

Revision Indices 5.1

Revision

$$2^3$$

power / index

base

Sol

Questions 1

Simplify the following leaving your answer in Indices Format

a) $2^3 \times 2^4 = 2^7$

b) $2^5 \times 2 = 2^5 \times 2^1 = 2^6$

c) $4^2 \times 4^8 \times 3^2 = 4^2 \times 4^8 = 4^{10} \times 3^2$

d) $2^{13} \div 2^4 = 2^{13-4} = 2^9$

e) $2^5 \div 2 = 2^{5-1} = 2^4$

f) $8^{12} \div 8^8 = 8^{12-8} = 8^4$

Questions 2

Simplify the following leaving your answer in Integer Format

a) $2^0 = 1$

b) $2^5 \times 5^0 = 2^5 = 32 \times 5^0 = 1$
 $32 \times 1 = 32$

c) $2^3 \times 4^2 \times 4^2 = 1 \times 16 \times 16 = 256$

d) $2^0 \div 2^4 = \frac{2^0}{2^4} = \frac{1}{16}$

e) $2^0 \div 2 = \frac{2^0}{2} = \frac{1}{2}$

f) $8^2 \div 8^0 = \frac{64}{1} = 64$

Questions 3

Simplify the following leaving your answer in positive Integer Format

a) $(2^0)^3 = 2^{0 \times 3} = 2^0 = 1$

b) $(2^5)^3 = 2^{5 \times 3} = 2^{15} = \underline{32,768}$

c) $(2^{-4})^3 = 2^{-4 \times 3} = 2^{-12} = \frac{1}{2^{12}} = \frac{1}{4096}$

d) $2^0 \div (2)^4 = 2^0 = 1 \quad \frac{1}{2^4} = \frac{1}{16}$

e) $(5^2)^3 \div 125 = \frac{5^6}{125} = \frac{15,625}{125} = \underline{125}$

f) $\frac{(-6)^2 \times 3^2}{6^{10} \times 3^5} = \frac{-6^2 \times 3^2}{6^{10} \times 3^5} = \frac{6 \times 6 \times 3 \times 3}{\cancel{6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6} \times 3 \times 3 \times 3}$
 $= \frac{1}{6^8 \times 3^3}$

Questions 4

Simplify algebraic products and quotients using index laws (leave answer in positive indices form where possible)

a) $2a^3 \times -5a^4 = \underline{-10a^7}$

b) $z^5 \times 4z = 4 \times 1 = 4 \quad z^5 \times z^1 = z^6$
 $= \underline{4z^6}$

c) $a^2 \times y^8 \times 3x^2 = 1 \times 1 \times 3 = 3$
 $\underline{3a^2x^2y^8}$

d) $2x^{13} \div 14x^4 = \frac{2x^{13}}{14x^4} = \frac{1x^8}{7} = \frac{x^8}{7}$

e) $3y^5 \div 9 = \frac{3y^5}{9} = \frac{1y^5}{3} = \frac{y^5}{3} \text{ or } \frac{1}{3}y^5$

f) $4b^{12} \div b^8 = \frac{4b^{12}}{b^8} = \underline{4b^4}$

Questions 5

Simplify algebraic products and quotients using index laws (leave answer in positive indices form where possible)

a) $(2x^0)^3 = 2^{3 \times 1 \times 0 \times 3} = 2^3 \times x^0 = 2^3$

b) $(2^5 x^5)^3 = 2^{15} x^{15}$

c) $(2x^4)^3 = 2^3 x^{12}$

d) $2b^0 \div (2a)^4 = \frac{2b^0}{2^4 a^4} = \frac{2}{2^4 a^4}$

e) $(5^2)^3 \div 5 = \frac{5^6}{5^1} = 5^5 = \frac{1}{2^3 a^4}$

f) $\frac{(-6x)^2 \times 3y^2}{6y^{10} \times 3x^5} = \frac{6 \cancel{6} x^2 \times 3 \cancel{3} y^2}{6 \cancel{6} x^5 \times 3 \cancel{3} y^{10}} = \frac{6}{x^3 y^8}$

Questions 6

Complete the following table (use a calculator but leave your answer as a positive integer)

2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}
4	2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$

Are the following expressions True or False?

a) $a^2 \times a^3 = a^6$ Show reason (try substituting a value for 'a').

Let $a=2$ so $2^2 \times 2^3 = 2^5 = 32$ but $2^6 = 64$

$\therefore 32 \neq 64$, No False!

b) $2x^3 \times 4x^3 = 2x^3 + 4x^3$? Why

Let $x=1$ $2 \times 4 = 8$ $2 \times 1 + 4 \times 1 = 2 + 4 = 6$

$8 \neq 6$ no false!

