

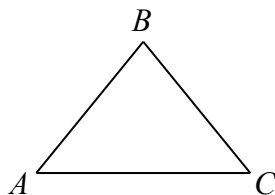
0 (a). Evaluate  $\frac{9 + 2 \times 3}{3}$ .

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0 (b). Let  $t$  be TNYWR.  
What is the area of a triangle with base  $2t$  and height  $3t - 1$ ?

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0 (c). Let  $t$  be TNYWR.  
In the diagram,  $\triangle ABC$  is isosceles with  $AB = BC$ . If  $\angle BAC = t^\circ$ , what is the measure of  $\angle ABC$ , in degrees?

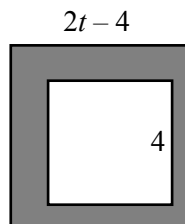


1 (a). If  $w$  is a positive integer with  $w^2 - 5w = 0$ , what is the value of  $w$ ?

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1 (b). Let  $t$  be TNYWR.

In the diagram, the larger square has side length  $2t - 4$  and the smaller square has side length 4. What is the area of the shaded region?



1 (c). Let  $t$  be TNYWR.

Consider the three-digit positive integers of the form  $xy0$ , where  $x$  and  $y$  are digits with  $x \neq 0$ . How many of these integers are divisible by both 11 and  $t$ ?

2 (a). When the integer  $300^8$  is written out, it has  $d$  digits. What is the value of  $d$ ?

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2 (b). Let  $t$  be TNYWR.

The area of the triangle formed by the line  $\sqrt{k}x + 4y = 10$ , the  $x$ -axis and the  $y$ -axis is  $t$ .  
What is the value of  $k$ ?

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2 (c). Let  $t$  be TNYWR.

Justin measures the heights of three different trees: a maple, a pine and a spruce. The maple tree is 1 m taller than the pine tree and the pine tree is 4 m shorter than the spruce tree. If the ratio of the height of the maple tree to the spruce tree is  $t$ , what is the height of the spruce tree, in metres? (Write your answer in the form  $\frac{a}{b}$ , where  $a$  and  $b$  are positive integers with no common divisor larger than 1.)

3 (a). Suppose that  $x = \sqrt{20 - 17 - 2 \times 0 - 1 + 7}$ . What is the value of  $x$ ?

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3 (b). Let  $t$  be TNYWR.

If the graph of  $y = 2\sqrt{2t}\sqrt{x} - 2t$  passes through the point  $(a, a)$ , what is the value of  $a$ ?

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3 (c). Let  $t$  be TNYWR.

Suppose that

$$\frac{1}{2^{12}} + \frac{1}{2^{11}} + \frac{1}{2^{10}} + \cdots + \frac{1}{2^{t+1}} + \frac{1}{2^t} = \frac{n}{2^{12}}$$

(The sum on the left side consists of  $13 - t$  terms.)

What is the value of  $n$ ?