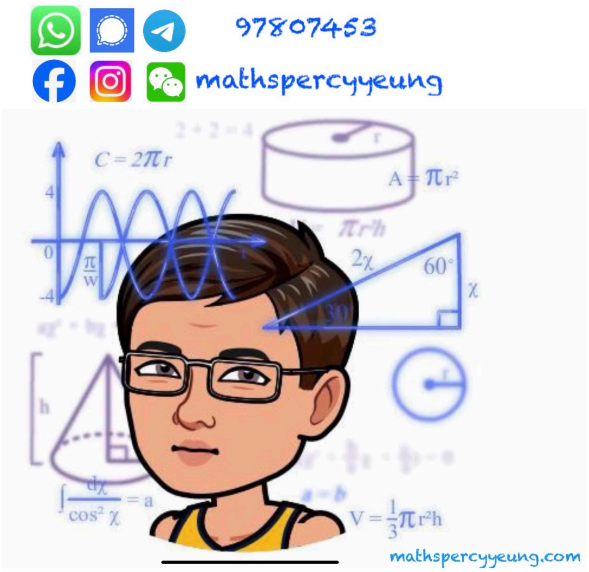
Ch 2 Laws of Integral Indices

(from Quick Practice 2.1)

Simplify the following expressions.

(a) $(p^2 \times p^7)^4$ **(b)** $\left(\dfrac{y^2}{y^{10}}\right)^2$

(c) $(h^7)^3 \div h^8$



(from Quick Practice 2.2)

Simplify the following expressions.

(a) $(4x)^3$

(b) $(-y^6)^5$

(c) $(2x^3y)^4$

(from Quick Practice 2.3)

Simplify the following expressions.

(a) $\left(\frac{x^5}{3}\right)^3$ **(b)** $\left(\frac{x^4}{4y^2}\right)^2$

(c) $\left(\frac{3y}{-y^4}\right)^4$

Simplify the following expressions.

(a) $\frac{a^8b^5}{(a^3b^4)^2}$ (from Quick Practice 2.4(a))

(b) $\left(\frac{2x}{y^4}\right)^4 \times \frac{x^2y^7}{8}$ (from Quick Practice 2.4(b))

(from Quick Practice 2.5)

Given that n is a positive integer, simplify the following expressions.

(a) $3^{2n-1} \times 9^{2n}$

(b) $\frac{9^{2n}}{27}$

(from Quick Practice 2.6)

Find the values of the following expressions without using a calculator.

(a) $25^{-1} + 5^{0} \times 10^{-3}$ **(b)** $8^{-3} \times 2^{5}$

(c) $64^{-3} \div 4^{-6}$

(Leave your answers in fractions if necessary.)

(from Quick Practice 2.7)

Simplify the following expressions and express your answers with positive indices.

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

(from Quick Practice 2.8)

Simplify the following expressions and express your answers with positive indices.

(a) $\dfrac{(3a^0b^3)^{-2}}{a^{-2}b^{-4}}$ **(b)** $\left(\dfrac{2p^{-3}q}{4p^2q^{-3}}\right)^{-2}$

(from Quick Practice 2.9)

Express the following numbers in scientific notation.

(a) 650 000 **(b)** 184 000 000

(c) 0.000 000 25 **(d)** –0.000 037 2

(from Quick Practice 2.10)

Express the following numbers as integers or decimals.

(a) 4.93×10^{7} **(b)** -5.001×10^{2}

(c) 6.72×10^{-3} **(d)** -3.69×10^{-4}

(from Quick Practice 2.11)

Express the following numbers in scientific notation, and round off your answers to 3 significant figures.

(a) $247\ 500\ 000 \times 10^{-5}$

(b) 8264.5×10^{6}

(c) $0.000\ 529\ 8 \times 10^{-4}$

(d) $-0.007\ 539\ 2 \times 10^{5}$

(from Quick Practice 2.12)

Without using a calculator, find the values of the following expressions, and express your answers in scientific notation.

(a) $4 \times 10^{9} + 7 \times 10^{8}$

(b) $0.000\ 000\ 069 - 0.000\ 000\ 004$

(c) $\dfrac{8 \times 10^{8}}{2 \times 10^{-6}}$

(d) $0.0004 \times 6\ 000\ 000$

(from Quick Practice 2.13)

Masks with *nanotechnology* provide good protection against SARS. It is given that the size of a SARS virus is about 8×10^{-8} m and the hole size of a mask is about 6×10^{-9} m. How many times the hole size of the mask is the size of a SARS virus?

(from Quick Practice 2.14)

(a) In the following table, write down the place value of each digit in $93\ 085_{10}$.
(Give your answers in index notation.)

Digit	9	3	0	8	5
Place value					

(b) Hence, express $93\ 085_{10}$ in the expanded form.

(from Quick Practice 2.15)

(a) In the following table, write down the place value of each digit in 11010_2.
(Give your answers in index notation.)

Digit	1	1	0	1	0
Place value					

(b) Hence, express 11010_2 in the expanded form.

(from Quick Practice 2.16)

Write the following expressions as binary numbers.

(a) $1 \times 2^5 + 1 \times 2^4 + 1$

(b) $2^6 + 2^2 + 2$

(c) $1 \times 8 + 1 \times 4 + 1$

(from Quick Practice 2.17)

Convert the following binary numbers into denary numbers.

(a) 1010_2

(b) 101101_2

(from Quick Practice 2.18)

Convert the following denary numbers into binary numbers.

(a) 13_{10} **(b)** 34_{10}

(from Quick Practice 2.19)

Express $2^5 + 2^2 + 5$ as a binary number.