

Polynomials Quest**1. Simplify**

a) $(x + 4)(x - 6)$

$$= x^2 - 2x - 24$$

b) $(2x - 3)(3x + 5)$

$$= 6x^2 + x - 15$$

c) $(3x - 7)(3x + 7)$

$$= 9x^2 - 49$$

d) $(x + 4)^2$

$$= x^2 + 8x + 16$$

e) $(2x - 5)^2$

$$= 4x^2 - 20x + 25$$

f) $(x - 1)^3$

$$= (x - 1)(x^2 - 2x + 1)$$

$$= x^3 - 2x^2 + x - x^2 + 2x - 1$$

$$= x^3 - 3x^2 + 3x - 1$$

2. Factor

a) $9x^5 - 6x^3 + 3x^2$

$$= 3x^2(3x^3 - 2x + 1)$$

b) $xy^2 - x^2 + 2y^2 - 2x$

$$= x(y^2 - x) + 2(y^2 - x)$$

$$= (y^2 - x)(x + 2)$$

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c) $x^2 + 9x + 14$

$$= (x+2)(x+7)$$

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d) $4x^2 - 25$

$$= (2x+5)(2x-5)$$

e) $4x^2 - 12x + 20$

$$= 4(x^2 - 3x + 5)$$

f) $3x^2 + 10x + 3$

$$= 3x^2 + 9x + 1x + 3$$

$$= 3x(x+3) + 1(x+3)$$

$$= (x+3)(3x+1)$$

g) $-3x^2 + 12x - 12$

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

$$= -3(x-2)(x-2)$$

h) $9x^2y - 6xy^2$

$$= 3xy(3x-2y)$$

i) $8x^2 - 32$

$$= 8(x^2 - 4)$$

$$= 8(x+2)(x-2)$$

j) $5x(y-3) - 6(y-3)$

$$= (y-3)(5x-6)$$

k) $10x^2 + 13x - 3$

$$\begin{aligned}
 &= 10x^2 + 15x - 2x - 3 \\
 &= 5x(2x+3) - 1(2x+3) \\
 &= (2x+3)(5x-1)
 \end{aligned}$$

m) $-x^2 + 12xy - 27y^2$

$$\begin{aligned}
 &= -(x^2 - 12xy + 27y^2) \\
 &= -(x-3y)(x-9y)
 \end{aligned}$$

o) $-x^3 + 169x$

$$\begin{aligned}
 &= -x(x^2 - 169) \\
 &= -x(x+13)(x-13)
 \end{aligned}$$

q) $4x^2 - 28x + 49$

$$\begin{aligned}
 &= (2x-7)(2x-7) \\
 &\text{or } (2x-7)^2
 \end{aligned}$$

l) $4x^3 + 36x$

$$= 4x(x^2 + 9)$$

n) $16x^2 + 4x - 6$

$$\begin{aligned}
 &= 2(8x^2 + 2x - 3) \\
 &= 2[8x^2 - 4x + 6x - 3] \\
 &= 2[4x(2x-1) + 3(2x-1)] \\
 &= 2(2x-1)(4x+3)
 \end{aligned}$$

p) $x^4 + 16x^2 + 63$

$$= (x^2 + 9)(x^2 + 7)$$

r) $49y^2 + 36x^2$

Does not Factor

s) $2x^4 - 32$

$$= 2(x^4 - 16)$$

$$= 2(x^2 + 4)(x^2 - 4)$$

$$= 2(x^2 + 4)(x + 2)(x - 2)$$

t) $16x^2 + 20x + 25$

$$= (4x + 5)(4x + 5) ? \text{ No!}$$

Does not Factor.