

1. NCTM

If the binary operation  $\Delta$  is defined as

$$a\Delta b = a^2 + 2ab + b^2, \text{ evaluate } 37\Delta 63.$$

2. NCTM Jan/Feb 2018 #10

Define the operation  $@$  as follows:

$$a@b = (2a - b)^2 \text{ for any real numbers } a \text{ and } b.$$

Find the value or values of  $b$  such that

$$2@(4@b) = 25.$$

3. NCTM Nov 2015 #25

The product

$$\sqrt[5]{8} \cdot \sqrt[3]{16}$$

can be expressed as  $2^n$ . What is the value of  $n$ ?

4. NCTM Nov 2015 #30

Write the following numerical expressions in order, from smallest to largest, without using a calculator:

$$-64^{-\frac{1}{2}}, \quad 64^{-\frac{2}{3}}, \quad -64^{\frac{2}{3}}, \quad -64^{-\frac{2}{3}}, \quad 64^{-\frac{1}{2}}, \quad 64^{\frac{1}{2}}$$

5. NCTM Dec/Jan 2014/15 #4

Simplify:

$$81^{7/4} - \sqrt{3^{13} + 3 \cdot 9^6 + 3 \cdot 27^4}$$