

Below is a diagnostic test to determine if students are ready for Art of Problem Solving's **Math 6: Prealgebra (Part 1)** course. We suggest using the following process to assess whether or not your student is ready for the course:

Step 1: The student should attempt all of the questions below without a calculator and without any help. There is no time limit.

Step 2: Check the student's responses using the answer key at the end of this document.

Step 3: The student should be given a second chance on the problems that they answered incorrectly (except for problems 4(a)-4(d)).

A student who is ready for **Math 6: Prealgebra (Part 1)** should be able to answer **at least 23 of the 28** problems below correctly (after the second chance).

### Multi-digit multiplication and division

1. Compute:

(a)  $305 \times 12$

(c)  $996 \div 12$

(b)  $51 \times 319$

(d)  $22294 \div 71$

### Basic arithmetic with negative numbers

2. Compute:

(a)  $-2 + 6 + (-5)$

(d)  $(-7) \times 11$

(b)  $19 - (-13)$

(e)  $(-5) \times (-8)$

(c)  $-23 + (-61)$

(f)  $48 \div (-6)$

### Addition and subtraction of fractions with the same denominator

3. Compute:

(a)  $\frac{2}{7} + \frac{3}{7}$

(c)  $\frac{7}{9} - \frac{2}{9}$

(b)  $\frac{3}{8} + \frac{5}{8}$

(d)  $\frac{3}{5} - \frac{2}{5}$

### Basic fraction comparison

4. In each pair below, identify the greater number.

(a)  $\frac{4}{5}, \frac{3}{5}$

(b)  $\frac{2}{7}, \frac{2}{9}$

(c)  $1, \frac{9}{8}$

(d)  $\frac{1}{6}, \frac{2}{3}$

**Basic decimal arithmetic**

5. Compute:

(a)  $15.8 + 2.371$

(b)  $63.42 - 34.17$

(c)  $5.6 \times 0.4$

(d)  $7.38 \div 2$

**Fill in the blank**

6.  $\frac{\square}{30} = \frac{11}{6}$

7.  $3 \times \square - 6 = 15$

**Word problems**

8. Every large pack of gum has 8 pieces and every small pack of gum has 3 pieces. Mary has 7 small packs and 4 large packs. How many pieces of gum does Mary have altogether?
9. Jason has 17 pencils and Shannon has 43 pencils. How many pencils must Shannon give Jason in order for them to have the same number of pencils?
10. Ravi's age is double Ranu's age. The product of their ages in years is 72. How old is Ranu?
11. Billy brought a large box of chocolates to school. In his first class, he gave half of the chocolates in the box to his teacher. In his second class, he gave half of his remaining chocolates to his best friend. At lunch, he ate half of his remaining chocolates. If he had 3 pieces of chocolate left at the end of lunch, then how many pieces were in the box when Billy arrived at school?

**Don't look at the next page until you've attempted all the problems!**

The answers to Are You Ready are below.

1. (a) 3,660; (b) 16,269; (c) 83; (d) 314
2. (a)  $-1$ ; (b) 32; (c)  $-84$ ; (d)  $-77$ ; (e) 40; (f)  $-8$
3. (a)  $\frac{5}{7}$ ; (b) 1; (c)  $\frac{5}{9}$ ; (d)  $\frac{1}{5}$
4. (a)  $\frac{4}{5}$ ; (b)  $\frac{2}{7}$ ; (c)  $\frac{9}{8}$ ; (d)  $\frac{2}{3}$
5. (a) 18.171; (b) 29.25; (c) 2.24; (d) 3.69
6. 55
7. 7
8. 53
9. 13
10. 6
11. 24