



F13.5 Number and data questions

Exam preparation · GCSE · OCR J277 1.2.4, AQA 8525 3.3.2, Edexcel 1CP2
2.1.3 · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

Conversions, units and file sizes at speed, with the checks that catch mistakes.

- Show your working
- The five conversions
- The checks that catch slips
- Units and file sizes
- Character codes

Questions

6 marks in all

1. Convert 200 to 8-bit binary. [1 mark]

2. Convert 10110110 to hexadecimal. [1 mark]

3. How many different values can 8 bits hold? [1 mark]

4. A 64 by 48 image at 8 bits a pixel. How many bits? [1 mark]

5. What is the ASCII code for capital A? [1 mark]

6. Your binary answer has 7 digits. What should you check? [1 mark]

- ☐ A An 8-bit answer needs exactly 8 digits, so add the leading zero
- ☐ B Nothing: 7 is fine
- ☐ C Convert it to hex instead
- ☐ D Double the number

The task: the conversion drill

For each number in `numbers`, print `<denary> = <8-bit binary> = <2-digit hex>`, working each one out yourself rather than using `bin()`, `hex()` or `format()`. Then for the image in `image` (width, height, bits per pixel), print `image: <n> bits` and `image: <n> kB`, and for `sound` (rate, seconds, bit depth) print `sound: <n> bits` and `sound: <n> kB`. Give the kB to 1 decimal place.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

numbers = [5, 77, 200, 255]
image = (64, 48, 8)          # width, height, bits per pixel
sound = (8000, 5, 8)         # samples a second, seconds, bits a sample
```

Plan your program here, then type it in and press Run.



Do it on the robot

www.bugbotlab.com/learn/f13-5-number-and-data-questions/

The simulator checks it and tells you when it passes. Nothing to install, no account.

Challenges

1. Add a column for the number after a left shift of one place. What happens to 200?
2. Work out the size of a 10-second stereo recording at 44,100 Hz and 16 bits.
3. Time yourself converting ten random numbers. Where do you slow down?