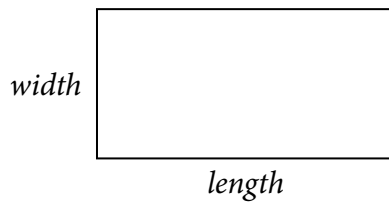# Placement Test for Principles of Mathematics Book 2
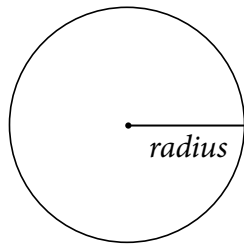
■ Do not use a calculator.

■ Unless instructed otherwise, give all fractional answers in simplest terms. This includes converting improper fractions to mixed numbers.

■ Unless instructed otherwise, round all decimal answers to the nearest hundredth.
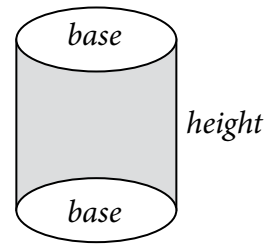
■ You will need these formulas on the test:

Area of rectangle = length • width
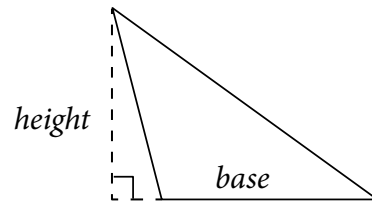
$$Area\ of\ triangle = \frac{1}{2} \cdot base \cdot height$$

Area of circle = π • radius • radius

Volume of cylinder = area of base • height

1. **Skill Check**

   a. 10.5(3.12 – 0.56)

   b. $\dfrac{2}{5} \div \dfrac{3}{4}$

   c. $|-15|$

   d. $-4 \cdot -2$

   e. $5\dfrac{1}{6} \cdot \dfrac{2}{3}$

   f. $4\dfrac{2}{7} + 3\dfrac{2}{5}$

   g. Show how this problem can be solved using the distributive property: 3(2 + 6)

h. 56.58 ÷ 2.5

j. 256.56 + 23.50

k. −9 + −3

l. Simplify: 5^2

m. Round 4.561 to the nearest tenth.

n. Round 3.789 to the nearest hundredth.

o. There are 30.48 centimeters per foot; convert 145 feet to centimeters.

p. There are 2.54 cm per inch; convert 12 in^2 to cm^2.

q. There are 2.54 cm per inch and 12 inches per foot; convert 14 cm to feet.

2. **More with Fractions and Factoring**

   a. Simplify: $\dfrac{70 \text{ ft}}{115 \text{ ft}}$

   b. List the prime factors of 20 and the prime factors of 44.

c. What is the greatest common factor of 20 and 44?

d. Rewrite as an improper fraction (do not simplify): $16 \div 5$

e. Rewrite $\dfrac{15}{6}$ as a decimal.

3. **Geometry and Problem Solving**

   a. What is the volume of an inflatable circular pool that has a radius of 3 feet and is 48 inches tall? There are 12 inches in 1 foot.

   b. What is the approximate cost of sodding the yard shown if sod costs approximately $0.15 a square foot to install?
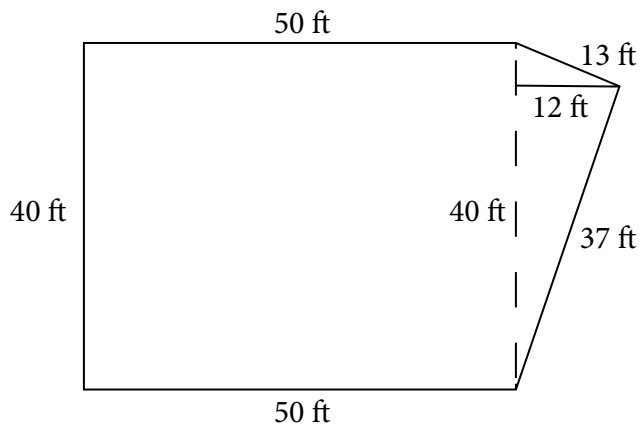
   c. What would be the approximate cost of putting a fence around the yard shown in 3b if a fence costs approximately $15.40 per foot, plus 6% tax, plus a $500 installation fee that is not taxed?

4. **More Problem-Solving** — If you earn $7,800 a year, how much do you make per hour if you work three 5-hour days per week and there are 52 weeks in a year?

Grading

This test is designed to help determine if a student is ready to begin Book 2 of *Principles of Mathematics* or if they need to start in Book 1. You may explain the instructions and terms on the test as needed—the point is to see if students have the skills to solve the problems.

If students get problems wrong on the placement test, check to see if they made a careless error, didn't understand the instructions, or if they truly didn't understand a concept. It's okay if students make a few errors, but it's important that students understand these concepts before beginning Book 2, as they are only very briefly reviewed in Book 2:

- basic math skills (including rounding and working with decimals),
- fractions,
- unit conversion,
- negative numbers,
- geometry formulas (finding perimeter, area, and volume),
- exponents, and
- problem-solving skills.

Please also keep in mind that this test only tests for skills needed to learn those covered in Book 2; it does not test for other important skills covered in Book 1, such as these:

- Mental math
- Identifying shapes
- Surface area
- Units of measure (capacity, weight, distance, etc.)
- Measuring and drawing angles

If you feel your student could use a deeper understanding of arithmetic (place value, basic operations, decimals, fractions, etc.), the basics of geometry, or problem-solving skills, we recommend starting with Book 1 even if your student can pass this placement test. Those concepts are stressed in Book 1, while Book 2 focuses more on prealgebra concepts.

Answers

1. a. $10.5(2.56) = 26.88$

   b. $\frac{2}{5} \cdot \frac{4}{3} = \frac{8}{15}$

   c. 15

   d. 8

   e. $\frac{31}{6} \cdot \frac{2}{3} = \frac{62}{18} = 3\frac{4}{9}$

   f. $4\frac{10}{35} + 3\frac{14}{35} = 7\frac{24}{35}$

   g. $3(2 + 6) = 3(2) + 3(6) = 6 + 18 = 24$

   h. 22.63

j. 280.06

k. −12

l. 25

m. 4.6

n. 3.79

o. $145 \ \cancel{ft} \bullet \frac{30.48 \ cm}{1 \ \cancel{ft}} = 4{,}419.6 \ cm$

p. $12 \ \cancel{in^2} \bullet \frac{2.54 \ cm}{1 \ \cancel{in}} \bullet \frac{2.54 \ cm}{1 \ \cancel{in}} = 77.42 \ cm^2$

q. $14 \ \cancel{cm} \bullet \frac{1 \ \cancel{in}}{2.54 \ \cancel{cm}} \bullet \frac{1 \ ft}{12 \ \cancel{in}} = 0.46 \ ft$

2. a. $\frac{14}{23}$

   b. $20 = 2 \bullet 2 \bullet 5$

   $44 = 2 \bullet 2 \bullet 11$

   c. 4

   d. $\frac{16}{5}$

   e. $15 \div 6 = 2.5$

3. a. *Area* = 3.14 • 3 ft • 3 ft = 28.26 ft²

   Converting height to feet:

   $48 \ \cancel{in} \bullet \frac{1 \ ft}{12 \ \cancel{in}} = 4 \ ft$

   Volume = 28.26 ft² • 4 ft = 113.04 ft²

   b. *Area of rectangular portion* = 50 ft • 40 ft = 2,000 ft²

   Area of triangular portion = $\frac{1}{2}$ • 40 ft • 12 ft = 240 ft²

   total area = 2,000 ft² + 240 ft² = 2,240 ft²

   cost = $0.15 • 2,240 = $336

   c. *Perimeter* = 40 ft + 50 ft + 37 ft + 13 ft + 50 ft = 190 ft

   fence cost = ($15.40 • 190 • 1.06) + $500 = $3,601.56

4. *earnings per week* = $\frac{\$7{,}800}{52 \ weeks}$ = $150

   earnings per day = $\frac{\$150}{3}$ = $50

   earnings per hour = $\frac{\$50}{5}$ = $10