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# Level 3 Certificate

# MATHEMATICAL STUDIES

Paper 1

June 2018

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## Preliminary Material

To be opened and issued to candidates on  
Thursday 1 March 2018.

### REMINDER TO CANDIDATES

YOU MUST **NOT** BRING THIS PRELIMINARY MATERIAL  
WITH YOU WHEN YOU SIT THE EXAMINATION.  
A CLEAN COPY WILL BE MADE AVAILABLE.

### INFORMATION

The Preliminary Material is to be seen by teachers and candidates **only**, for use during preparation for the examination on Wednesday 16 May 2018. It **cannot** be used by anyone else for any other purpose, other than as stated in the instructions issued, until after the examination date has passed. It must **not** be provided to third parties.

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## Income Tax and National Insurance 2017–2018

### Income tax 2017–2018

Everyone in the UK has a personal allowance. This is their annual amount of tax-free income. The standard personal allowance for 2017–2018 is £11 500

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

### Income tax rates and taxable bands 2017–2018

Rate	Taxable income
Basic: 20%	up to £33 500
Higher: 40%	over £33 500 and up to £150 000
Additional: 45%	over £150 000

### Calculating your income tax

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

You pay income tax at 20% on the first £33 500 of your taxable income.

You pay income tax at 40% on your taxable income over £33 500 and up to £150 000

You pay income tax at 45% on your taxable income over £150 000

## National Insurance (NI) 2017–2018

Percentage NI due	Minimum weekly income	Maximum weekly income	Minimum yearly income	Maximum yearly income
0%		£157		£8164
12%	£157.01	£866	£8164.01	£45 032
2%	above £866		above £45 032	

### Examples

A person who had a weekly income of £350 paid 12% on the amount above £157

A person who had a weekly income of £950 paid 12% on the amount between £157.01 and £866 plus 2% of the amount above £866

### Gross pay

Your gross pay is your wage or salary, before any deductions are made.

### Net pay

Your net pay (or take-home pay) is the amount of money you receive after income tax, National Insurance and other deductions have been taken off your gross pay.

### Payday loan

A payday loan is a short-term loan which often has a very high Annual Percentage Interest Rate (APR). The formula for APR is given on the formulae sheet.

Turn over ►

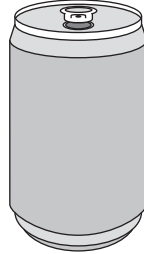
## Making food and drink cans

The basic material used for most food cans in the UK is steel.

There are two ways to produce food cans; by using three pieces of metal or by using two pieces of metal.



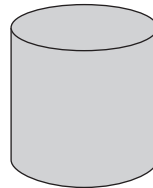
Three-piece



Two-piece

The traditional method is to make **three-piece** cans. This involves cutting pieces from 1 m by 1 m sheets of steel and, in most cases, coating them on the inside with lacquer to protect the food inside the can.

Rectangles of steel are cut and curled into a cylinder and the edges welded together. Circular ends are also cut.

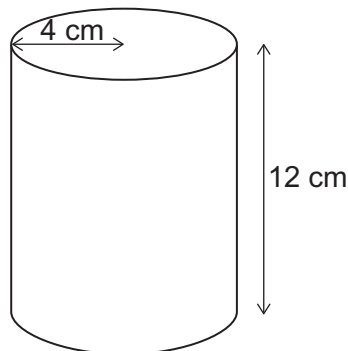


The bottom end is seamed onto the cylinder together with a compound that ensures an airtight seal. The waste steel left after cutting out the cylinders or circles is recycled for other uses.

To make a **two-piece** can, coils of steel are fed through an automatic cupping machine where small steel cups are formed. The cups are then fed into a machine that stretches the cup to make it taller.

Both types of can are then sent to the company which ordered them, to be filled with food or drink. The circular top of each can is then seamed on and treated to be airtight.

Food and drinks cans are made in many different sizes. For example, this three-piece can has radius 4 cm and height 12 cm



**END OF PRELIMINARY MATERIAL**