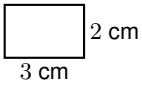
3. Working backward: $20 \div 10 = 2$ cm and $30 \div 10 = 3$ cm.

Answer: 20 cm by 30 cm.

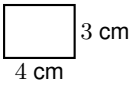
Practice Problems

Show your thinking.

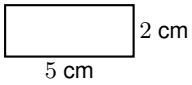
1. A model has scale $1 : 12$. Its rectangular base is 3 cm by 2 cm. Find the actual dimensions in cm.



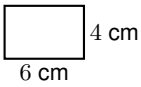
2. A model has scale $1 : 20$. Its rectangular base is 4 cm by 3 cm. Find the actual dimensions in cm. Complete the actual/model ratio for the long side and explain its direction.



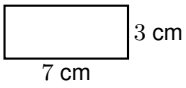
3. A model has scale $1 : 15$. Its rectangular base is 5 cm by 2 cm. Find the actual dimensions in cm. Find the actual area of the base and the model area, checking the area scale.



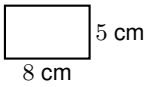
4. A model has scale $1 : 10$. Its rectangular base is 6 cm by 4 cm. Find the actual dimensions in cm. A second model uses $1 : 20$. Find its dimensions for the same actual object.



5. A model has scale $1 : 8$. Its rectangular base is 7 cm by 3 cm. Find the actual dimensions in cm. A proposed second model has sides 14 cm and 5 cm. Are both sides at one common scale?



6. A model has scale $1 : 5$. Its rectangular base is 8 cm by 5 cm. Find the actual dimensions in cm. Find total base area for three such models.



Answer Key

1. 36 cm by 24 cm.
2. 80 cm by 60 cm. Actual/model $= 80/4 = 20$.
3. 75 cm by 30 cm. Model 10 cm^2, actual 2250 cm^2; factor 225.
4. 60 cm by 40 cm. Second model 3 cm by 2 cm.
5. 56 cm by 24 cm. No: $56/14 = 4$ but $24/5 = 4.8$.
6. 40 cm by 25 cm. $3(8)(5) = 120$ cm^2.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The scale means actual/model $= 12$.
2. $3 \times 12 = 36$ cm and $2 \times 12 = 24$ cm are the actual sides.
3. Working backward: $36 \div 12 = 3$ cm and $24 \div 12 = 2$ cm.

Problem 2

1. The scale means actual/model $= 20$.
2. $4 \times 20 = 80$ cm and $3 \times 20 = 60$ cm are the actual sides.
3. Working backward: $80 \div 20 = 4$ cm and $60 \div 20 = 3$ cm.
4. $80/4 = 20$, so actual lengths are 20 times model lengths.

Problem 3

1. The scale means actual/model $= 15$.
2. $5 \times 15 = 75$ cm and $2 \times 15 = 30$ cm are the actual sides.
3. Working backward: $75 \div 15 = 5$ cm and $30 \div 15 = 2$ cm.
4. Model $5(2) = 10$ cm^2; actual $75(30) = 2250$ cm^2, ratio $225 = 15^2$.

Problem 4

1. The scale means actual/model $= 10$.
2. $6 \times 10 = 60$ cm and $4 \times 10 = 40$ cm are the actual sides.
3. Working backward: $60 \div 10 = 6$ cm and $40 \div 10 = 4$ cm.
4. Same actual object is 60 by 40 cm; divide by 20 to get 3 by 2 cm.

Problem 5

1. The scale means actual/model $= 8$.
2. $7 \times 8 = 56$ cm and $3 \times 8 = 24$ cm are the actual sides.
3. Working backward: $56 \div 8 = 7$ cm and $24 \div 8 = 3$ cm.
4. Compare actual/model ratios $56/14 = 4$ and $24/5 = 4.8$; these differ.

Problem 6

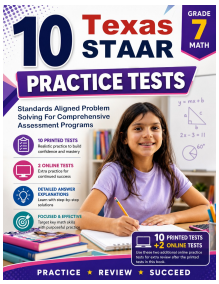
1. The scale means actual/model $= 5$.
2. $8 \times 5 = 40$ cm and $5 \times 5 = 25$ cm are the actual sides.
3. Working backward: $40 \div 5 = 8$ cm and $25 \div 5 = 5$ cm.
4. One base area is $8(5) = 40$ cm^2; three need $3(40) = 120$ cm^2.

TESTINAR

Keep Building Grade 7 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 7 books



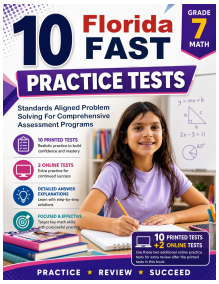
TEXAS STAAR

10 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook



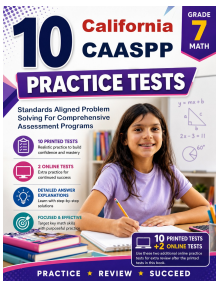
FLORIDA FAST

10 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook



CALIFORNIA CAASPP

10 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 7 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/7