

Number Nest Christmas Challenge

It's the Christmas season and Santa needs your help with these maths questions...

Get into teams of 2 or 3 and complete these challenges as fast as possible!



1. Eddy the elf helps Santa pack five presents, but he forgot the costs of the five presents, use the clues below to help Eddy find the **total costs** of the five presents:



1. The **red** and **purple** presents together cost £51
2. The **purple** and **blue** presents together cost £35
3. The **blue** and **gold** presents together cost £27
4. The **gold** and **green** presents together cost £35
5. The **green** and **red** presents together cost £46

Since we are not required to find the individual costs of each present but the total cost we can just add all the costs together to give:

$$2 \text{ red} + 2 \text{ purple} + 2 \text{ blue} + 2 \text{ gold} + 2 \text{ green} = 194$$

$$\text{So cost of 5 presents} = \text{£97}$$

2. Ellie the elf has three bells, one that rings every 7 minutes, one that rings every 28 minutes and one that rings every hour. If the bells all ring together at noon, what time will they next ring all together?

If we convert all times into minutes, then we have 7 min, 28 min, and $1 \times 60 = 60$ min We need to find the least common multiple of these three numbers, we can do this by considering the prime factors of each number:

$$7 = 7$$

$$14 = 2^2 \times 7$$

$$60 = 2 \times 3 \times 5$$



By comparing the prime factors of each number we can see that the least common multiple is $2^2 \times 3 \times 5 \times 7 = 420$ minutes = 7 hours.

This means the next time the bells ring together will be $12:00 + 7 \text{ hours} = 19:00$

3. How many gifts did my true love send to me across all twelve days in the song "The Twelve Days of Christmas"?

"A partridge in a pear tree" is repeated 12 times

"Two turtle doves" is repeated 11 times

"Three French hens" is repeated 10 times

...

"Ten lord a-leaping" is repeated 3 times

"Eleven pipers piping" is repeated 2 times

"Twelve drummers drumming" is repeated once.

Therefore the total number of gifts is:

$$1 \times 12 + 2 \times 11 + 3 \times 10 + 4 \times 9 + 5 \times 8 + 6 \times 7 + 7 \times 6 + 8 \times 5 + 9 \times 4 + 10 \times 3 + 11 \times 2 + 12 \times 1$$

$$= 2 \times (12 + 2 \times 11 + 3 \times 10 + 4 \times 9 + 5 \times 8 + 6 \times 7)$$

$$= 2 \times (12 + 22 + 30 + 36 + 40 + 42)$$

$$= 2 \times 182 = 364$$



You could also think of this question as the sum of the first 12 triangular numbers: $1 + 3 + 6 + 10 + 15 + \dots + 45 + 55 + 66 + 78 = 364$

4. Elliot the Elf sells some Christmas trees at the elf's Christmas market. He sells half his trees to Eddy and a third of the remaining trees to Ellie. Elliot takes 6 trees back home. How many trees did Elliot have at the beginning?

Elliot sold $\frac{1}{2}$ of his trees to Eddy so he has $\frac{1}{2}$ of his trees left.

Then he sold $\frac{1}{3}$ of what was left to Ellie so $\frac{1}{3}$ of a $\frac{1}{2} = \frac{1}{6}$ of his trees.

This means Elliot has $\frac{2}{6}$ of his original number of trees left

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

$$6 \text{ trees} = \frac{2}{6}, \text{ i.e. } 6 \text{ trees} = \frac{1}{3}$$

So $6 \times 3 = 18$ is the original number of trees that Elliot has.

* remember that some pupils haven't learnt algebra yet to try to avoid explaining this question using x!



5. Solve the maths problems to reveal the hidden picture! Some answers have a special colour, shown below. Leave the other answers uncoloured.

64 = blue

55 = black

113 = orange

96 = green

$6 \times 4 + 40$	$6 \times 12 - 8$	$156 - 92$	$12 \times 4 + 7$	$5 \times 7 + 20$	$110 \div 2$	$200 - 145$	4^3	$(6 + 2) \times 8$
$6 \times 11 - 2$	$7 \times 9 + 1$	$(74 + 54) \div 2$	12 × 8	200 - 104	43 + 32 + 21	30 + 5 + 90	$24 + 97 - 57$	$256 \div 4$
$4 \times 8 \times 2$	$24 + 45 - 5$	$7 \times 8 - 1$	$\frac{11000}{\div 200}$	11×5	$10 \times 10 - 45$	$13 + 25 + 17$	$134 - 79$	$12 \times 7 - 20$
$(12 + 4) \times 4$	$6 \times 8 + 4^2$	$148 - 84$	$6 \times 4 + 45$	$(9 + 4) \times 10$	$92 - (10 \times 5)$	$15 \div 5 + 18$	8^2	$12 \times 8 - 4 \times 8$
$116 - 52$	$12 \times 9 - 44$	$10 \times 4 \div 2$	$220 \div 4$	$15 \div 3 - 2$	$5 \times 2 \times 5$	$10 \times 5 + 5$	$23 + 94 + 12$	$16 \times (17 - 13)$
$65 + 24 - 25$	$3 \times 4 + 101$	$\frac{113000}{\div 1000}$	$11^2 - 8$	$226 \div 2$	$8 \times 5 - 17$	$9 \times 4 + 43$	$6 \times 8 + 19$	$11 \times 5 + 9$
4^3	$40 \div 5 \times 8$	$102 - 22$	$11 \times 8 - 33$	$84 + 12 + 3$	$300 - 184$	$(11 \times 10) \div 2$	$4^2 - 12$	$6 \times 12 - 8$
$128 \div 2$	$320 \div 5$	$12 + 62$	$28 \div 2 + 6$	$150 \div 3 + 5$	$7^2 + 6$	$12 \times 11 - 23$	$100 - 72$	$\frac{12465 - 12401}{}$
$11 \times 6 - 2$	$21 + 18 + 25$	$100 - 36$	34×2	$4 \times 3 \times 2$	$25 + 84 + 3$	$12 + 12 - 3$	$200 - 136$	$\frac{128000}{\div 2000}$
$5 \times 2 \times 3 + 34$	$9 \times 7 + 1$	$452 - 123$	$5 \times 8 \times 2$	$(50 - 34) \div 2$	20×4	$123 - 54$	$123 - 45 + 3$	8^2



Well done! Here's an additional fun puzzle, colour in the the Christmas picture according to the properties of the numbers:



Prime numbers



Single digit numbers with four factors



First 10 multiples of 10



Numbers made up of two different digits that add up to 12



Multiples of 11 greater than 11



Square numbers

