UNIT 1: DIVISIBILITY AND INTEGER NUMBERS

Exercise 1: Solve the following operations with natural numbers:

a) $20:4+7\cdot 2-3\cdot 8:4=$

b) $2\cdot 5^2-1^7-21:(4\cdot 4-3\cdot 3)=$

c) $35-30:[28:2-3\cdot(13-5\cdot 2)]=$

d) $(4\cdot 2+10:5)^2-(21:3-20:4)^3=$

e) $(17-5\cdot 3)^4-(12-3^2)^2=$

f) $7\cdot(10-3\cdot 3)^4+18:3^2-(7-5)^3=$

Exercise 2: Indicate if the following statements are true or false and why

a) Ninety-eight is a multiple of fourteen
b) Forty is a divisor of five
c) Fifty is a multiple of nine
d) Nine is a multiple of twenty-seven
e) Thirteen is a divisor of ninety-one

Exercise 3: Write the first five multiples of seventeen

Exercise 4: Write three multiples of twelve that are greater than five hundred

Exercise 5: Write five multiples of thirteen between one hundred and sixty-eight and two hundred fifteen

Exercise 6: Indicate if the following numbers are divisible by 2, 3, 5, 10 or 11

5405 6798 88935 222750 138567 557568 166870

Exercise 7: Find the value of the digit x so that these affirmations are true:

a) 6493x is a multiple of 3
b) 11 is a divisor of 567x2
c) 724x31 is a multiple of 2
d) 3 and 5 are divisors of 8248x

Exercise 8: There are twenty-nine students in 2ºA.

a) Their teacher decided to place them in rows with three students each and she realized that two of the students had to form a pair. Why?
b) Would they all have a partner if the rows had two students?
c) And if she places four students in each row? What is the distribution of the classroom now?

Exercise 9: Work out all the divisors of the numbers 135, 343, 225, 169, and 43

Exercise 10: How many different ways can we find to place forty plastic unicorns in a shoe box without piling them up on top of one another? Write them all.

Exercise 11: Factor out the numbers 252, 1210, 2000, 1372 and 720

Exercise 12:

a) Determine if the numbers 300, 1225, 3784, 5412, 3663 and 637 are divisible by 2, 3, 5, 10 or 11. Are any of them prime numbers? Why?

b) Factor them out

Exercise 13: Work out:

a) $\text{lcm}(104, 78) =$

b) $\text{lcm}(44, 153) =$

c) $\text{hcf}(468, 546) =$

d) $\text{hcf}(304, 459) =$

Exercise 14: There are two different upholsterers that visit my neighbourhood on a regular basis. One of them strolls by every five days, while the other visits us every Thursday. Knowing that both of them coincided yesterday ("Upholsterer, we upholster chairs, armchairs, easy chairs, rocking chairs, ear chairs and any other kind of furniture that you have in your house..."), when will they coincide again?

Exercise 15: I have twenty-four turtle erasers, sixteen of each octopus, whale and blowfish erasers, and thirty-two bendable pencils. I want to make packages with them, all of them equal and with the maximum amount of stationery stuff, to give as presents to the best students at the end of the year. How many students are getting the package? What's in every one of them?

Exercise 16: I have like a hundred different plants with different needs. A nightmare when it comes to water them. During the summer time I have to water the spathiphyllums every two days, the succulents once a week and the rest of the plants every three days. If I watered them all on the first day of July, when will I have to water them all on the same day? How long is it going to take? Any suggestions?

Exercise 17: I want to place a checkered floor in my living room, that measures 3.6 x 2.7m, without breaking the tiles. I went to the store and they told me that they sell 40 x 40cm and 45 x 45cm tiles. What's the largest possible length of the side of each tile? How many tiles will I need to cover the floor?

Exercise 18: Express the following quantities using integer numbers:

a) I had to pay a 62€ energy bill

b) I got a salary increase of 13€ a month

c) I am diving at a depth of 2 m

d) American houses have the living room in the basement

e) The NASA sent a weather balloon that rose to an altitude of 24 miles

f) To kill anisakis you must freeze them at a temperature of 20 degrees below zero for a week

Exercise 19: Classify the following numbers and place them on the number line:

$$-4 \;;\; 7 \;;\; 0 \;;\; -9 \;;\; -2 \;;\; 15 \;;\; -11 \;;\; -8$$

Exercise 20: Order the following numbers from least to greatest:

a) $-5 \;;\; 7 \;;\; -3 \;;\; 2 \;;\; 9 \;;\; 0 \;;\; -10 \;;\; -1$

b) $0 \;;\; -6 \;;\; -11 \;;\; 7 \;;\; 1 \;;\; -2 \;;\; 3 \;;\; -7$

Exercise 21: Work out:

a) $-3-7=$ b) $-7+2=$ c) $11-12=$

d) $-1+8=$ e) $-3-14=$ f) $-5+15=$

g) $7+12=$ h) $-5-2=$ i) $-5+9=$

Exercise 22: Work out the value of the following expressions:

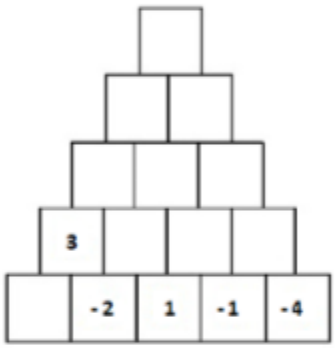
a) $-7+5-3-2-1+10-9+5=$ b) $10-8-3-1+4+3-5+2=$

c) $-5-2-3+9+1-4+7-3=$ d) $8-3-5+7-2-3+4-8+1=$

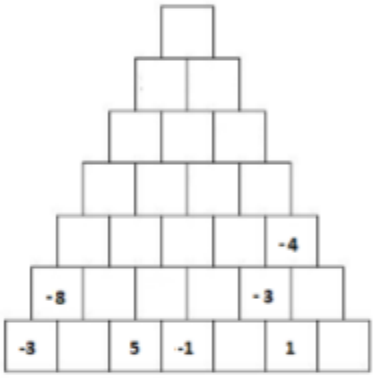
e) $1-2-4-2+7-9-1+5=$ f) $7-3+2-9-4+5-1=$

Exercise 23: Find the number at the top of the pyramid knowing that each cell is the sum of the two cells directly under it.

a)



b)



Exercise 24: Work out the value of the following expressions:

a) $-5\cdot(-8)=$ b) $(-3)\cdot(+7)=$

c) $(-45):(-5)=$ d) $-2\cdot 6:(-4)=$

e) $100:(-5):(-5)=$ f) $-18:(-2)\cdot(-1)=$

g) $(-5)^4=$ h) $(-1)^{17}=$

i) $(-2)^7=$ j) $-3^2=$

Exercise 25: Work out the value of the following expressions:

a) $-9-7+3+7+1-8+3-4+5=$

b) $-(-5)+(-7)-(+3)+(+9)=$

c) $(4-6)-(5-10)+(12-9)-(-2-1)=$

d) $-2-8:(-4)-5\cdot(-2+7)=$

e) $1+2\cdot(17-2):(-6)-(5-11):(-2)=$

f) $-20:5+3\cdot(-4)-18:(-6)-(-1)^3=$

g) $5-2\cdot(4-6)^3-3\cdot(6-9)^2=$

h) $-1-(-1)^2+(-1)^3-(-1)^4=$

Exercise 26: A glider is soaring through the sky. The main plane released it at an altitude of 2750 feet and it glided down 1470 feet, but then it found an upwards air current and it elevated again 585 feet. Then it soared for another hour, going down a total of 1827 feet. Where's the glider right now?

Exercise 27: Jean works as a waiter and she has a salary of 950€ a month. Last month she had to pay a 525€ rent, 18.50€ for the water, 72.25€ of the electric bill, 24.75€ for the Internet, 29.10€ for the mobile phone line, and she also likes eating three times a day and getting dressed before going away in the morning, spending a total of 325.40€ in groceries and clothes. Thank God it was a good month and she got 45€ in tips. How much money did Jean have at the end of the month?

Exercise 28: The highest recorded temperature on Earth was registered in Death Valley, California, at 56.7°C, while the lowest was -89.2°C in Antarctica. What is the range of temperatures recorded on Earth?

Exercise 29: The tallest building on Earth is the Burj Khalifa, in Dubai, with a height of 829.8m, while the deepest oil well goes 12345.1m into the Earth. What's the difference of distances between their highest and lowest points?

Exercise 30: Roman Civilization began in 509 BC and ended in 476 AC. How long did Roman Civilization last?

Exercise 31: Thales of Miletus was born on the year 624 BC and died on the year 546 BC. How old was he when he died?

Exercise 32: Methane has a gaseous state under normal circumstances, with a boiling point of $-161.5°C$. But if we lower the temperature for another $20.5°C$, it will reach its melting point. At what temperature will methane become solid?