

Bands Worksheet 2

This exercise **worksheet 2** will cover the following:

- Working with calculations through bands
- Includes Tax calculations (simplified)

Exercise Name: Worksheet

The exercise begins:

Question 1:

Water Usage Charges

A water company charges as follows per year (simplified version):

- First 50 cubic metres at £0.80 per cubic metre
- Next 100 cubic metres (50–150) at £1.20 per cubic metre
- Next 200 cubic metres (150–350) at £1.50 per cubic metre
- Any usage above 350 cubic metres at £2.00 per cubic metre

If a business uses 420 cubic metres in a year. What is the total water charge?

ANSWER:

Band	Usage in Band	Rate (£/m ³)	Charge for Band	Explanation
Band 1	First 50 m ³	£0.80	$50 \times 0.80 =$ £40.00	
Band 2	Next 100 m ³ (50-150) → 100 m ³	£1.20	$100 \times 1.20 =$ £120.00	
Band 3	Next 200 m ³ (150-350) → 200 m ³	£1.50	$200 \times 1.50 =$ £300.00	
Band 4	Above 350 → $420 - 350 = 70$ m ³	£2.00	$70 \times 2.00 =$ £140.00	
Total Charge	— Double check m ³ —	—	£600.00	Sum: $40 + 120 + 300 + 140$

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Question 2:

Progressive Property Tax

A city imposes property tax based on the value of the property (in £):

- 0.5% on value up to £150,000
- 1.0% on the portion over £150,000 up to £400,000
- 1.5% on the portion over £400,000

What is the property tax on a house valued at £550,000?

ANSWER:

Progressive Property Tax

Band	Value in Band	Rate	Tax for Band	Explanation
Band 1	Up to £150,000	0.5%	$150,000 \times 0.005 =$ £750.00	
Band 2	$£400,000 - £150,000 =$ £250,000	1.0%	$250,000 \times 0.01 =$ £2,500.00	
Band 3	$\text{Over } £400,000 \rightarrow £550,000$ $- £400,000 =$ £150,000	1.5%	$150,000 \times 0.015 =$ £2,250.00	
Total Property Tax	—	—	£5,500.00	$750 + 2,500 +$ $2,250$

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Question 3:

Graduated Pension-Withdrawal Charge

A pension scheme charges a fee on withdrawals in bands:

- First £10,000 at 2%
- Next £20,000 at 4%
- Next £30,000 at 6%
- Above £60,000 at 8%

If someone withdraws £85,000 in a year, what is the total charge?

ANSWER:

Pension-Withdrawal Charge

Band	Amount in Band	Rate	Charge for Band	Explanation
Band 1	First £10,000	2%	$10,000 \times 0.02 =$ £200.00	
Band 2	Next £20,000 → up to £30,000	4%	$20,000 \times 0.04 =$ £800.00	
Band 3	Next £30,000 → up to £60,000	6%	$30,000 \times 0.06 =$ £1,800.00	
Band 4	Above £60,000 → 85,000 – 60,000 = £25,000	8%	$25,000 \times 0.08 =$ £2,000.00	
Total Charge	—	—	£4,800.00	200 + 800 + 1,800 + 2,000

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Question 4:

Import VAT Bands

A country has an import-VAT regime:

- 0% VAT on declared value up to £500
- 5% on the portion over £500 up to £2,000
- 20% on the portion over £2,000

If you import goods worth £3,750, what is the total VAT payable?

ANSWER:

Import VAT Bands

Band	Value in Band	Rate VAT for Band	Explanation
Band 1	Up to £500	0% £0	
Band 2	£2,000 – £500 = £1,500	5% $1,500 \times 0.05 =$ £75.00	
Band 3	Above £2,000 $\rightarrow 3,750 -$ 2,000 = £1,750	20% $1,750 \times 0.20 =$ £350.00	
Total VAT Payable	—	— £425.00	0 + 75 + 350

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Question 5:

Corporate Bonus Tiers

A company gives end-of-year bonuses based on profit share as follows:

- 5% of profits up to £100,000
- 10% on the next £200,000 (i.e. from £100,000 to £300,000)
- 15% on profits above £300,000

If profits are £480,000, what is the bonus amount?

ANSWER:

Corporate Bonus Tiers

Band	Profits in Band	Rate	Bonus for Band	Explanation
Band 1	Up to £100,000	5%	$100,000 \times 0.05 =$ £5,000.00	
Band 2	Next £200,000 → up to £300,000	10%	$200,000 \times 0.10 =$ £20,000.00	
Band 3	Above £300,000 → 480,000 – 300,000 = £180,000	15%	$180,000 \times 0.15 =$ £27,000.00	
Total Bonus	—	—	£52,000.00	5,000 + 20,000 + 27,000

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Question 6:

Gym Membership Discount Bands

A gym offers discounted rates on membership fees based on years of membership:

- Year 1: full fee £500
- Years 2 to 4: 10% discount (so 90% of full fee each year)
- Years 5 to 9: 20% discount
- Year 10 onwards: 30% discount

Over 12 years, what is the total amount paid, assuming full fee remains £500 each year?

ANSWER:

Gym Membership Discount Bands

Year	Fee per Year	Discount	Fee Paid That Year	Explanation
Year 1	£500	0%	$500 \times 1.00 = \text{£}500.00$	
Years 2-4 (3 years)	£500 each	10% off → 90%	$3 \times (500 \times 0.90) = 3 \times \text{£}450 = \text{£}1,350.00$	
Years 5-9 (5 years)	£500 each	20% off → 80%	$5 \times (500 \times 0.80) = 5 \times \text{£}400 = \text{£}2,000.00$	
Years 10-12 (3 years)	£500 each	30% off → 70%	$3 \times (500 \times 0.70) = 3 \times \text{£}350 = \text{£}1,050.00$	
Total Over 12 Years	—	—	£4,900.00	Sum: 500 + 1,350 + 2,000 + 1,050

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Question 7:

Private Health Insurance Premium Bands

A health insurance company charges premiums based on age bands:

- Ages up to 25: £200 per year
- Ages 26–40: £350 per year
- Ages 41–60: £600 per year
- Ages over 60: £1,000 per year

What is total premium paid from age 20 through age 65 (inclusive of every year of age within band), assuming you pay each year in the band you're in?

ANSWER:

Private Health Insurance Premium Bands

Age Range	Number of Years in that Band	Annual Premium	Total Premium for Band	Explanation
Ages 20-25	Ages 20,21,22,23,24,25 → 6 years	£200	$6 \times 200 =$ £1,200	
Ages 26-40	Ages 26-40 inclusive → 15 years	£350	$15 \times 350 =$ £5,250	
Ages 41-60	Ages 41-60 inclusive → 20 years	£600	$20 \times 600 =$ £12,000	
Ages 61-65	Ages 61-65 inclusive → 5 years	£1,000	$5 \times 1,000 =$ £5,000	
Total Premium from 20-65	—	—	£23,450.00	Sum: 1,200 + 5,250 + 12,000 + 5,000

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Question 8:

Tiered Shipping Costs

A shipping company charges for packages by weight using a tiered charge:

- Up to 2 kg: £3 per kg
- Over 2 kg up to 10 kg: £5 per kg for the portion over 2 kg
- Over 10 kg: £10 per kg for the portion over 10 kg

What is the shipping cost of a 15 kg package?

ANSWER:

Tiered Shipping Costs

Band	Weight in Band	Rate per kg	Cost for Band	Explanation
Band 1	First 2 kg	£3/kg	$2 \times 3 =$ £6.00	
Band 2	Next up to 10 kg $\rightarrow 15 - 2 = 13$ kg $\rightarrow$ but band 2 is only up to 10 kg total, so portion = $10 - 2 = 8$ kg	£5/kg	$8 \times 5 =$ £40.00	
Band 3	Above 10 kg $\rightarrow 15 - 10 = 5$ kg	£10/kg	$5 \times 10 =$ £50.00	
Total Shipping Cost	—	—	£96.00	$6 + 40 + 50$

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Question 9:

University Tuition Fee Bands

A university charges tuition fees based on the number of credits:

- First 30 credits at £250 each
- Next 30 credits at £200 each
- Next 60 credits at £150 each
- Any credits over 120 at £100 each

If a student takes 150 credits in a year, what is their fee?

ANSWER:

University Tuition Fee Bands

Band	Credits in Band	Rate per Credit	Fee for Band	Explanation
Band 1	First 30 credits	£250	$30 \times 250 =$ £7,500	
Band 2	Next 30 credits → up to 60	£200	$30 \times 200 =$ £6,000	
Band 3	Next 60 credits → up to 120	£150	$60 \times 150 =$ £9,000	
Band 4	Credits over 120 → 150 – 120 = 30 credits	£100	$30 \times 100 =$ £3,000	
Total Fee	—	—	£25,500.00	$7,500 + 6,000 +$ $9,000 + 3,000$

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Question 10:

Progressive Sales Commission

A salesperson earns commission on sales in yearly bands:

- 2% on sales up to £50,000 (for the first £50,000)
- 5% on the next £100,000 (i.e. from £50,000 to £150,000)
- 7% on the next £200,000 (from £150,000 to £350,000)
- 10% on anything above £350,000

If the salesperson's sales in the year are £480,000, how much commission do they earn?

ANSWER:

Progressive Sales Commission

Band	Sales in Band	Rate	Commission for Band	Explanation
Band 1	First £50,000	2%	$50,000 \times 0.02 =$ £1,000.00	
Band 2	Next £100,000 → up to £150,000	5%	$100,000 \times 0.05 =$ £5,000.00	
Band 3	Next £200,000 → up to £350,000	7%	$200,000 \times 0.07 =$ £14,000.00	
Band 4	Above £350,000 → $480,000 - 350,000 =$ £130,000	10%	$130,000 \times 0.10 =$ £13,000.00	
Total Commission	—	—	£33,000.00	Sum: 1,000 + 5,000 + 14,000 + 13,000

The exercise worksheet ends. Check your work.