

Week 6

This week in a nutshell:

Students may need a reminder of the methods for calculating with fractions for Q3. Q4 is challenging and some examples may be required before students attempt these questions. Both a written description and column vector has been provided for the answers to Q5 so that you can differentiate by outcome.

Question 1: Powers and roots

Question 2: Estimating calculations

Question 3: Arithmetic with fractions

Question 4: Calculating percentage change

Question 5: Describing a translation

This week's ideas for class discussion include:

Question 1: **Powers and roots**

- **Task:** Write a list of square numbers from 1^2 to 15^2 and cube numbers from 1^3 to 5^3 . In pairs, take it in turns to use the list to test each other on recalling squares, cubes and roots.

Question 2: **Estimating calculations**

- Simon says "When estimating a calculation, if all the numbers round up then the estimate is always a bit bigger than the correct answer." Is Simon correct? Write examples to justify your answer.

Question 3: **Arithmetic with fractions**

- **Challenge:** Take the two fractions $\frac{1}{2}$ and $\frac{1}{3}$. Calculate $\frac{1}{2} + \frac{1}{3}$, $\frac{1}{2} - \frac{1}{3}$, $\frac{1}{2} \times \frac{1}{3}$ and $\frac{1}{2} \div \frac{1}{3}$. Attempt to draw diagrams to illustrate your calculations and answers.

Question 4: **Calculating percentage change**

- Cup A started with 200ml of water and increased to 250ml. Cup B started with 250ml of water decreased to 200ml. Calculate the percentage change for each cup. What do you notice?

Question 5: **Describing a translation**

- Why do you think 'right' is the positive direction and 'left' is the negative direction on the horizontal axis?

Week 6: Day 1

1) Evaluate:

a) 5^2

b) 3^4

2) By first rounding to one significant figure, estimate:

$$7.8 \times 6.2 =$$

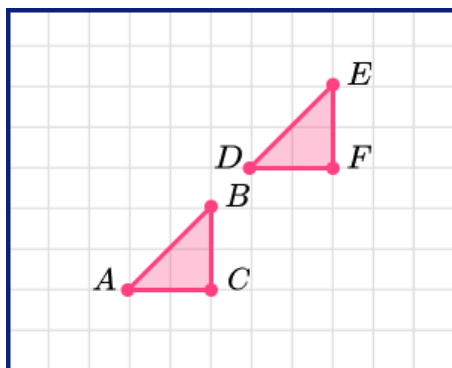
3) Evaluate:

$$\frac{1}{4} \times \frac{2}{3} =$$

4) A chocolate bar is 120 grams. The company decides to change the size of this chocolate bar to 150 grams to try and increase sales.

What was the percentage increase in the size of the chocolate bar?

5) Describe the translation of triangle ABC to triangle DEF.



Week 6: Day 1 Answers

1) Evaluate:

a) $5^2 = 25$

b) $3^4 = 81$

2) By first rounding to one significant figure, estimate:

$$7.8 \times 6.2 \approx 8 \times 6 \\ \approx 48$$

3) Evaluate:

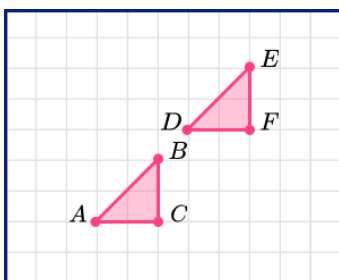
$$\frac{1}{4} \times \frac{2}{3} = \frac{1}{6}$$

4) A chocolate bar is 120 grams. The company decides to change the size of this chocolate bar to 150 grams to try and increase sales.

What was the percentage increase in the size of the chocolate bar?

25% increase

5) Describe the translation of triangle ABC to triangle DEF.



3 units right,
3 units up
OR $\begin{pmatrix} 3 \\ 3 \end{pmatrix}$

Week 6: Day 2

1) Evaluate:

a) 2^5

b) $\sqrt{144}$

2) By first rounding to one significant figure, estimate:

$$9.87 \times 10.12 =$$

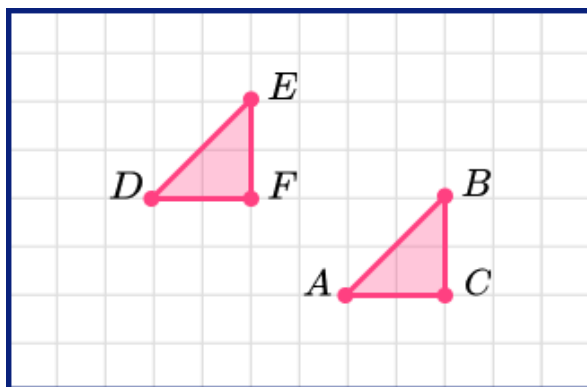
3) Evaluate:

$$\frac{8}{15} - \frac{2}{5} =$$

4) A new car cost £20000. One year later the car was valued at £18000.

Work out the percentage decrease in the value of the car.

5) Describe the translation of triangle ABC to triangle DEF.



Week 6: Day 2 Answers

1) Evaluate:

b) $2^5 = 32$

b) $\sqrt{144} = 12$

2) By first rounding to one significant figure, estimate:

$$9.87 \times 10.12 \approx 10 \times 10 \\ \approx 100$$

3) Evaluate:

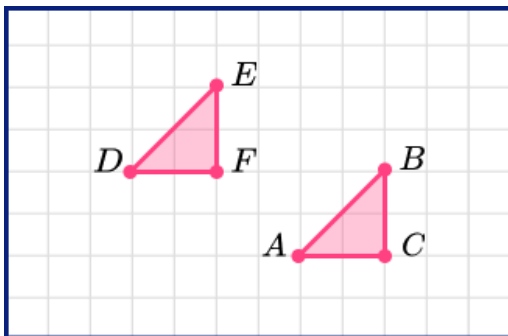
$$\frac{8}{15} - \frac{2}{5} = \frac{2}{15}$$

4) A new car cost £20000. One year later the car was valued at £18000.

Work out the percentage decrease in the value of the car.

10% decrease

5) Describe the translation of triangle ABC to triangle DEF.



4 units left,
2 units up

OR $\begin{pmatrix} -4 \\ 2 \end{pmatrix}$

Week 6: Day 3

1) Evaluate:

a) $2^2 \times 5^2$

b) $\sqrt[3]{1000}$

2) By first rounding to one significant figure, estimate:

$$305 + 489 + 214 =$$

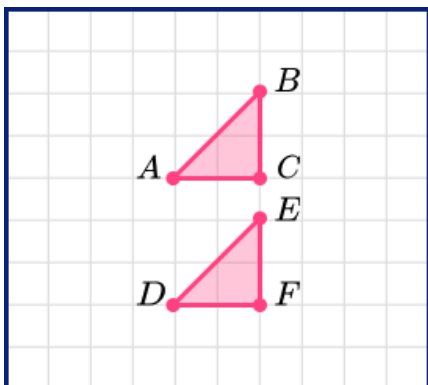
3) Evaluate

$$\frac{7}{10} - \frac{2}{5} =$$

4) Over the course of 10 hours, a colony of bacteria grew from a population size of 30000 to 48000.

What is the percentage increase in the size of the bacteria colony during this time period?

5) Describe the translation of triangle ABC to triangle DEF.



Week 6: Day 3 Answers

1) Evaluate:

b) $2^2 \times 5^2 = 100$

b) $\sqrt[3]{1000} = 10$

2) By first rounding to one significant figure, estimate:

$$305 + 489 + 214 \approx 300 + 500 + 200 \\ \approx 1000$$

3) Evaluate

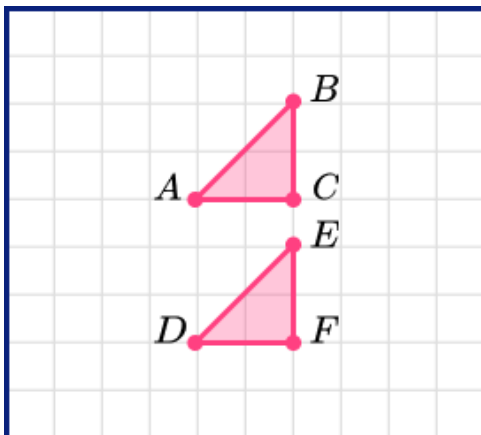
$$\frac{7}{10} \div \frac{2}{5} = \frac{7}{4}$$

4) Over the course of 10 hours, a colony of bacteria grew from a population size of 30000 to 48000.

What is the percentage increase in the size of the bacteria colony during this time period?

60% increase

5) Describe the translation of triangle ABC to triangle DEF.



0 units horizontally

3 units down

OR $\begin{pmatrix} 0 \\ -3 \end{pmatrix}$

Week 6: Day 4

1) Evaluate:

a) $2^3 \times \sqrt{25}$

b) $\sqrt{400}$

2) By first rounding to one significant figure, estimate:

$$81.6 \div 3.88 =$$

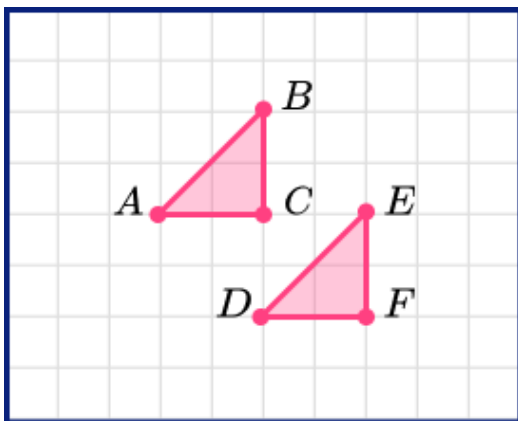
3) Evaluate:

$$\frac{4}{5} - \frac{1}{8} =$$

4) A bag of sand has a hole in the bottom and is leaking. The mass of sand in the bag at 9am is 25kg. At 11am, the mass of sand in the bag is 22.5kg.

What is the percentage decrease in the mass of sand in the bag?

5) Describe the translation of triangle ABC to triangle DEF.



Week 6: Day 4 Answers

1) Evaluate:

b) $2^3 \times \sqrt{25} = 40$

b) $\sqrt{400} = 20$

2) By first rounding to one significant figure, estimate:

$$81.6 \div 3.88 \approx 80 \div 4 \\ \approx 20$$

3) Evaluate:

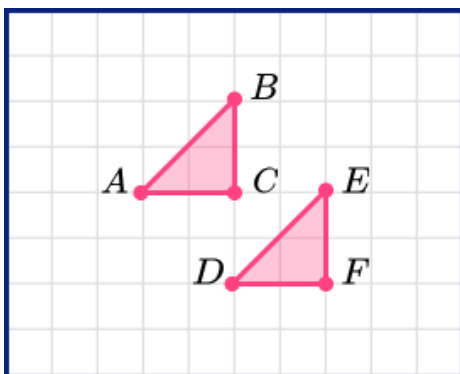
$$\frac{4}{5} - \frac{1}{8} = \frac{27}{40}$$

4) A bag of sand has a hole in the bottom and is leaking. The mass of sand in the bag at 9am is 25kg. At 11am, the mass of sand in the bag is 22.5kg.

What is the percentage decrease in the mass of sand in the bag?

10% decrease

5) Describe the translation of triangle ABC to triangle DEF.



2 units right
2 units down

OR $\begin{pmatrix} 2 \\ -2 \end{pmatrix}$

Week 6: Day 5

1) Evaluate:

a) $\sqrt{169}$

b) $\sqrt{(3^4)}$

2) By first rounding to one significant figure, estimate:

$$1.96 \times 10.22 \times 4.95 =$$

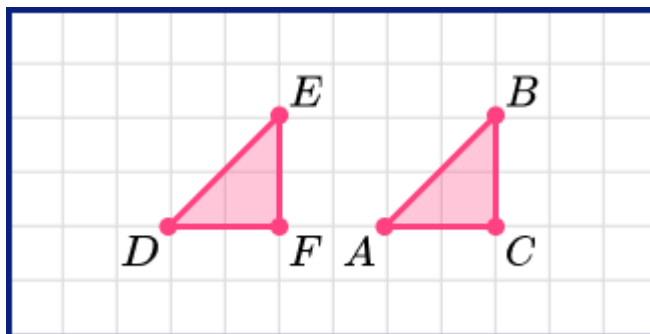
3) Evaluate:

$$2\frac{1}{5} \times \frac{3}{7} =$$

4) The price of a particular bar of chocolate ten years ago was 32p. This bar of chocolate now costs 44p.

What is the percentage increase in the price of this bar of chocolate?

5) Describe the translation of triangle ABC to triangle DEF.



Week 6: Day 5 Answers

1) Evaluate:

b) $\sqrt{169} = 13$

b) $\sqrt{(3^4)} = 9$

2) By first rounding to one significant figure, estimate:

$$1.96 \times 10.22 \times 4.95 \approx 2 \times 10 \times 5 \\ \approx 100$$

3) Evaluate:

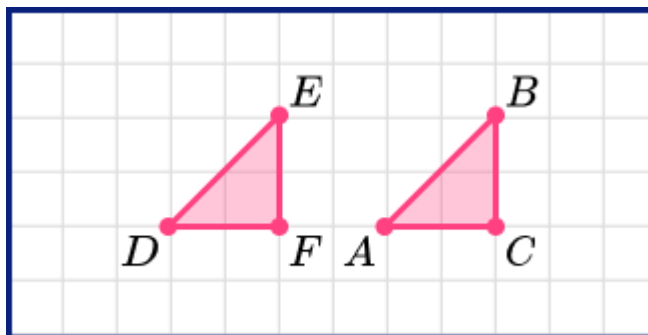
$$2\frac{1}{5} \times \frac{3}{7} = \frac{33}{35}$$

4) The price of a particular bar of chocolate ten years ago was 32p. This bar of chocolate now costs 44p.

What is the percentage increase in the price of this bar of chocolate?

37.5% increase

5) Describe the translation of triangle ABC to triangle DEF.



4 units left
0 units vertically

OR $\begin{pmatrix} -4 \\ 0 \end{pmatrix}$

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