Use of Exponents to Express Small Numbers in Standard Form

Understanding of Use of Exponents to Express Small Numbers in Standard Form

- Standard form is a way of writing very small numbers using powers of 10.
- Small numbers are written as a number between 1 and 10 multiplied by 10 raised to a negative power.
- It makes reading, writing, and comparing small numbers easier.
- The number of places the decimal moves to the right gives the negative exponent.

Important Points

- **Standard form of small numbers:** $a \times 10^{-n}$ where $1 \leq a < 10$.
- Move the decimal point to the right until one non-zero digit remains before the decimal.
- Count the number of moves to get the exponent.
- The exponent is negative because the number is less than 1.
- Useful in fields like science, astronomy, and measurements.

Examples with Solutions

Example: Express 0.0005 in standard form

Solution: Move decimal 4 places right → 5×10^{-4}

Example: Express 0.0062 in standard form

Solution: Move decimal 3 places right → 6.2×10^{-3}

Example: Express 0.000012 in standard form

Solution: Move decimal 5 places right → 1.2×10^{-5}

Example: Express 0.078 in standard form

Solution: Move decimal 2 places right → 7.8×10^{-2}

Example: Express 0.00000091 in standard form

Solution: Move decimal 7 places right → 9.1×10^{-7}

Summary Points

- Write small numbers as $a \times 10^{-n}$.
- Move decimal right to form a number between 1 and 10.
- Number of decimal shifts becomes the negative exponent.
- Small numbers in standard form are easy to read and compare.
- Always check if the first digit lies between 1 and 10.