# Converting and working with numbers in index form

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Name:

1) Write these numbers as a single power of 2, 3, 5 or 7:

| | | | | | |
|---|---|---|---|---|---|
| a) 4 | $2^2$ | e) 16 | $2^4$ | i) $\frac{1}{25}$ | $5^{-2}$ |
| b) 9 | $3^2$ | f) $\frac{1}{9}$ | $3^{-2}$ | j) $\frac{1}{27}$ | $3^{-3}$ |
| c) 25 | $5^2$ | g) $\frac{1}{5}$ | $5^{-1}$ | k) $\frac{1}{16}$ | $2^{-4}$ |
| d) 125 | $5^3$ | h) $\frac{1}{49}$ | $7^{-2}$ | l) $\frac{1}{343}$ | $7^{-3}$ |

2) Write all these calculations as a single power of 2, 3 or 5:

| | | | | | |
|---|---|---|---|---|---|
| a) $4 \times 2$ | $2^3$ | e) $32 \times 4$ | $2^7$ | i) $27^3 \div 9^7$ | $3^{-5}$ |
| b) $9 \times 3^2$ | $3^4$ | f) $27 \div \frac{1}{3}$ | $3^4$ | j) $16 \times 16$ | $2^8$ |
| c) $2^4 \div 4$ | $2^2$ | g) $125 \times \frac{1}{5}$ | $5^2$ | k) $4^3 \div \frac{1}{16}$ | $2^{10}$ |
| d) $3^3 \div 9$ | $3^1$ | h) $4^3 \div 2^2$ | $2^4$ | l) $8^2 \div \frac{1}{4}$ | $2^8$ |

3) Using laws of indices, find the value of $x$ in these equations:

| | | | |
|---|---|---|---|
| a) $9 \times 3^x = 81$ | x = 2 | f) $3^x \times \frac{1}{3} = 27$ | x = 4 |
| b) $27 \times 3^2 = 3^x$ | x = 5 | g) $16 \times 2^{2x+1} = 2^9$ | x = 2 |
| c) $2^x \div 8 = 16$ | x = 7 | h) $3^{x+2} \div 9 = 27$ | x = 3 |
| d) $32 \div 2^x = 2^2$ | x = 3 | i) $2^{10} \div 2^{2x} = 4$ | x = 4 |
| e) $\frac{32}{2^x} = \frac{1}{2^2}$ | x = 7 | j) $\frac{81}{3^x} = \frac{1}{9}$ | x = 2 |

**Exam question:**

a) If $3^x = 81$, find the value of x. x = 4

b) If $2^y = 32^{\frac{1}{2}}$, find the value of y. y = 2.5