Number Representation 3 - Negative Numbers

- 1. Express the following decimal numbers in an 8-bit binary register using sign and magnitude
- a) 20
- b) 50
- c) -68

Answers

- a) 10010100
- b) 00110010
- c) 11000100
- 2. Assuming you have 8-bits to represent a number and you are working in two's complement, find the binary expression of:
- a) 55
- b) -14
- c) 94

Answers

- a) 11001001 (-128+64+8+1)
- b) 11110010 (-128+64+32+16+2)
- c) 01011110 (+64+16+8+4+2)
- 3. Perform the following calculations using two's complement arithmetic. All numbers are represented in an 8-bit register.
- a) 99 56
- b) 85 106
- c) -25 30

Answers

- a) 00101011
- b) 11101011
- c) 11001001
- 4. Write the decimal value of the following numbers expressed in two's complement:
- a) 10010011
- b) 00110110

Answers

- a) -109
- b) 54
- 5. Given a 6-bit register, work out the possible ranges of decimal numbers for each of the following representations
- a) Unsigned binary
- b) Sign and Magnitude binary

c) Two's Complement binary

Answers

- a) From 0 to 63
- b) From -31 to 31
- c) From -32 to 31