

# Bonus Algebra Activities

reprinted from the Quebec Association of Mathematics Teachers journal.

1. How would you use parentheses to make these equations true?

$$72 \div 2 \times 4 \div 4 + 5 = 1$$

$$72 \div 2 \times 4 \div 4 + 5 = 16$$

$$72 \div 2 \times 4 \div 4 + 5 = 41$$

$$72 \div 2 \times 4 \div 4 + 5 = 10 \frac{2}{3}$$

$$72 \div 2 \times 4 \div 4 + 5 = 6$$

2. What value does the following expression approach as  $x \rightarrow \infty$ ?

$$\log_3 (6x-5) - \log_3 (2x+1)$$

3. If  $f(x) = \frac{x+1}{x-1}$ , evaluate  $f\left(\frac{f(f(x))+1}{f(f(x))-1}\right)$

4. Consider the following method for evaluating

$$\sqrt{20 + \sqrt{20 + \sqrt{20 + \sqrt{20 + \dots}}}}$$

let  $x =$

$$\sqrt{20 + \sqrt{20 + \sqrt{20 + \sqrt{20 + \dots}}}}$$

then  $x = \sqrt{20 + x}$

$$x^2 = 20 + x$$

$$x^2 - x - 20 = 0$$

$$(x-5)(x+4) = 0$$

$$x = 5 \text{ or } -4, \text{ but } x \neq -4 \therefore x = 5.$$

Now you try a similar method for

a)  $1 + \frac{2}{1 + \frac{2}{1 + \frac{2}{\dots}}}$

- b) and to evaluate  $x$  given:

$$x = \sqrt{x + \sqrt{x + \sqrt{x + \dots}}} = 2 \text{ and } x > 0$$

- ANSWERS:** 2.) Expression  $\rightarrow \log_3 3 = 1$   
 3.)  $x$   
 4.) a) 2      b)  $x = \sqrt{2}$

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