Drawing Geometric Figures with Given Conditions

Apply the skill to decisions and designs

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

QUICK REVIEW

Use grid units rather than measuring the printed page. Check every condition: side lengths, right angles, parallel sides, and area. A rectangle with vertices $(0,0), (3,0), (3,2), (0,2)$ has side lengths $3, 2$, perimeter 10, and area 6 square units.

Worked example

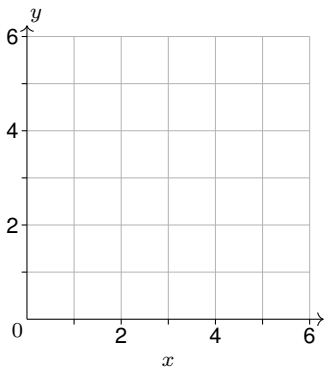
Can a 3 by 2 rectangle meet perimeter 10 and area 6?

1. Perimeter $= 2(3+2) = 10$.
2. Area $= 3(2) = 6$.
3. Horizontal and vertical grid edges make four right angles, so all conditions hold.
Answer: Yes.

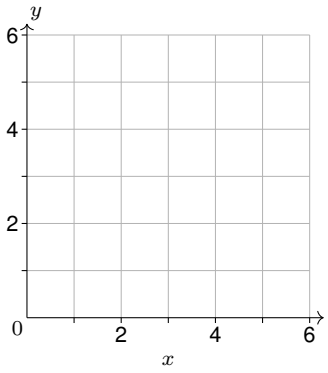
Practice Problems

Show your thinking.

1. Design a rectangular sign of area 8 square grid units and perimeter 12 grid units. Draw one possible design from the origin.



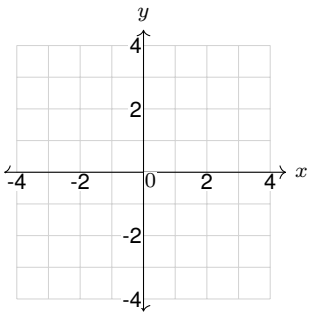
2. A right-triangle pennant must have area 6 square units and one leg of 2 units. Find the other leg. Draw it with legs on the axes.



3. A slanted parallelogram has base 3 and height 2. A design shifts the top edge one unit right. Explain why this shift does not change the area.

4. A square tile must have area 9 square grid units. Find a whole-number side length and verify its perimeter.

5. Design a symmetric triangular flag with base 4 and height 3 grid units centered on the y-axis. Draw it and verify the area.



6. A trapezoid garden has bases 4 and 2 and height 2 grid units. A second design makes the height twice as long. Find and compare their areas.

Answer Key

1. One rectangle: $(0,0), (4,0), (4,2), (0,2)$; area 8, perimeter 12.
2. Other leg 6 units. One sketch uses $(0,0), (2,0), (0,6)$.
3. Area remains 6 square units.
4. Side 3 units; area 9 square units; perimeter 12 units.
5. $(-2,0), (2,0), (0,3)$; base 4, height 3, area 6.
6. Areas 6 and 12 square units; the second area is twice the first.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Integer factor pairs for area 8 are $(1,8)$ and $(2,4)$. Only $2+4=6$ is half the required perimeter.

2. Horizontal edges span $4-0=4$ units; vertical edges span $2-0=2$ units.

3. The perimeter is $2(4+2)=12$ units and the area is $4(2)=8$ square units.

4. Horizontal and vertical sides meet at right angles; the listed vertices satisfy all conditions.

Problem 2

1. Twice the area is $2(6)=12$. Divide by the known leg: $12/2=6$ units.

2. Plot $(0,0), (2,0), (0,6)$ and join them; the axes meet at a right angle.

3. Check: $(1/2)(2)(6)=6$ square units.

Problem 3

1. A horizontal shift preserves the 3-unit base length.

2. Moving the top edge right does not change its vertical distance of 2 units from the bottom edge.

3. Area still equals base times height: $3(2)=6$ square units.

Problem 4

1. Area equals side times side. The positive whole number whose square is 9 is 3.

2. Area $=3^2=9$ square units.

3. Four equal sides give perimeter $4(3)=12$ units.

Problem 5

1. Base length $=2-(-2)=4$ units.

2. The base midpoint is $(0,0)$, so the symmetric apex has $x=0$. Its height above the base is $3-0=3$ units.

3. Area $=(1/2)(4)(3)=6$ square units.

Problem 6

1. Half the sum of the parallel bases is $(4+2)/2=3$ units.

2. First area $=3(2)=6$ square units; new height $=2(2)=4$ units.

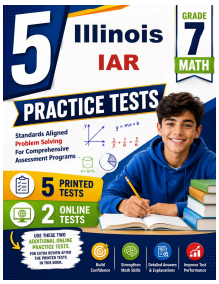
3. Second area $=3(4)=12$ square units, exactly 2 times as large.

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



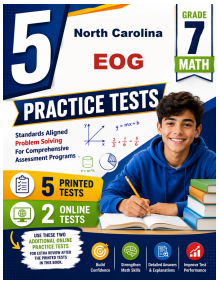
ILLINOIS IAR

5 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook



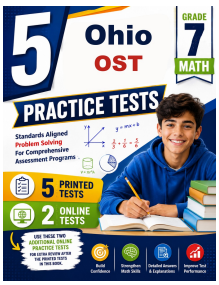
NORTH CAROLINA EOG

5 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook



OHIO OST

5 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 5 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