Algebraic expressions 1A

1 a $x^3 \times x^4 = x^{3+4}$
$= x^7$

b $2x^3 \times 3x^2 = 2 \times 3 \times x^{3+2}$
$= 6x^5$

c $\frac{k^3}{k^2} = k^{3-2}$
$= k$

d $4p^3 \div 2p = \frac{4}{2} \times p^3 \div p$
$= 2 \times p^{3-1}$
$= 2p^2$

e $\frac{3x^3}{3x^2} = \frac{3}{3} \times \frac{x^3}{x^2}$
$= 1 \times x^{3-2}$
$= x$

f $(y^2)^5 = y^{2 \times 5}$
$= y^{10}$

g $10x^5 \div 2x^3 = 5x^{5-3}$
$= 5x^2$

h $(p^3)^2 \div p^4 = p^6 \div p^4$
$= p^{6-4}$
$= p^2$

i $(2a^3)^2 \div 2a^3 = 2^2 \times a^6 \div 2a^3$
$= 4a^6 \div 2a^3$
$= 2a^{6-3}$
$= 2a^3$

j $8p^4 \div 4p^3 = 2p^{4-3}$
$= 2p^1$
$= 2p$

k $2a^4 \times 3a^5 = 2 \times 3 \times a^4 \times a^5$
$= 6 \times a^{4+5}$
$= 6a^9$

l $\frac{21a^3b^7}{7ab^4} = \frac{21}{7} \times \frac{a^3}{a} \times \frac{b^7}{b^4}$
$= 3a^{3-1}b^{7-4}$
$= 3a^2b^3$

m $9x^2 \times 3(x^{2)3} = 9 \times 3 \times x^2 \times x^{2 \times 3}$
$= 27x^{2+6}$
$= 27x^8$

n $3x^3 \times 2x^2 \times 4x^6 = 3 \times 2 \times 4 \times x^{3+2+6}$
$= 24x^{11}$

o $7a^4 \times (3a^4)^2 = 7a^4 \times 9a^8$
$= 63a^{12}$

p $(4y^3)^3 \div 2y^3 = 64y^9 \div 2y^3$
$= 32y^6$

q $2a^3 \div 3a^2 \times 6a^5 = 2 \div 3 \times 6 \times a^{3-2+5}$
$= 4a^6$

r $3a^4 \times 2a^5 \times a^3 = 3 \times 2 \times a^{4+5+3}$
$= 6a^{12}$

2 a $9(x - 2) = 9x - 18$

b $x(x + 9) = x^2 + 9x$

c $-3y(4 - 3y) = -12y + 9y^2$

d $x(y + 5) = xy + 5x$

e $-x(3x + 5) = -3x^2 - 5x$

f $-5x(4x + 1) = -20x^2 - 5x$

g $(4x + 5)x = 4x^2 + 5x$

h $-3y(5 - 2y^{2)} = -15y + 6y^3$

i $-2x(5x - 4) = -10x^2 + 8x$

j $(3x - 5)x^2 = 3x^3 - 5x^2$

k $3(x + 2) + (x - 7) = 3x + 6 + x - 7$
$= 4x - 1$

l $5x - 6 - (3x - 2) = 5x - 6 - 3x + 2$
$= 2x - 4$

m $4(c + 3d^2) - 3(2c + d^2)$
$= 4c + 12d^2 - 6c - 3d^2$
$= -2c + 9d^2$

2 n $(r^2 + 3t^2 + 9) - (2r^2 + 3t^2 - 4)$
$= r^2 + 3t^2 + 9 - 2r^2 - 3t^2 + 4$
$= 13 - r^2$

o $x(3x^2 - 2x + 5) = 3x^3 - 2x^2 + 5x$

p $7y^2(2 - 5y + 3y^{2)} = 14y^2 - 35y^3 + 21y^4$

q $-2y^2(5 - 7y + 3y^2) = -10y^2 + 14y^3 - 6y^4$

r $7(x - 2) + 3(x + 4) - 6(x - 2)$
$= 7x - 14 + 3x + 12 - 6x + 12$
$= 4x + 10$

s $5x - 3(4 - 2x) + 6 = 5x - 12 + 6x + 6$
$= 11x - 6$

t $3x^2 - x(3 - 4x) + 7 = 3x^2 - 3x + 4x^2 + 7$
$= 7x^2 - 3x + 7$

u $4x(x + 3) - 2x(3x - 7)$
$= 4x^2 + 12x - 6x^2 + 14x$
$= 26x - 2x^2$

v $3x^2(2x + 1) - 5x^2(3x - 4)$
$= 6x^3 + 3x^2 - 15x^3 + 20x^2$
$= 23x^2 - 9x^3$

3 a $\frac{6x^4 + 10x^6}{2x} = \frac{6x^4}{2x} + \frac{10x^6}{2x}$
$= 3x^{4-1} + 5x^{6-1}$
$= 3x^3 + 5x^5$

b $\frac{3x^5 - x^7}{x} = \frac{3x^5}{x} - \frac{x^7}{x}$
$= 3x^{5-1} - x^{7-1}$
$= 3x^4 - 5x^6$

c $\frac{2x^4 - 4x^2}{4x} = \frac{2x^4}{4x} - \frac{4x^2}{4x}$
$= \frac{1}{2}x^{4-1} - x^{2-1}$
$= \frac{x^3}{2} - x$

3 d $\frac{8x^3 + 5x}{2x} = \frac{8x^3}{2x} + \frac{5x}{2x}$
$= 4x^{3-1} + \frac{5}{2}x^{1-1}$
$= 4x^2 + \frac{5}{2}$

e $\frac{7x^7 + 5x^2}{5x} = \frac{7x^7}{5x} + \frac{5x^2}{5x}$
$= \frac{7}{5}x^{7-1} + x^{2-1}$
$= \frac{7x^6}{5} + x$

f $\frac{9x^5 - 5x^3}{3x} = \frac{9x^5}{3x} - \frac{5x^3}{3x}$
$= 3x^{5-1} - \frac{5}{3}x^{3-1}$
$= 3x^4 - \frac{5x^2}{3}$