

Model Answers: **SNALPHABET**



a) Simplify $4x \times 5x^2$

SIGN: There are two positive signs so the overall sign is positive.

NUMBER: $4 \times 5 = 20$

ALPHABET: There is $x \times x^2 = x^3$ (from the first and second terms.)

So: $4x \times 5x^2 = +20x^3 = 20x^3$

b) Simplify $6x^3 \times -4x$

SIGN: There is one positive sign and one negative sign so the overall sign is negative.

NUMBER: $6 \times 4 = 24$

ALPHABET: There is $x^3 \times x = x^4$ (from the first and second terms.)

So: $6x^3 \times -4x = -24x^4$

c) Simplify $7x^2 \times -3x^3$

SIGN: There is one positive sign and one negative sign so the overall sign is negative.

NUMBER: $7 \times 3 = 21$

ALPHABET: There is $x^2 \times x^3 = x^5$ (from the first and second terms.)

So: $7x^2 \times -3x^3 = -21x^5$

d) Simplify $7ab \times -3a^2$

SIGN: There is one positive sign and one negative sign so the overall sign is negative.

NUMBER: $7 \times 3 = 21$

ALPHABET: There is $a \times a^2 = a^3$ (from the first and second terms) and b (from the first term).

So: $7ab \times -3a^2 = -21a^3b$

e) Simplify $6a^2b^3 \times 5ab$

SIGN: There are two positive signs so the overall sign is positive.

NUMBER: $6 \times 5 = 30$

ALPHABET: There is $a^2 \times a = a^3$ (from the first and second terms) and $b^3 \times b = b^4$ (from the first and second terms).

So: $6a^2b^3 \times 5ab = 30a^3b^4$

f) Simplify $2q^3r^4 \times 5qr^2$

SIGN: There are two positive signs so the overall sign is positive.

NUMBER: $2 \times 5 = 10$

ALPHABET: There is $q^3 \times q = q^4$ (from the first and second terms) and $r^4 \times r^2 = r^6$ (from the first and second terms).

So: $2q^3r^4 \times 5qr^2 = 10q^4r^6$

g) Simplify $8a^2bc^2 \times -4ac^3$

SIGN: There is one positive sign and one negative sign so the overall sign is negative.

NUMBER: $8 \times 4 = 32$

ALPHABET: There is $a^2 \times a = a^3$ (from the first and second terms,) b (from the first term) and $c^2 \times c^3 = c^5$

So: $8a^2bc^2 \times -4ac^3 = -32a^3bc^5$

h) Simplify $2x^2y \times y \times 4xy^3$

SIGN: There are three positive signs so the overall sign is positive.

NUMBER: $2 \times 1 \times 4 = 8$

ALPHABET: There is $x^2 \times x = x^3$ (from the first and third terms) and $y \times y \times y^3 = y^5$ (from the first, second and third terms).

So: $2x^2y \times y \times 4xy^3 = 8x^3y^5$

i) Simplify $5a^2 \times -3b \times 5ab^4$

SIGN: There are two positive signs and one negative so the overall sign is negative.

NUMBER: $5 \times 3 \times 5 = 75$

ALPHABET: There is $a^2 \times a = a^3$ (from the first and third terms) and $b \times b^4 = b^5$ (from the second and third terms).

So: $5a^2 \times -3b \times 5ab^4 = -75a^3b^5$

j) Simplify $-m^3n \times -3mn \times 5m^2n^2$

SIGN: There are two negative signs and one positive so the overall sign is positive.

NUMBER: $1 \times 3 \times 5 = 15$

ALPHABET: There is $m^3 \times m \times m^2 = m^6$ (from the first, second and third terms) and $n \times n \times n^2 = n^4$ (from the first, second and third terms).

So: $-m^3n \times -3mn \times 5m^2n^2 = 15m^6n^4$

k) Simplify $-4p^3 \times -3q^6 \times 6p^2r^4$

SIGN: There are two negative signs and one positive so the overall sign is positive.

NUMBER: $4 \times 3 \times 6 = 72$

ALPHABET: There is $p^3 \times p^2 = p^5$ (from the first and third terms,) q^6 (from the second term) and r^4 (from the third term.)

So: $-4p^3 \times -3q^6 \times 6p^2r^4 = 72p^5q^6r^4$

l) Simplify $3x^2 \times -5\cos(3x)$

SIGN: There is one positive sign and one negative sign so the overall sign is negative.

NUMBER: $3 \times 5 = 15$

ALPHABET: There is x^2 in the first term but no alphabetic part in the second term.

So: $3x^2 \times -5\cos(3x) = -15x^2 \cos(3x)$

m) Simplify $4xe^{2x} \times -6x^3$

SIGN: There is one positive sign and one negative sign so the overall sign is negative.

NUMBER: $4 \times 6 = 24$

ALPHABET: There is $x \times x^3 = x^4$ (from the first and second terms.)

OTHER: The e^{2x} goes at the end

So: $4xe^{2x} \times -6x^3 = -24x^4 e^{2x}$

n) Simplify $2x^3 \times 3e^{2x} \times 6\cos(2x)$

SIGN: There are three positive signs so the overall sign is positive.

NUMBER: $2 \times 3 \times 6 = 36$

ALPHABET: There is x^3 in the first term but no alphabetic part in the second or third terms.

OTHER: The $\cos(2x)$ term goes at the end.

So: $2x^3 \times 3e^{2x} \times 6\cos(2x) = 36x^3 e^{2x} \cos(2x)$

o) Simplify $4x\sin x \times -3x^4 \times 5xye^{2x}$

SIGN: There is a negative sign so the overall sign is negative.

NUMBER: $4 \times 3 \times 5 = 60$

ALPHABET: There is $x \times x^4 \times x = x^6$ (from the first, second and third terms,) and y (from the third term.)

OTHER: The e^{2x} goes before the $\sin x$ term at the end.

So: $4x\sin x \times -3x^4 \times 5xye^{2x} = -60x^6 ye^{2x} \sin x$

p) Simplify $4ab \div 2a$

You can think of this problem as $4ab \times \frac{1}{2a}$.

SIGN: There are two positive signs so the overall sign is positive.

NUMBER: $4 \times \frac{1}{2} = 2$

ALPHABET: There is $a \times \frac{1}{a} = 1$ (from the first and second terms) and b (from the first term.)

So: $4ab \div 2a = 2b$

q) Simplify $6a^2b^2 \div 3ab$

You can think of this problem as $6a^2b^2 \times \frac{1}{3ab}$.

SIGN: There are two positive signs so the overall sign is positive.

NUMBER: $6 \times \frac{1}{3} = 2$

ALPHABET: There is $a^2 \times \frac{1}{a} = a$ (from the first and second terms) and $b^2 \times \frac{1}{b} = b$ (from the first and second terms.)

So: $6a^2b^2 \div 3ab = 2ab$

r) Simplify $8a^3bc^2 \div 4ac^2$.

You can think of this question as $8a^3bc^2 \times \frac{1}{4ac^2}$.

SIGN: There are two positive signs so the overall sign is positive.

NUMBER: $8 \times \frac{1}{4} = 2$

ALPHABET: There is $a^3 \times \frac{1}{a} = a^2$ (from the first and second terms,) b (from the first term)

and $c^2 \times \frac{1}{c^2} = 1$ (from the first and second terms.)

So: $8a^3bc^2 \div 4ac^2 = 2a^2b$



These model answers are one of a series on mathematics produced by the Learning Enhancement Team.

Scan the QR-code with a smartphone app for [more resources](#).



UEA

University of East Anglia

STUDENT SUPPORT
SERVICE