

# BootMath Test

Try to solve the following exercises using *only pen and paper*. Do *not* use a computer or a calculator.

1. Put the following fractions in their simplest form:

(a)  $\frac{10}{25}$

(d)  $\frac{50}{15}$

(g)  $\frac{16}{40}$

(b)  $\frac{3}{9}$

(e)  $\frac{45}{9}$

(c)  $\frac{30}{25}$

(f)  $\frac{33}{25}$

(h)  $\frac{23}{46}$

2. Reduce as much as possible.

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

(f)  $\frac{7}{3} \cdot \frac{3}{7}$

(b)  $\frac{3}{2} + \frac{5}{3} + \frac{2}{6}$

(g)  $\frac{\left(\frac{3}{4}\right)}{\left(\frac{5}{4}\right)}$

(c)  $\frac{3}{4} - \frac{5}{4}$

(h)  $\frac{\left(\frac{7}{3}\right)}{\left(\frac{3}{7}\right)}$

(d)  $\frac{7}{3} - \frac{3}{7}$

(e)  $\frac{3}{4} \cdot \frac{5}{4}$

3. For each statement below, state if it is true or false:

(a)  $\frac{16}{20} = \frac{8}{10}$

(d)  $\frac{15}{16} \leq \frac{3}{4}$

(b)  $\frac{33}{110} = \frac{3}{10}$

(c)  $\frac{36}{16} = \frac{34}{14}$

(e)  $\frac{8}{14} \leq \frac{7}{9}$

4. Solve for  $x$  in the following equations:

(a)  $\frac{3}{5}x = \frac{23}{7}$

(d)  $\frac{-2}{13}x = 3x - 1$

(b)  $\frac{3}{5}x + \frac{8}{9} = \frac{7}{11}$

(e)  $\frac{4(1-3x)}{7} = \frac{2}{3}x - 1$

(c)  $2x - \frac{3}{7} = \frac{x}{5} + 1$

(f)  $\frac{2-x}{3} = \frac{7}{8}x$

5. Solve for  $x$  and  $y$  in the following equations:

(a)  $y = 2x$   
 $x + 2 = 3$

(c)  $2y + 4 = 2x$   
 $2x + 2y = 4$

(b)  $4x - 2 = y$   
 $\frac{4x + 3y}{2} = 5$

(d)  $2y + 4 = x - 1$   
 $\frac{2y}{x} - \frac{1}{3} = -1$

6. Solve for  $x$ . There can be one, two or zero solutions.

(a)  $x^2 + 4x - 5 = 0$

(c)  $x^2 = x + 6$

(b)  $2x^2 - x - 1 = 0$

(d)  $x^2 - 7x + 12 = 0$

7. Solve for  $x$ . Find all possible values for  $x$ .

(a)  $|x| = 5$

(d)  $|4x - 5| = 6$

(b)  $|x - 3| = 4$

(e)  $2x + 3 \leq x$

(c)  $|3x + 1| = 2$

(f)  $4(x - 1) < -3(x + 1)$

8. Express each of the following in the form  $2^m 3^n a^r b^s$ , where  $m, n, r$ , and  $s$  are integers:

(a)  $8a^2b^3(27a^4)(2^5ab)$

(d)  $\frac{(3^2ab)^2(18a^3b)}{27ab^3}$

(b)  $3^2(2ab)^3(16a^2b^5)(24b^2a)$

(c)  $(3^2ab)^2(18a^3b)(16ab^3)$

(e)  $\frac{18a^3b}{(3^2ab)^2(16b^3)}$

9. Use the properties of logarithms to evaluate the following expressions:

(a)  $\log_2 8$

(d)  $3^{\log_3 6}$

(b)  $\log_2 \frac{1}{2}$

(e)  $\log_3 \left(\frac{1}{9}\right) - 3 \log_3 3$

(c)  $\log_{\frac{1}{2}} 2$

(f)  $7^{\frac{\log_4 11}{\log_4 7}}$