

# Busy at Maths 6 - Sixth Class

## Fractions/Decimals/Percentages 2 – Puzzles

It may help to find 100% first!



1. Solve these puzzles.

(a) Mary spent  $66\frac{2}{3}\%$  of her money on a present and 10% on postage. If the postage cost €1.20, how much did the present cost?

(b) Kristin scored 35% of her team's goals this year. If the rest of the team scored 52 goals, how many did Kristin score?



(c) If it rained for  $83\frac{1}{3}\%$  of the days in April, how many dry days were there?



(d) Jack had Maths, English and Irish homework. He spent 90 mins altogether at it. He spent 45% of the time at Maths and 30.5 mins at English. How long did he spend at Irish?

2. Increasing and decreasing by a fraction.

**A**

Increase 25 by  $\frac{1}{5}$

We must find  $\frac{5}{5} + \frac{1}{5} = \frac{6}{5}$

**Short way**

$\frac{5}{5} = 25$   
 $\frac{1}{5} = 5$   
 $\frac{6}{5} = 30$

**B**

Decrease 27 by  $\frac{4}{9}$

We must find  $\frac{9}{9} - \frac{4}{9} = \frac{5}{9}$

**Short way**

$\frac{9}{9} = 27$   
 $\frac{1}{9} = 3$   
 $\frac{5}{9} = 15$

Now try these.

(a) Increase 12 by  $\frac{1}{3}$

(b) Decrease 24 by  $\frac{1}{6}$

(c) Increase 18 by  $\frac{2}{3}$

(d) Increase 20 by  $\frac{3}{5}$

(e) Decrease 40 by  $\frac{3}{4}$

(f) Decrease 56 by  $\frac{3}{8}$

(g) Decrease 55 by  $\frac{4}{5}$

(h) Increase 14 by  $\frac{5}{7}$

(i) Decrease 36 by  $\frac{2}{9}$

3. Increasing and decreasing by a percentage. (Hint: change to fractions first.)

**C**

Increase 21 by  $33\frac{1}{3}\%$

$33\frac{1}{3}\% \rightarrow \frac{33\frac{1}{3}}{100} \times \frac{3}{3} \rightarrow \frac{100}{300} = \frac{1}{3}$

We must find  $\frac{3}{3} + \frac{1}{3} = \frac{4}{3}$

**Short way**

$\frac{3}{3} = 21$   
 $\frac{1}{3} = 7$   
 $\frac{4}{3} = 28$

**D**

Decrease 50 by 40%

$40\% \rightarrow \frac{40}{100} \rightarrow \frac{4}{10} = \frac{2}{5}$

We must find  $\frac{5}{5} - \frac{2}{5} = \frac{3}{5}$

**Short way**

$\frac{5}{5} = 50$   
 $\frac{1}{5} = 10$   
 $\frac{3}{5} = 30$

Now do these.

(a) Increase 10 by 60%.

(b) Decrease 88 by  $37\frac{1}{2}\%$ .

(c) Decrease 90 by  $66\frac{2}{3}\%$ .

(d) Increase 18 by 50%.

(e) Decrease 40 by  $62\frac{1}{2}\%$ .

(f) Increase 200 by 45%.

(g) Decrease 88 by  $12\frac{1}{2}\%$ .

(h) Increase 48 by 75%.

(i) Decrease 120 by 15%.

**Challenge** A farmer had 96 cows. He increased his herd by  $37\frac{1}{2}\%$ . How many cows had the farmer then?



## Fractions/Decimals/Percentages 2 – Problem-solving

### 1. Use fractions to help you solve these problems.

- (a) During spring a farmer's flock of 45 sheep increased by 40%. How many sheep has she now?



- (b) Janine got 72 out of 100 in her last Math's test. What score did she get this time if she increased the result by  $37\frac{1}{2}\%$ ?



- (c) A typical day in June will have about 16 hours of daylight. By December this will have decreased by  $56\frac{1}{4}\%$ . How many hours of daylight would you get then?

- (d) Eoin has saved €21 towards buying a concert ticket. He needs to increase his savings by  $33\frac{1}{3}\%$  to buy one. What is the cost of a ticket?

### 2. Increasing or decreasing by a percentage using a calculator.

#### A Decimal method

Increase €7 by 13%

We must find  $100\% + 13\% = 113\%$

$$113\% = 1.13$$

Press: 7 × 1 . 1 3 =

→ 7.91 or €7.91

#### B Percentage method

Decrease 184 by 8%

We must find  $100\% - 8\% = 92\%$

Press: 1 8 4 × 9 2 %

→ 169.28

You don't have to press the = key when using the percentage method (on most calculators)!



Now try these using the **decimal** method.

- |                         |                         |                           |
|-------------------------|-------------------------|---------------------------|
| (a) Increase €12 by 14% | (b) Decrease €24 by 18% | (c) Increase €18 by 24%   |
| (d) Increase €20 by 60% | (e) Decrease €40 by 75% | (f) Decrease €56 by 37.5% |

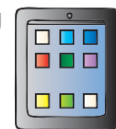
### 3. Now try these using your calculator. (Answer to the nearest whole number.)

- |                           |                         |                          |
|---------------------------|-------------------------|--------------------------|
| (a) Increase 99 by 47%    | (b) Increase 45 by 25%  | (c) Decrease 88 by 87.5% |
| (d) Decrease 90 by 33.33% | (e) Decrease 100 by 71% | (f) Increase 50 by 80%   |

### 4. Increasing and decreasing problems – use your calculator.

- (a) Nick's journey to Primary School was 1.5km long. The distance he has to travel to Secondary School is a 76% increase. What is the length of his journey to secondary school?

- (b) When Digital World began selling the latest tablet, they decreased its price by 37.5%. If the original price was €210, how much does it now cost?



- (c) Sarah paid €12,700 for a car two years ago. Its value has fallen by 48%. How much is her car worth now?



- (d) The price of a cinema ticket increased by 25% this year. If the new price is €9.40, how much did the ticket cost last year?

Fractions/Decimals/Percentages 2 – Problem-solving

**A** The temperature today is 21°C. This is an increase of 40% on yesterday. What was yesterday's temperature?



Original amount + increase = new amount  
 $100\% + 40\% = 140\%$   
 $140\% \rightarrow \frac{140}{100} \rightarrow \frac{14}{10} = \frac{7}{5}$

We now have  $\frac{7}{5}$ . We must find  $\frac{5}{5}$ .  
 $\frac{7}{5} = 21^\circ\text{C} \rightarrow$  (today's temperature)  
 $\frac{1}{5} = 3^\circ\text{C}$   
 $\frac{5}{5} = 15^\circ\text{C} \rightarrow$  (yesterday's temperature)

**B** A smartphone was reduced by €40. This was a reduction of 8% on the original price. What was the new price?



Original price – reduction = new price  
 $100\% - 8\% = 92\%$   
 $92\% \rightarrow \frac{92}{100} = \frac{23}{25}$

We have  $\frac{2}{25}$  (8%). We must find  $\frac{23}{25}$ .  
 $\frac{2}{25} = €40 \rightarrow$  (reduction)  
 $\frac{1}{25} = €20$   
 $\frac{23}{25} = €460 \rightarrow$  (new price)

1. Write the missing amounts. Decreases are shown in brackets.

New amount	66kg	45cm			56km
Increase/decrease	kg	cm	(€8)	18l	
Original amount	kg	cm			
% increase/decrease	10%	50%	(40%)	$66\frac{2}{3}\%$	75%

Expressing an increase or decrease as a percentage.

Aaron usually jogs 5km each Saturday. Last Saturday he only jogged 3km. What was the percentage decrease in the distance he jogged?

$5\text{km} - 3\text{km} = 2\text{km}$  (decrease)  
 Fraction decrease =  $\frac{2}{5}$



Percentage decrease  $\rightarrow \frac{2}{5} \times \frac{100}{1} = 40\%$

2. Express these increases/decreases as a percentage of the original:

- (a) 5kg increased to 8kg
- (b) €20 decreased to €12
- (c) 18l increased to 24l
- (d) 45m decreased to 40m

3. If there were 8cm of rain in April and 5cm of rain in May, what was the percentage decrease from April to May?

4. A lion cub increased in weight by  $33\frac{1}{3}\%$  in its first six months of life. If it now weighs 36.8kg, what did it weigh when it was born?

5. When the cook finished making breakfast there were 140 eggs left. If that was a 30% decrease, how many eggs had he at the start?

6. Jack drank 270ml from a 1 litre bottle and still had 730ml left. What percentage did he drink?



**Challenge** What was Alex's height at his last birthday if the 165cm he is at his present birthday is a 5% increase on last year?  cm (2 places of decimals.)

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Fractions/Decimals/Percentages 2 – Check-up

1. Use the **fraction method** to find the answers to these.

- (a) 40% of 350      (b)  $62\frac{1}{2}\%$  of 96      (c)  $8\frac{1}{3}\%$  of 72      (d)  $87\frac{1}{2}\%$  of 56

2. Use the **decimal method** to find these.

- (a) 8% of 175      (b) 35% of 120      (c) 17.5% of 160      (d) 42.5% of 240

3. When a kestrel increased its speed by 20%, it was travelling at 75km/h. What speed was it flying at originally?



4. Find a match! Match an answer in the first box to its equivalent in the second box.

- If  $\frac{7}{4}$  is €8.75, the original amount is ...
- 80% is €1.80, so 100% is ...
- $\frac{6}{5}$  is €2.88, so 50% is ...
- €1 increased by 25% is ...
- A 10% increase is 20c, the original amount is ...

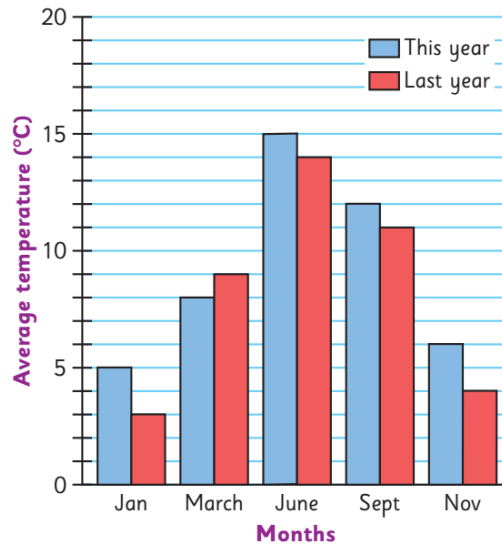
- €5 decreased by 75%
- 8% of €62.50
- 4% of €50
- Decrease €6.75 by  $66\frac{2}{3}\%$
- Increase €1 by  $\frac{200}{1000}$

5. True  or false ! Work out the answer for each of these statements:

Aoife's class recorded the temperature in the school yard over the last two years.

Check if their statements are correct.

- (a) The lowest monthly temperature this year was  $33\frac{1}{3}\%$  of the highest.
- (b) November's average temperature this year was 50% higher than last year's.
- (c) This year the temperature decreased by 40% from June's average to September's average.
- (d) March's temperature this year decreased by 12.5% compared to last year's.
- (e) January's average temperature over the last two years is 80% of November's average.
- (f) Last year the temperature in January was  $33\frac{1}{3}\%$  of that in March.



**Challenge** The more you take the more you leave behind. What are they?

Put the answers to these in **descending** order to find out.

- |                              |                               |   |
|------------------------------|-------------------------------|---|
| <b>S</b> 20% of 7.           | <b>P</b> Decrease 2.45 by 40% | <b>O</b> Increase 2.5 by 50%              |
| <b>T</b> $\frac{2015}{1000}$ | <b>T</b> 6% of 50             | <b>F</b> $66\frac{2}{3}\% = 4$ , 100% = ? |
| <b>O</b> 4% of 87.5          | <b>E</b> Reduce 100 by 98.5%  | <b>S</b> 11% of 22                        |

Answer: