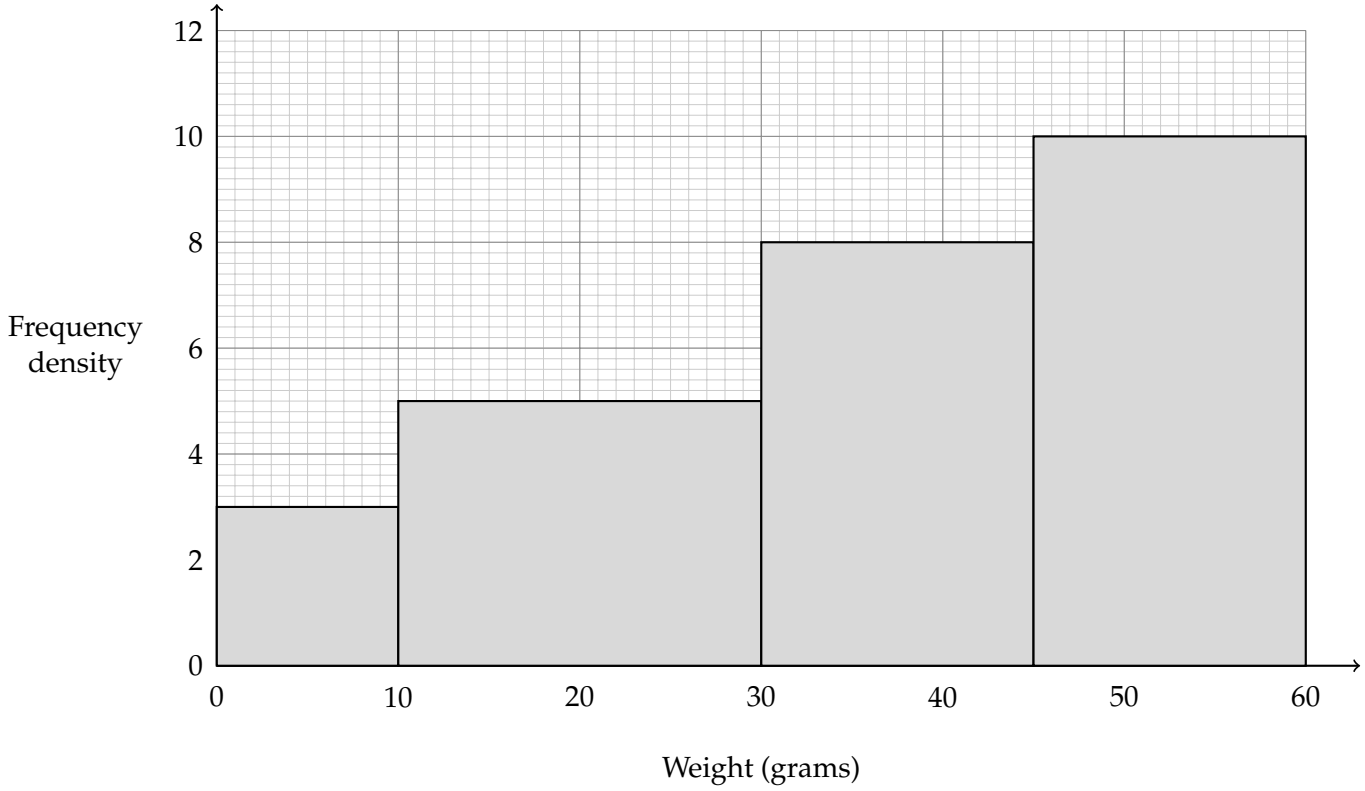
Histograms & Probability Worksheet

Calculating Frequencies and Estimating Probabilities

Reference: Edexcel GCSE 1MA1 / Higher Tier / Paper 1H / Q15

I Do

The histogram gives information about the weights, in grams, of some biscuits.

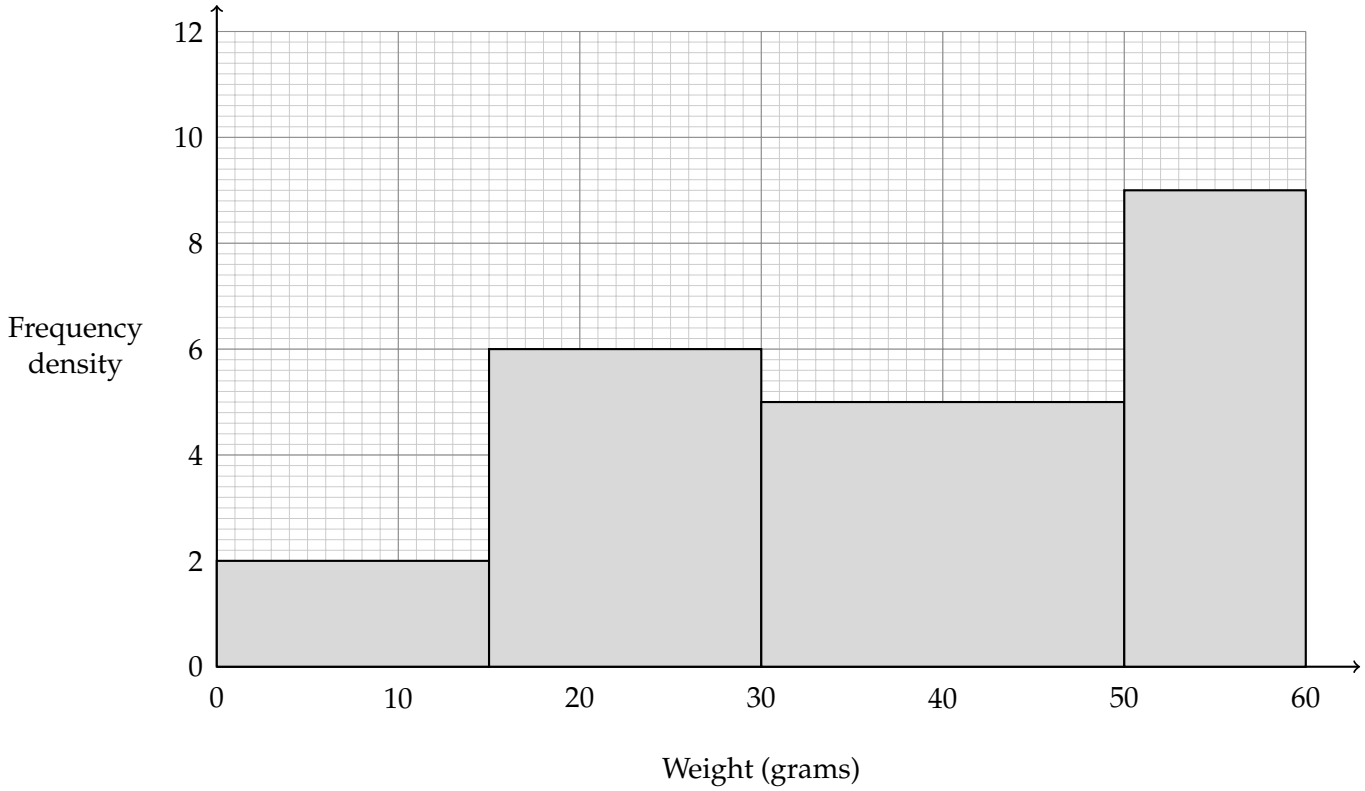


One of these biscuits is taken at random.
Work out an estimate for the probability that the biscuit will have a weight between 20 grams and 40 grams.

(Total for Question 1 is 4 marks)

We Do

The histogram gives information about the weights, in grams, of some packets of sweets.

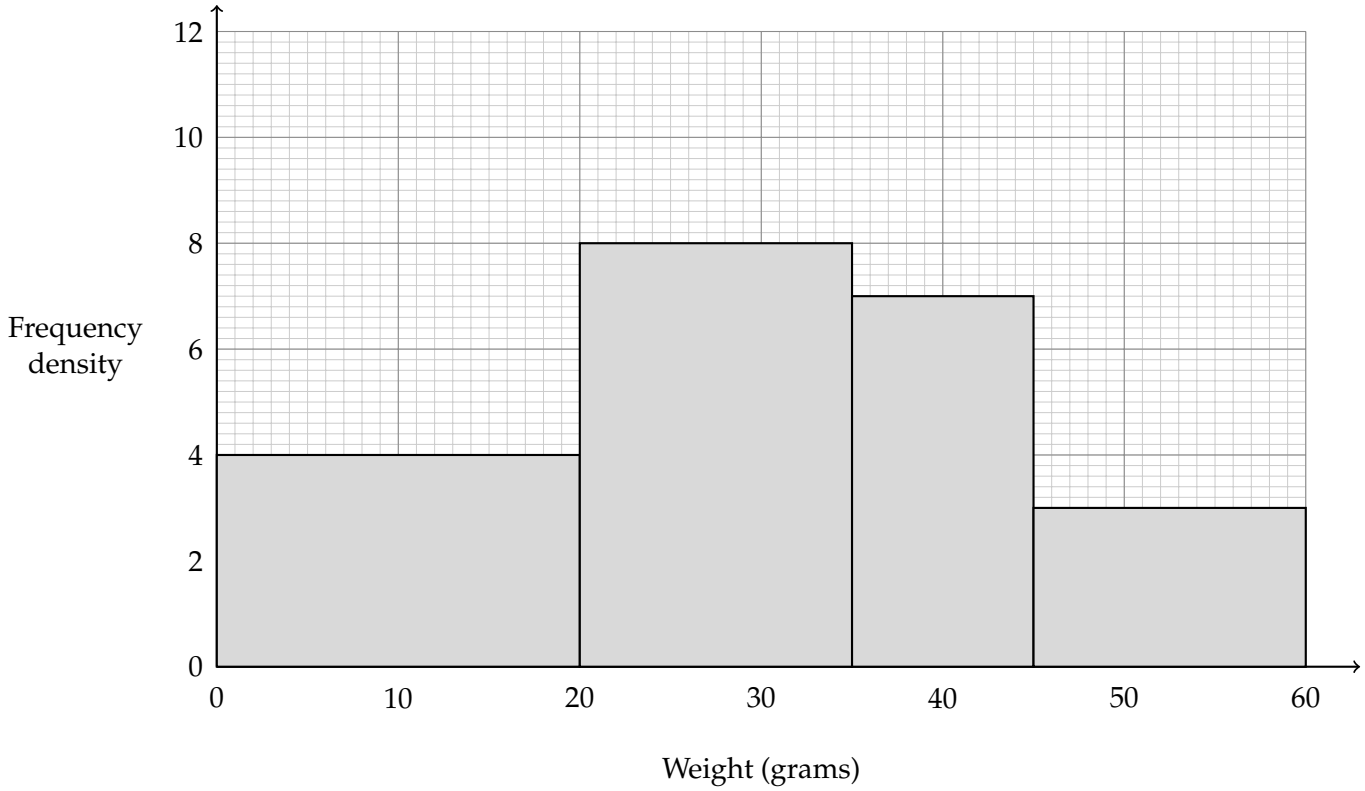


One of these packets is taken at random.
Work out an estimate for the probability that the packet will have a weight between 10 grams and 40 grams.

(Total for Question 2 is 4 marks)

You Do

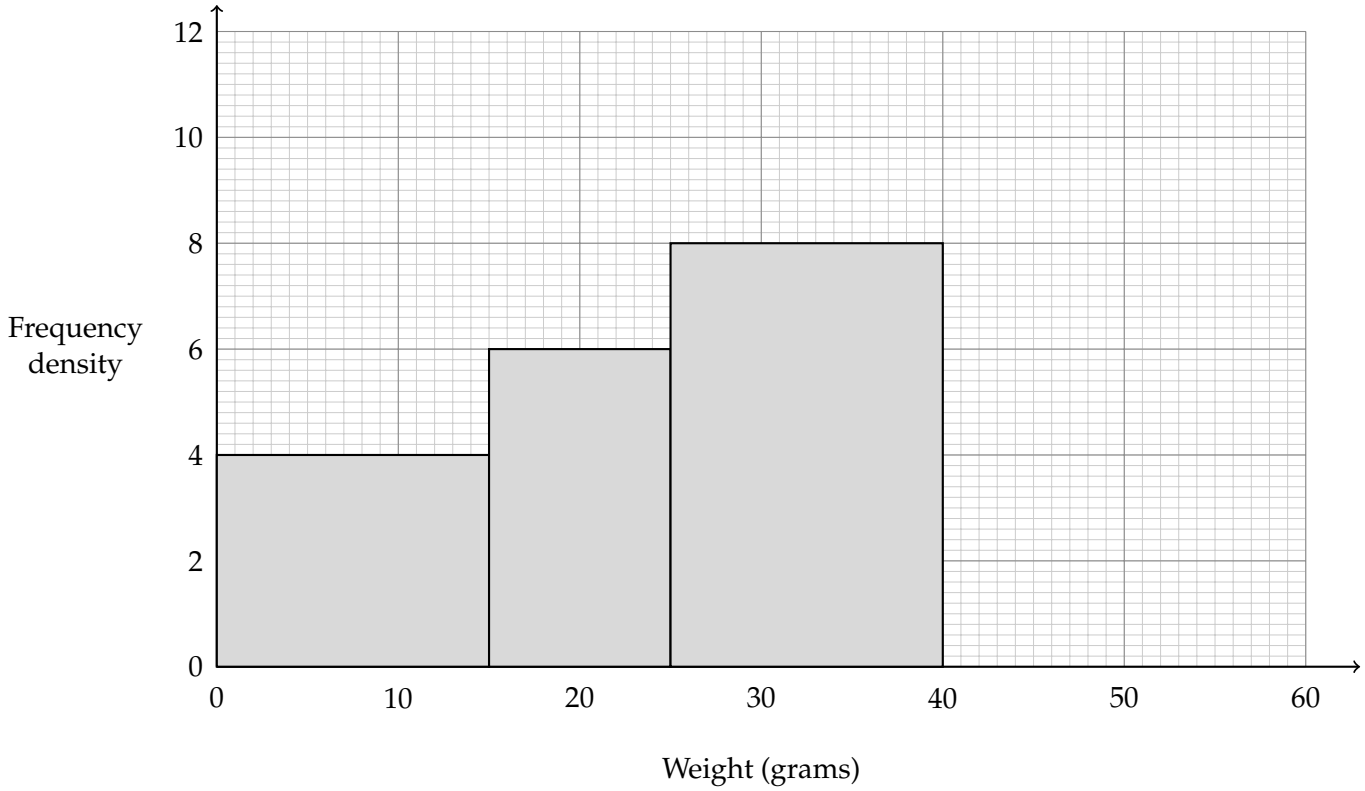
The histogram gives information about the weights, in grams, of some pebbles.



One of these pebbles is taken at random.
Work out an estimate for the probability that the pebble will have a weight greater than 25 grams.

(Total for Question 3 is 4 marks)

Challenge
The incomplete histogram gives information about the weights, in grams, of some apples.



There are 350 apples in total.
An apple is chosen at random.
Work out an estimate for the probability that the apple will have a weight of less than 45 grams.

(Total for Question 4 is 5 marks)

Answers & Worked Solutions

• **I Do:**

1. Calculate frequencies for all bars (Freq = Class Width × Frequency Density):

$0-10g: 10 \times 3 = 30$
$10-30g: 20 \times 5 = 100$
$30-45g: 15 \times 8 = 120$
$45-60g: 15 \times 10 = 150$

Total number of biscuits = $30+100+120+150 = 400$.

2. Calculate target frequency (between 20g and 40g):

Fraction of 10-30g bar (from 20 to 30): $10 \times 5 = 50$
Fraction of 30-45g bar (from 30 to 40): $10 \times 8 = 80$
Target frequency = $50+80 = 130$.

Answer: $P = \frac{130}{400} = \frac{13}{40}$

• **We Do:**

1. Calculate frequencies:

$0-15g: 15 \times 2 = 30$
$15-30g: 15 \times 6 = 90$
$30-50g: 20 \times 5 = 100$
$50-60g: 10 \times 9 = 90$

Total packets = $30+90+100+90 = 310$.

2. Target frequency (between 10g and 40g):

From 10 to 15g: $5 \times 2 = 10$
From 15 to 30g: 90 ***(entire bar)***
From 30 to 40g: $10 \times 5 = 50$
Target frequency = $10+90+50 = 150$.

Answer: $P = \frac{150}{310} = \frac{15}{31}$

• **You Do:**

1. Calculate frequencies:

$0-20g: 20 \times 4 = 80$
$20-35g: 15 \times 8 = 120$
$35-45g: 10 \times 7 = 70$
$45-60g: 15 \times 3 = 45$

Total pebbles = $80+120+70+45 = 315$.

2. Target frequency (greater than 25g):

From 25 to 35g: $10 \times 8 = 80$
From 35 to 60g: $70+45 = 115$
Target frequency = $80+115 = 195$.

Answer: $P = \frac{195}{315} = \frac{39}{63} = \frac{13}{21}$

• **Challenge:**

1. Find the known frequencies:

$0-15g: 15 \times 4 = 60$
$15-25g: 10 \times 6 = 60$
$25-40g: 15 \times 8 = 120$

Total so far = $60+60+120 = 240$ ***apples.***

2. Find the missing frequency (40-60g bar):

Missing apples **=** $350 - 240 = 110$**.**
Frequency density of this bar **=** $110 \div 20 = 5.5$**.**

3. Target frequency (less than 45g):
All apples up to 40g = 240.
Apples from 40 to 45g **=** $5 \times 5.5 = 27.5$**.**
Total target **=** $240 + 27.5 = 267.5$**.**

Answer: $P = \frac{267.5}{350} = \frac{2675}{3500} = \frac{107}{140}$