N5 Maths: Indices

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Non-calculator

Q1 Fully simplify, expressing your answer with a positive power:

a) $\dfrac{x^2 \times x^5}{x^3}$ **b)** $\dfrac{x \times x^5}{x^8}$ **c)** $\dfrac{x^3 \times x^{-5}}{x^4}$

d) $\dfrac{3x^{-3} \times 4x^7}{2x^3}$ **e)** $\dfrac{6x^2}{3x^{-2} \times 3x^6}$ **f)** $\dfrac{x^{-3} \times 2x^4}{4x^5 \times x^{-1}}$

Q2 Fully simplify, expressing your answer with no brackets or negative powers:

a) $(xy)^3$ **b)** $(4x^2y)^3$ **c)** $\left(\frac{2}{3}x^2y^4\right)^3$

d) $(x^4)^2 \times x^3$ **e)** $(x^{-4})^2 \times x^{-2}$ **f)** $x^{-6} \times (x^3)^2$

g) $(2x^3)^2 \times (3x^{-4})^2$ **h)** $(x^3 \times x^{-5})^{-3}$ **i)** $(x^{-4} \div x^{-1})^2$

Q3 Express each of these expressions in the form x^n.

a) $\sqrt{x}$ **b)** $\sqrt[3]{x}$ **c)** $\left(\sqrt[3]{x}\right)^5$

d) $\dfrac{1}{\sqrt{x}}$ **e)** $\dfrac{1}{\sqrt[3]{x}}$ **f)** $\left(\dfrac{1}{\sqrt[3]{x}}\right)^2$

Q4 Evaluate:

a) $9^{\frac{1}{2}}$ **b)** $9^{-\frac{1}{2}}$ **c)** $8^{\frac{1}{3}}$

d) $8^{-\frac{1}{3}}$ **e)** $16^{\frac{3}{2}}$ **f)** $27^{-\frac{4}{3}}$

g) $16^{\frac{3}{4}}$ **h)** $64^{-\frac{2}{3}}$ **i)** $100^{-\frac{3}{2}}$

j) $\left(\frac{1}{4}\right)^{\frac{3}{2}}$ **k)** $\left(\frac{25}{9}\right)^{-\frac{1}{2}}$ **l)** $\left(\frac{27}{64}\right)^{-\frac{2}{3}}$

Q5 Expand and simplify:

a) $x^2(x^2 + 3)$ **b)** $x^2(x^{-4} + x^{-2})$ **c)** $2x^2\left(\frac{1}{x} + \frac{1}{2}x^{-2}\right)$

d) $x^{\frac{1}{2}}\left(x^{\frac{1}{2}} - 5x^{-\frac{1}{2}}\right)$ **e)** $2x^{-\frac{1}{2}}\left(x^{\frac{3}{2}} - 3x^{-\frac{1}{2}}\right)$ **f)** $3x^{-\frac{1}{4}}\left(x^{\frac{9}{4}} + 2x^{\frac{1}{2}}\right)$

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