

Mh4718 Worksheet 2

1. Write down the base two representation of 4, 8, 16, 32, 64, 128, 256, 512, 1024.
2. Write down the base two representation of 3, 7, 15, 31, 63, 127, 255, 511, 1023.
3. Write down the base two representation of 0.5, 0.25, 0.75, 0.125, 0.375.
4. Write down the base two representation of $2^5, 2^{12}, 2^3 + 2^7 + 2^8, 2^7 + 2^3 + 1,$
5. Write down the base two representation of $2^{-5}, 2^{-3} + 0.5, 2^5 + 2^4 + 1 + 2^{-2} + 2^{-4} + 2^{-10}.$
6. Write down the base ten representation of the following base two numbers:
10; 100; 1000; 10000; 11; 111; 1111; 11111; 0.1; 0.01; 0.001; 1.1; 1.11; 10.111;
1010; 1011; 101111; 101011.001; $0.\dot{1}0\dot{1}; 0.10\dot{1}0\dot{0}\dot{1}; 0.11\dot{0}\dot{0}\dot{1}$
7. Write down the results of the following base two sums in base two: $1+1; 11 + 1;$
 $111+1; 1111+1; 10010; 1110; 1010100; 1.00110; 10.111000; 0.001101+0.0000001;$
 $0.001101+0.000001; 0.001011+0.000001; 0.001111+0.000001.$
8. Convert each of the following base ten numbers to base two representation:
(i) 127, (ii) 257, (iii) 36 (iv) 0.5, (v) 0.75, (vi) 0.625, (vii) 126.4375 (viii) 0.1,
(ix) 0.2, (x) 0.3, (xi) $\frac{1}{6}$, (xii) $\frac{2}{3}$, (xiii) $\frac{7}{8}$, (xiv) $\frac{3}{16}$.
9. First decide which of the following have finite base two place value representation and then write down the representation in each case, finally convert each representation to base two floating point format:
 $\frac{2}{7}, \frac{4}{5}, \frac{3}{16}, \frac{7}{8}, \frac{1}{6}, 0.3, 0.4, 0.0125, 0.046875.$
10. Convert each of the following to base two normalised scientific representation:
(i) 210, (ii) $210 + 0.5,$ (iii) 211, (iv) $211 + 0.5,$ (v) 212, (vi) $212 + 0.5.$
11. How many digits are there in the base ten representation of each of the following: $3^{20}; 2^{140}; 3^{40}2^{140}$
12. How many leading zeroes and how many significant digits are there in the base ten representation of $\frac{7}{2^{10}5^8}$?