

1. Expand and simplify.

a)  $(2x + 3y)(2x - 3y)$

$$4x^2 - 9y^2$$

$$\underline{4x^2 - 9y^2}$$

b)  $(2x + 5)^2$

$$\underline{4x^2 + 20x + 25}$$

c)  $(2x - 3)(x^2 + 2x - 5)$

$$\begin{array}{r} 2x^3 + 4x^2 - 10x \\ - 3x^2 - 6x + 15 \\ \hline 2x^3 + x^2 - 16x + 15 \end{array}$$

$$\underline{2x^3 + x^2 - 16x + 15}$$

d)  $(x^2 + 3x + 6)(x^2 - 2x - 5)$

$$\begin{array}{r} x^4 - 2x^3 - 5x^2 \\ + 3x^3 - 6x^2 - 15x \\ + 6x^2 - 12x - 30 \\ \hline x^4 + x^3 - 5x^2 - 27x - 30 \end{array}$$

$$\underline{x^4 + x^3 - 5x^2 - 27x - 30}$$

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

$$(x^2 + 5x + 6)(x - 5)$$

$$\begin{array}{r} x^3 + 5x^2 + 6x \\ - 5x^2 - 25x - 30 \\ \hline x^3 - 19x - 30 \end{array}$$

$$\underline{x^3 - 19x - 30}$$

2. Factor completely, if possible.

a)  $x^2 - 9$  *Diff. sq.*

$$\underline{(x + 3)(x - 3)}$$

b)  $3x^2 + 5x + 2$

$$3x^2 + 3x + 2x + 2$$

$$3x(x + 1) + 2(x + 1)$$

$$\underline{(3x + 2)(x + 1)}$$

$$\begin{array}{l} 2 \times 3 = 6 \\ 2 + 3 = 5 \end{array}$$

\* c)  $x^2 + 6x + 9$

$$\begin{array}{l} 3 \times 3 = 9 \\ 3 + 3 = 6 \end{array}$$

$$\underline{(x + 3)^2}$$

d)  $49x^2 + 25$

can't factor.

diff. eq.

e)  $16x^2 - 25$

$(4x-5)(4x+5)$

f)  $5x^2 + 16x + 3$

$5x^2 + 15x + 1x + 3$   $-x- = 15$   
 $5x(x+3) + 1(x+3)$   $- + - = 16$   
 $(5x+1)(x+3)$

g)  $4x^2 - 20x + 25$

\*

$(2x-5)^2$

h)  $7x^2 + 2x - 5$

$7x^2 + 7x - 5x - 5$   $7x-5 = -35$   
 $7x(x+1) - 5(x+1)$   $7-5 = +2$   
 $(7x-5)(x+1)$

i)  $16x^2 - 8xy + y^2$

\*

$(4x-y)^2$

j)  $2x^2 + 4x - 48$

$2(x^2 + 2x - 24)$   
 $2(x+6)(x-4)$

k)  $3a^4 - 48b^4$

$= 3(a^4 - 16b^4)$   
 $= 3(a^2 + 4b^2)(a^2 - 4b^2) = 3(a^2 + 4b^2)(a-2b)(a+2b)$

l)  $9x^2 - 21x + 6$

$3(3x^2 - 7x + 2)$   $-1x-6 = 6$   
 $3(3x^2 - 6x - x + 2)$   $-1+6 = -7$   
 $3[3x(x-2) - 1(x-2)] = 3(3x-1)(x-2)$

m)  $x^2 - 14x + 49$

$= (x-7)(x-7)$   
 $(x-7)^2$

n)  $8x^2 - 10x - 3$

$8x^2 + 2x - 12x - 3$   $+2x-12 = -24$   
 $2x(4x+1) - 3(4x+1)$   $+2+12 = -10$   
 $(2x-3)(4x+1)$

o)  $2x^2 + 12x + 9$

$-x- = 18$   
 $- + - = 12$

p)  $x^4 - 81$

$= (x^2-9)(x^2+9)$   
 $= (x-3)(x+3)(x^2+9)$

ANNOT. FACTOR

3. Which of the polynomials from question 2 are perfect square trinomials? List the letters below.

c, g, i, m