

1. Simplify the following expressions.

i) $3a^2 \times 2b^{-2} \times 4a^3 \div b$

ii) $4^3 \times 4^3 \times 4^3 \times 4^3 \times 5^0 \times 6^3$

iii) $5^4 \div (4^3 \times 3^2)$

iv) $4 \times 3^{-3/4}$

2. Factorise the following.

i) $p^3q + p^2q^4$

ii) $pqr^2st^3 - qrs^2t^2$

iii) $pq + pq^3r^4 + p^2q^2r^2$

iv) $h^{3;2}k^3 + h^{3;3}k^3 + h^{3;2}k^5 + h^{8;8}k^8$

3. Find the lowest common multiple of the following four sets.

i) {14, 325}

ii) {3, 25}

iii) {16, 20}

4. Find the highest common factor of the following sets.

i) {15, 231}

ii) {18, 27}

iii) {18, 81}

iv) {560, 7954}

5. Decompose the following numbers into prime factors.

i) 3829

ii) 193812

iii) 92012

iv) 2910

6. Round the following numbers to the nearest **ten**.

i) 2819

ii) 291.492

- iii) 2914.920
- iv) 291.201
7. Write the following numbers in scientific notation to **three** significant figures.
- i) 281.38291
- ii) 2837949281.291039
- iii) 1929294929102019294872
- iv) 9
8. A cuboid has the edges that are $k+3$, $4k+9$ and $6k-12$ cm long.
- i) What is the total length of the edges of the cuboid?
- ii) What is the surface area of the cuboid?
- iii) What is the volume of the cuboid?
- iv) If $k=4$, what are the values of the three quantities above?
- v) What is the value of k when the volume of the cuboid is 100cm^3 ?
- vi) Using the information that you calculated for parts i - iii of question 8, draw a graph showing how the surface area changes as k moves from 0 to 5 in steps of 0.5.
9. Write a rule explaining how to round a number to the nearest degree of 10.
10. In base ten, the highest digit we can have is nine. In base two, the highest digit that we can have is one. The base of any particular number must always be at least one more than the highest digit in that base.

Convert the following numbers into base 10.

- i) Base 3 201022012
- ii) Base 8 763271627
- iii) Base 4 30101120331
- iv) Base 7 4361011212