

MATH 4: Homework 12

Due January 6, before the start of the class

Homework must be submitted on time—at least 15 minutes before the start of the class.

Homework will not be graded after the solutions are posted on Google Classroom.

Write the answers on separate sheets of paper, not between the lines.

1. Remove parentheses and simplify:

a). $(2x - 4) : 4 + \left(\frac{1}{2}x + \frac{2}{3}\right) \cdot 3 =$

b). $\left(\frac{3}{4} - x\right) \cdot 2 + \left(x + \frac{1}{6}\right) \cdot 3 =$

2. Multiply:

$1 \times 1 =$

$1 \times (-1) =$

$(-1) \times 1 =$

$(-1) \times (-1) =$

$3 \times 5 =$

$3 \times (-5) =$

$(-3) \times 5 =$

$(-3) \times (-5) =$

3. Solve the equations:

a) $\frac{2}{5}x = \frac{1}{15}$

b) $\frac{1}{3}x + \frac{1}{3} = \frac{1}{2}$

c) $\frac{5}{16} - \frac{y}{5} = \frac{1}{4}$

5. Solve the equations

a) $8 - 12x = 4$

b) $12 : x = 4$

c) $12 : (8 - x) = 4$

Hint: for c) treat the $(8 - x)$ as the unknown value, the same as in b)

6. Calculate:

a) $2 \times \frac{1}{4} =$

$\frac{1}{10} \times \frac{1}{2} =$

$\frac{1}{5} \times \frac{1}{6} =$

$2 \times (-6) =$

b) $\frac{1}{3} \times 6 =$

$\frac{2}{3} \times (6) =$

$2 : (-6) =$

$\frac{1}{3} : (-6) =$

c) $\frac{2}{3} : (-6) =$

$2 \times \frac{1}{6} =$

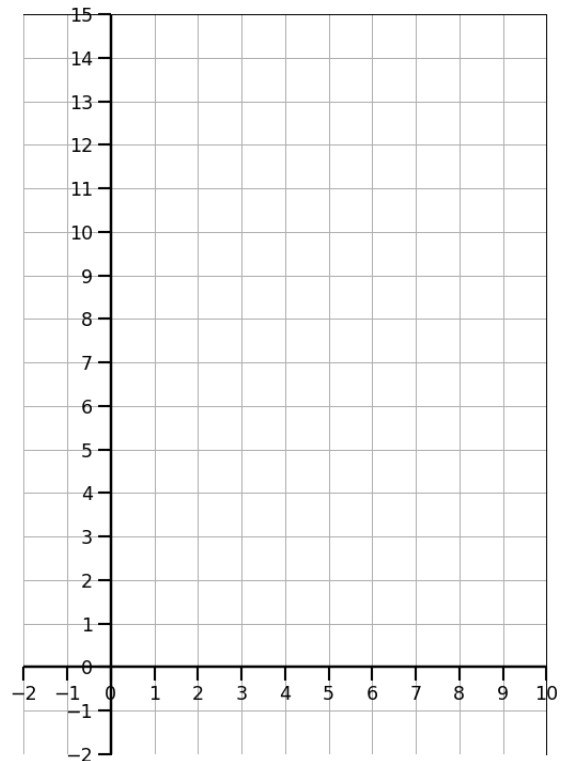
$\frac{1}{3} \times \frac{1}{6} =$

$\frac{2}{3} \times \frac{1}{6} =$

$$d) 2 : \left(-\frac{1}{6}\right) = \quad \frac{1}{3} \times \frac{1}{6} = \quad \frac{1}{3} : \left(-\frac{1}{6}\right) = \quad \frac{2}{3} \times \left(-\frac{1}{6}\right) =$$

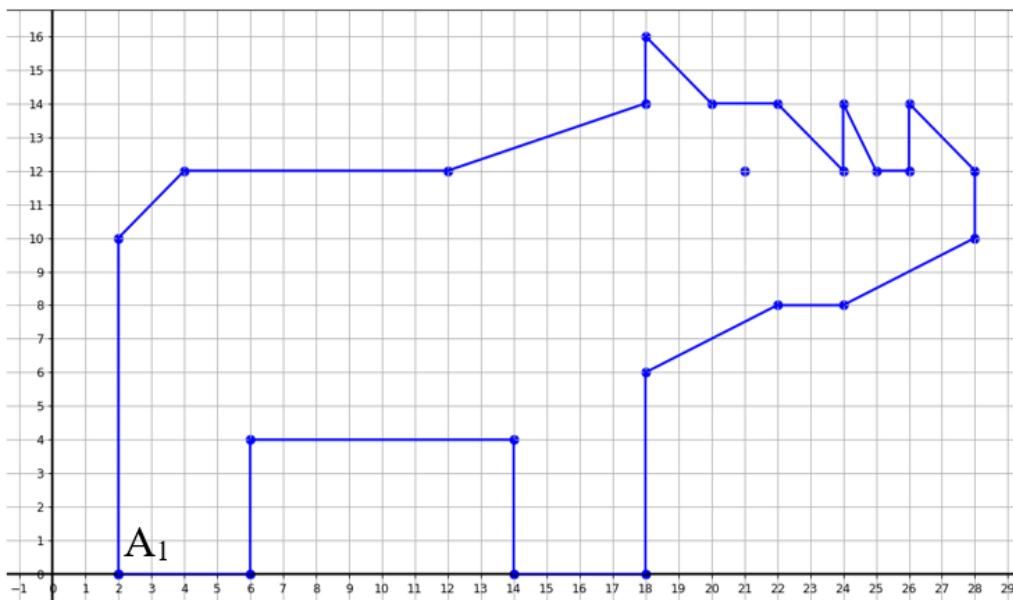
7. Mark the points by coordinates, connect them in the order they are arranged, and see what you got!

(2,12), (2,13), (3,13.5), (4,13.5), (5,13), (3,4),
 (8,4), (6,1), (3,1), (2,2), (2,4), (4,11), (4,12.5),
 (3.5,12.5), (2,11), (2,12), (3,12), (3,3), (4,2),
 (6,2), (3,3), eye: $\left(2\frac{1}{2}, 12\frac{1}{2}\right)$



8. Mark the points on the picture by coordinates:

$A_1 (2, 0)$, $A_2 (2, 10)$, $A_3 (4, 12)$, $A_4 (12, 12)$, $A_5 (18, 14)$, $A_6 (18, 16)$, $A_7(20, 14)$,
 $A_8 (22, 14)$, $A_9 (24, 12)$, $A_{10} (24, 14)$, $A_{11} (25, 12)$, $A_{12} (26, 12)$, $A_{13} (26, 14)$,
 $A_{14} (28, 12)$, $A_{15} (28, 10)$, $A_{16} (24, 8)$, $A_{17} (22, 8)$, $A_{18} (18, 6)$, $A_{19} (18, 0)$, $A_{20} (14, 0)$,
 $A_{21} (14, 4)$, $A_{22} (6, 4)$, $A_{23} (6, 0)$, $A_1 (2, 0)$, $A_{25} (21, 12)$



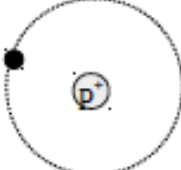


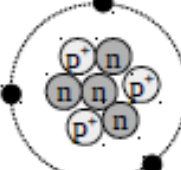
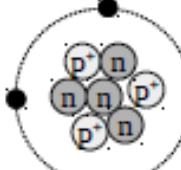
9. (* Optional, but you will learn about this in science) Negative numbers in atoms:

In Bohr's atomic model, the atoms contain positive protons or/and neutral neutrons in the middle of the atom (nucleus) and negative electrons (circling around the protons in orbits – the black dots). A proton has an electric charge +1. A neutron has 0 charge. An electron has an electric charge -1. Atoms do not have net electric charges (the total charge is zero) since the numbers of electrons and protons are equal. However, electrons can be added to or removed from atoms, making charged atoms known as ions.

A. Complete the table by counting the number of protons (+ charge), the number of neutrons (0 charges), and the number of electrons (- charges). Add the charges with their signs to get the total charge of the atom (or ion).

Use a periodic table to find the Symbol of the atom

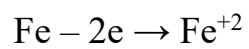
<https://pubchem.ncbi.nlm.nih.gov/periodic-table/>

Symbol	Protons	Neutrons	Electrons	Diagram	Electric charge
H Neutral atom	+1	0	-1		+1 - 1 = 0
H ⁻¹ Ion of the atom, charge of -1	+1	0	-2		+1 - 2 = -1
					
Li					
					

B. Complete the table:

Symbol	Protons	Electrons	Electric charge
O	8	8	
O ²⁻	8		-2
Na	11		0
Na ⁺	11	10	
N		7	0
N ³⁻	7		-3
Mg	12		0
Mg ²⁺	12		+2

C. Calculate the resulting electric charges



$$0 - (-1) \times 2 = 0 + 1 \times 2 = +2$$

From a neutral atom, subtract 2 electrons with negative charges to get a positive ion where the number of protons is larger by 2 compared to the electrons

