Composite Figures: Area and Perimeter

Applications and design

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

Partition a composite region into nonoverlapping rectangles, triangles, or circles, or subtract a completely specified cutout. Use $A = lw$, $A = \frac{1}{2}bh$, and $A = \pi r^2$. Perimeter follows exposed boundary only: shared edges are not exterior. A semicircle has curved length πr and area $\frac{1}{2}\pi r^2$; its diameter counts only when exposed. Keep length units separate from square units.

Worked example

An 8 by 6 rectangle has a 3 by 2 rectangular corner removed. The cutout sides follow the rectangle sides. Find area and perimeter.

1. The area is the outer rectangle minus the corner: $8(6) - 3(2) = 48 - 6 = 42$.

2. The exposed lengths are $8, 6-2, 3, 2, 8-3, 6$, totaling $8+4+3+2+5+6 = 28$.

3. The corner removal replaces exterior lengths $3+2$ with equal inner lengths $3+2$, so perimeter stays $2(8+6) = 28$.

Answer: 42 square units; 28 units.

Practice Problems

Show your thinking.

1. A 12 by 9 m patio has a 4 by 3 m rectangular corner reserved for plants. Find paving area.

2. A garden combines 8 by 5 m and 4 by 3 m rectangles outside each other along one 3 m edge. Find fencing for the outer boundary.

3. A window is a 6 by 4 m rectangle topped by a semicircle of diameter 6 m sharing its full top. Find glass area to the nearest tenth.

4. A racetrack has two straight sides of 40 m and two semicircular ends of radius 10 m. Find one lap to the nearest tenth.

5. A 10 by 8 m floor has a centered rectangular opening 4 by 2 m. Flooring costs $\$15$ per square meter. Find material cost.

6. Design an L-shaped garden from a 10 by 8 m rectangle by removing a 3 by h m corner. Required area is 62 m^2. Find h.

7. A triangular roof of base 10 m and height 4 m sits above a 10 by 6 m rectangular wall in a flat facade. Find total facade area.

8. A circular fountain of radius 2 m lies inside a 9 by 7 m courtyard. Find remaining paving area to the nearest tenth.

9. A 12 by 8 m playground has a middle notch with mouth 4 m and depth 3 m cut inward from a 12 m side. Find new fence length and area.

10. A square border has outer side 8 m and inner square opening side 6 m. Each bag covers 3 m^2. How many whole bags cover the border?

Answer Key

1. 96 m^2
2. 34 m
3. 38.1 m^2
4. 142.8 m
5. $\$1080$
6. $h = 6$ m
7. 80 m^2
8. 50.4 m^2
9. 46 m; 84 m^2.
10. 10 bags

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The outer patio rectangle has area $12(9) = 108$ m^2.

2. The planted corner occupies $4(3) = 12$ m^2, leaving $108 - 12 = 96$ m^2.

3. The check $96 + 12 = 108$ m^2 reconstructs the full patio. Only 96 m^2 receives paving; the reserved corner is excluded.

Problem 2

1. The separate perimeters total $2(8 + 5) + 2(4 + 3) = 26 + 14 = 40$ m.

2. The shared edge is internal and counted twice, so remove $2(3) = 6$ m.

3. The outer fence length is $40 - 6 = 34$ m, with no fence along the shared join between the two garden sections.

Problem 3

1. The rectangle area is $6(4) = 24$ m^2, and the semicircle radius is $6/2 = 3$ m.

2. Total glass area is $24 + \frac{1}{2}\pi(3)^2 = 24 + 4.5\pi \approx 38.137$ m^2.

3. Round the final area to 38.1 m^2. The shared diameter is not a gap and has no area to subtract.

Problem 4

1. The straight portions total $40 + 40 = 80$ m.

2. The two semicircular arcs equal one full circumference: $2\pi(10) = 20\pi$ m, giving $80 + 20\pi \approx 142.832$.

3. One lap is 142.8 m to the nearest tenth. The end diameters are not traveled and are excluded from the boundary length.

Problem 5

1. The floor material area is $10(8) - 4(2) = 80 - 8 = 72$ m^2.

2. The cost is $72(15) = 1080$ dollars.

3. The uncut floor would cost $80(15) = 1200$ dollars; removing $8(15) = 120$ gives the same $1200 - 120 = 1080$. No waste allowance is specified.

Problem 6

1. The original area is $10(8) = 80$ m^2, so the corner must remove $80 - 62 = 18$ m^2.

2. The cutout equation is $3h = 18$, giving $h = 6$ m.

3. The design check $80 - 3(6) = 62$ works, and $6 < 8$ ensures the cut does not remove the full rectangle height.

Problem 7

1. The rectangular wall area is $10(6) = 60$ m^2.

2. The triangular part adds $\frac{1}{2}(10)(4) = 20$ m^2, giving $60 + 20 = 80$ m^2.

3. The shapes meet along their common 10 m edge without interior overlap. This is flat facade area, not the surface area of a three-dimensional roof.

Problem 8

1. The courtyard area is $9(7) = 63$ m^2; the fountain area is $\pi(2)^2 = 4\pi$.

2. The paving area is $63 - 4\pi \approx 50.4336$ m^2.

3. Round to 50.4 m^2. The fountain is wholly inside, so its full circular area is excluded from the paving.

Problem 9

1. The original perimeter is $2(12 + 8) = 40$ m. The notch changes it to $40 - 4 + (3 + 4 + 3) = 46$ m.

2. The area is $12(8) - 4(3) = 96 - 12 = 84$ m^2.

3. The notch increases fence length by 6 m while reducing area by 12 m^2; these are different measurements with different units.

Problem 10

1. The border area is $8^2 - 6^2 = 64 - 36 = 28$ m^2.

2. The exact bag requirement is $28/3 = 9\frac{1}{3}$, so round upward to 10 whole bags.

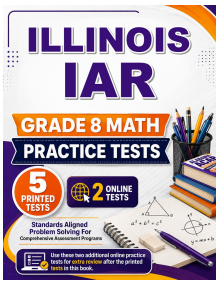
3. Ten bags cover 30 m^2, while nine cover only 27 m^2. Whole-bag rounding is upward, not to the nearest integer.

TESTINAR

Keep Building Grade 8 Math Skills

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

All Grade 8 books



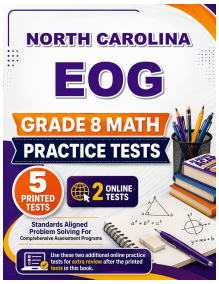
ILLINOIS IAR

5 Full-Length Math Practice Tests

Build Grade 8 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook



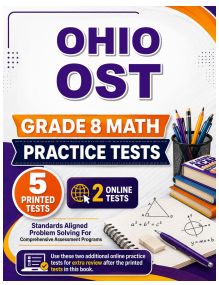
NORTH CAROLINA EOG

5 Full-Length Math Practice Tests

Build Grade 8 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 8 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 8 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/8