

(1) Simplify and write your answer as a positive exponent:

(a) $(-3xy^{-3}k^0)^3$

$$= (-3)^3 \times (x^1)^3 \times (y^{-3})^3 \times (k^0)^3$$

$$= -27x^3y^{-9}k^0$$

$$= \frac{-27x^3(1)}{y^9}$$

$$= \frac{-27x^3}{y^9}$$

(b) $\frac{a^{3\frac{1}{2}} \times a \times a^{\frac{1}{2}}}{b^3 \times b^{-6}}$

$$= \frac{a^{3\frac{1}{2} + 1 + \frac{1}{2}}}{b^{3-6}}$$

$$= \frac{a^5}{b^{-3}}$$

$$= a^5b^3$$

(c) $3^{x+2y} \cdot 9^{-y}$

$$= 3^{x+2y} \cdot (3^2)^{-y}$$

$$= 3^{x+2y} \cdot 3^{-2y}$$

$$= 3^{x+2y-2y}$$

$$= 3^x$$

(d) $\sqrt{9m^6 + 16m^6}$

$$= \sqrt{25m^6}$$

$$= \sqrt{25} \times \sqrt[2]{m^6}$$

$$= 5m^{\frac{6}{2}}$$

$$= 5m^3$$

(2) Simplify and write your answer as a positive exponent:

(a) $\frac{5^0 \times m^{12} \times n^4 \times n^{-2}}{m^5 \times m \times n^6}$

$$= \frac{1 \times m^{12} \times n^{4-2}}{m^{5+1} \times n^6}$$

$$= \frac{m^{12} \times n^2}{m^6 \times n^6}$$

$$= m^{12-6} \times n^{2-6}$$

$$= m^6 \times n^{-4}$$

$$= \frac{m^6}{n^4}$$

(b) $\frac{(5^3)^2 \times (5 \times 7)^3}{(7^2 \times 5^{-4})^{-1}}$

$$= \frac{5^6 \times 5^3 \times 7^3}{7^{-2} \times 5^4}$$

$$= \frac{5^9 \times 7^3}{7^{-2} \times 5^4}$$

$$= 5^{9-4} \times 7^{3-(-2)}$$

$$= 5^5 \times 7^{3+2}$$

$$= 5^5 \times 7^5$$

(3) (a) Write in scientific notation:

$$(i) \ 4\ 320 = 4,32 \times 10^3$$

$$(ii) \ 0,03166 = 3,166 \times 10^{-2}$$

(b) Write as a number:

$$(i) \ 1,1 \times 10^6 = 1\ 100\ 000$$

$$(ii) \ 5,08 \times 10^{-1} = 0,508$$

(4) Simplify without using a calculator and write the answer in scientific notation:

$$(i) \ (3,5 \times 10^{-5}) \div (7,0 \times 10^2)$$

$$= (3,5 \div 7,0) \times (10^{-5} \div 10^2)$$

$$= \left(\frac{3,5}{7,0}\right) \times (10^{-5-2})$$

$$= \frac{3,5^1}{7,0^2} \times (10^{-7})$$

$$= \frac{1}{2} \times 10^{-7}$$

$$= 0,5 \times 10^{-7}$$

$$= (5,0 \times 10^{-1}) \times 10^{-7}$$

$$= 5,0 \times 10^{-8}$$

$$(ii) \ (4,6 \times 10^3) + (3,2 \times 10^2)$$

$$= (4,6 \times 10^1 \times 10^2) + (3,2 \times 10^2) \quad \text{or} \quad (4,6 \times 10^3) + (3,2 \times 10^2)$$

$$= 10^2(4,6 \times 10^1 + 3,2)$$

$$= 10^2(46 + 3,2)$$

$$= 10^2(49,2)$$

$$= 49,2 \times 10^2$$

$$= 4,92 \times 10^1 \times 10^2$$

$$= 4,92 \times 10^3$$

$$= 4\ 600 + 320$$

$$= 4\ 920$$

$$= 4,92 \times 10^3$$

(5) Solve for x :

(a) $2^x = 8$

$$2^x = 2^3$$

$$\text{EB} \Leftrightarrow \text{EE}$$

$$\therefore x = 3$$

(b) $5^x = 1$

$$5^x = 5^0$$

$$\text{EB} \Leftrightarrow \text{EE}$$

$$\therefore x = 0$$

(c) $8^x = \frac{1}{16}$

$$(2^3)^x = \frac{1}{2^4}$$

$$2^{3x} = 2^{-4}$$

$$\text{EB} \Leftrightarrow \text{EE}$$

$$\therefore 3x = -4$$

$$\therefore x = \frac{-4}{3}$$

(d) $x^4 = 81$

$$x^4 = 3^4$$

$$\text{EB} \Leftrightarrow \text{EE}$$

$$\therefore x = \pm 3$$