



Level 3 Certificate

MATHEMATICAL STUDIES

Paper 1

June 2022

Preliminary Material

To be opened and issued to candidates on
Tuesday 1 March 2022 or as soon as possible after that date.

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INFORMATION

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Income Tax and National Insurance 2021–2022

Income tax 2021–2022

Everyone in the UK has a personal allowance. This is their annual amount of tax-free income. The standard personal allowance for 2021–2022 is £12 570

The rates of income tax you pay depend on how much income you have **above** your personal allowance.

Income tax rates and taxable bands 2021–2022

| Income after allowances | Income tax rate |
|---------------------------------|-----------------|
| up to £37 700 | 20% |
| over £37 700 and up to £150 000 | 40% |

To calculate your income tax

Find your taxable income by subtracting your personal allowance from your annual gross income.

You pay income tax at 20% on the first £37 700 of your taxable income.

You pay income tax at 40% on your taxable income over £37 700 and up to £150 000

There is also a higher rate of tax for taxable income above £150 000

National Insurance (NI) 2021–2022

| Percentage NI due | Minimum monthly income | Maximum monthly income | Minimum yearly income | Maximum yearly income |
|-------------------|------------------------|------------------------|-----------------------|-----------------------|
| 0% | | up to £797 | | £9568 |
| 12% | £797.01 | £4189 | £9568.01 | £50270 |
| 2% | above £4189 | | above £50270 | |

Examples

A person who had a monthly income of £1800 paid 12% of the amount above £797

A person who had a yearly income of £62000 paid 12% of the amount between £9568 and £50270 plus 2% of the amount above £50270

Sweet Factory

A sweet factory produces several different types of sweets. Sweets can be various shapes, including cuboids and spheres.



Making the sweets

Each day a sweet-making machine is switched on and starts to make the first batch of sweets. It takes between 1 and 3 hours before the first sweets are produced and packaged, depending on the type of sweet being made.

Once this initial period is completed the machine can continually produce and package sweets at a rate of 12 000 to 16 000 sweets per minute, again depending on the type of sweet being made.

The machine is stopped overnight for maintenance and cleaning.

Packaging the sweets

Sweets are packaged into boxes or cylindrical tubes.

Some cuboid-shaped sweets fit into their packaging with little empty space between them.

However, sweets that are spheres do not fit together without gaps, so often there is more empty space in the package.

The number of sweets that can fit in each box or tube is worked out.

Once the number of sweets per package is worked out, the machine is set to fill the chosen package type consistently.

END OF PRELIMINARY MATERIAL

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