

Indices 2

Further Examples

- 1) $x^9 \times x^2 = x^{9+2} = x^{11}$
 - 2) $x^7 \div x^2 = x^{7-2} = x^5$
 - 3) $(x^4)^3 = x^{4 \times 3} = x^{12}$
 - 4) $x \times x^2 = x^1 \times x^2 = x^{1+2} = x^3$
 - 5) $2x^3 \times 3x^2 = 6x^5$
 - 6) $8x^6 \div 4x^5 = \frac{8x^6}{4x^5} = 2x^1 = 2x$
 - 7) $(x^1)^7 = x^{1 \times 7} = x^7$
 - 8) $(x^0)^5 = x^0 = 1$
 - 9) $5x^2 \times 3x^4 \times 2x^3 = 30x^9$
 - 10) $(3x^2)^3 = 27x^6$
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- 1 $x^p \times x^q = x^{p+q}$
- 2 $x^p \div x^q = x^{p-q}$
- 3 $(x^p)^q = x^{p \times q}$
- 4 $x^1 = x$
- 5 $x^0 = 1$
- 6 $x^{-p} = \frac{1}{x^p}$

Exercise 21C

Simplify

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|--|------------------------------------|---|--------------------------|
| 1 (a) $x^8 \times x^2$ | (b) $y^3 \times y^8$ | (c) $z^7 \times z$ | (d) $w^9 \times w^5$ |
| 2 (a) $a^5 \times a^3$ | (b) $b^3 \times b^3$ | (c) $c \times c^9$ | (d) $d^7 \times d^4$ |
| 3 (a) $p^5 \div p^2$ | (b) $q^{12} \div q^2$ | (c) $r^9 \div r$ | (d) $t^8 \div t^4$ |
| 4 (a) $j^9 \div j^3$ | (b) $k^5 \div k^4$ | (c) $m^2 \div m$ | (d) $n^{25} \div n^{23}$ |
| 5 (a) $(d^3)^4$ | (b) $(e^5)^2$ | (c) $(f^3)^3$ | (d) $(g^7)^9$ |
| 6 (a) $(g^6)^4$ | (b) $(h^2)^2$ | (c) $(k^4)^0$ | (d) $(m^0)^{56}$ |
| 7 (a) $3x^2 \times 2x^3$ | (b) $5y^9 \times 3y^{20}$ | (c) $6z^8 \times 4z$ | |
| 8 (a) $12p^8 \div 4p^3$ | (b) $15q^5 \div 3q^3$ | (c) $6r^5 \div 3r$ | |
| 9 (a) $(3d^2)^7$ | (b) $(4e)^3$ | (c) $(3f^{129})^0$ | |
| 10 (a) $x^5 \times x^2 \times x$ | (b) $y^2 \times y^4 \times y^3$ | (c) $z^3 \times z^5 \times z$ | |
| 11 (a) $\frac{a^4 \times a^5}{a^3}$ | (b) $\frac{b^7 \times b}{b^4}$ | (c) $\frac{c^3 \times c^4}{c^2 \times c^5}$ | |
| 12 (a) $4d^9 \times 2d$ | (b) $8e^8 \div 4e^4$ | (c) $(4f^2)^2$ | |
| 13 (a) $3p^6 \times p^3 \times p^4$ | (b) $5q^5 \times 3q^3 \times 2q^2$ | | |
| 14 (a) $\frac{3x^3 \times 4x^7}{2x^5}$ | (b) $\frac{(6x^5)^2}{9x^8}$ | | |

$$1 \text{ a) } x^8 \times x^2 = x^{8+2} = x^{10}$$

$$1 \text{ c) } z^7 \times z = z^8$$

$$1 \text{ b) } y^3 \times y^8 = y^{3+8} = y^{11}$$

$$1 \text{ d) } w^9 \times w^5 = w^{14}$$

$$2 \text{ a) } a^5 \times a^3 = a^8$$

$$2 \text{ c) } c \times c^9 = c^{10}$$

$$2 \text{ b) } b^3 \times b^3 = b^6$$

$$2 \text{ d) } d^7 \times d^4 = d^{11}$$

$$3a) p^5 \div p^2 = p^3$$

$$3b) q^{12} \div q^2 = q^{10}$$

$$4a) j^9 \div j^3 = j^6$$

$$4b) k^5 \div k^4 = k$$

$$5a) (d^3)^4 = d^{12}$$

$$5b) (e^5)^2 = e^{10}$$

$$6a) (g^6)^4 = g^{24}$$

$$6b) (h^2)^2 = h^4$$

$$7a) 3x^2 \times 2x^3 \\ = 6x^5$$

$$7b) = 5y^9 \times 3y^{20} \\ = 15y^{29}$$

$$8a) 12p^8 \div 4p^3 \\ = 3p^5$$

$$8b) 15q^5 \div 3q^3 \\ = 5q^2$$

$$3c) r^9 \div r = r^8$$

$$3d) t^8 \div t^4 = t^4$$

$$4c) m^2 \div m = m$$

$$4d) h^{25} \div h^{23} = h^2$$

$$5c) (f^3)^3 = f^9$$

$$5d) (g^7)^9 = g^{63}$$

$$6c) (k^4)^0 = k^0 = 1$$

$$6d) (m^0)^{56} = m^0 = 1$$

$$7c) 6z^8 \times 4z \\ = 24z^9$$

$$8c) 6r^5 \div 3r \\ = 2r^4$$

$$9a) (3d^2)^7$$

$$2187d^{14}$$

$$9b) (4e)^3$$

$$= 64e^3$$

$$10a) x^5 \times x^2 \times x$$

$$= x^8$$

$$10b) y^2 \times y^4 \times y^3$$

$$= y^9$$

$$9c) (3f^{12g})^0 = 1$$

$$10c) z^3 \times z^5 \times z$$

$$= z^9$$