

1. Perform the indicated operations. Show all steps. **Write a separate line for each step.**

$$5^2 - 3 \left( (10 \cdot 2 - 4^2)^2 - 11 - 3 \right)^2 - 24 \div 6 \cdot 2$$

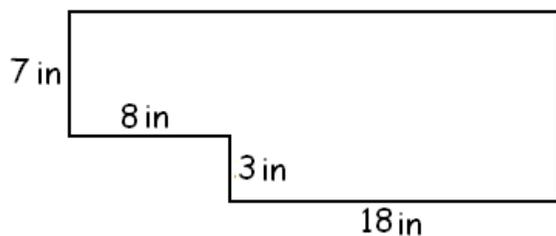
2. Label each of the following as true or false.

- |   |  |
|---|--|
| a) 3 is a factor of 3.                                    | f) If a positive integer $n$ is divisible by 2 and 3, then $n$ is also divisible by 6. |
| b) 1 is a divisor (or factor) of every positive integers. | g) For any sets $S$ and $T$ , $S \subseteq T$ or $T \subseteq S$ .                     |
| c) 91 is a prime number.                                  | h) If $A = \{1, 2, 3, 4, 5\}$ , then $6 \notin A$ .                                    |
| d) 2 is a prime number.                                   | i) If $A = \{1, 2, 3, 4, 5\}$ , then $1 \subseteq A$ .                                 |
| e) 1 is a prime number.                                   | j) If $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 3, 5\}$ , then $B \subseteq A$ .           |

3. Label each of the following as true or false.

- a) 15 is a prime number and 132 is divisible by 3.
- b) 15 is a prime number or 132 is divisible by 3.
- c) 1 is not a prime number and 6 has four positive factors.
- d) 1 is not a prime number or 6 has four positive factors.
- e) 17 is a prime number and 16 has six positive divisors.
- f) 17 is a prime number or 16 has six positive divisors.
- g)  $5 < 9$  and  $5 > 7$
- h)  $5 < 9$  or  $5 > 7$
- i)  $8 > 12$  and 45 is divisible by 7.
- j)  $8 > 12$  or 45 is divisible by 7.

4. List all positive factors of 40.
5. Suppose that  $U$  is a set with  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ . Find all elements  $n$  of  $U$  such that
- a)  $n > 5$  and  $n \leq 8$       c)  $n > 6$  and  $n \geq 3$       e)  $n$  is even and  $n$  is divisible by 3.
- b)  $n > 5$  or  $n \leq 8$       d)  $n > 6$  or  $n \geq 3$       f)  $n$  is even or  $n$  is divisible by 3.
6. Compute the perimeter and area of the object shown on the picture. Include units in your computation and answer.



7. Consider the rectangle with sides 5 ft and 8 ft. The perimeter is 26 ft and the area is  $40 \text{ ft}^2$ . Because of the difference in the computation, the number of feet expressing the perimeter is smaller than the number of square-feet expressing the area. Can you find a rectangle in which the perimeter is greater than the area?
8. \* Label the given statement as true or false.

We know that 3 is a factor of 24, because  $3 \cdot 8 = 24$ . So, when we verify that 3 is a factor of 24, we inevitably find another factor, namely 8. Therefore, factors come to us in pairs, and so every positive integer has an even number of divisors.

## Answers

1. 5
2. a) true   b) true   c) false   d) true   e) false   f) true   g) false   h) true   i) false   j) true
3. a) false   b) true   c) true   d) true   e) false   f) true   g) false   h) true   i) false   j) false
4. 1, 2, 4, 5, 8, 10, 20, 40
5. a) 6, 7, 8   b) 1, 2, 3, 4, 5, 6, 7, 8, 9, 10   c) 7, 8, 9, 10   d) 3, 4, 5, 6, 7, 8, 9, 10   e) 6   f) 2, 3, 4, 6, 8, 9, 10
6.  $P = 72 \text{ in}$     $A = 236 \text{ in}^2$
7. 1 by 5    $P = 12$     $A = 5$    even 1 by 1 works
8. false