

# Do Now: #s 30-40 from new page of Midterm Review sheet

In 30 - 40, factor each completely if possible.

30.  $x^3 - 3x^2 - 4x + 12$

$$\begin{aligned} &x^2(x-3) - 4(x-3) \\ &(x^2-4)(x-3) \\ &(x+2)(x-2)(x-3) \end{aligned}$$

31.  $3x^2 - 75$

$$\begin{aligned} &3(x^2 - 25) \\ &3(x+5)(x-5) \end{aligned}$$

32.  $ax^2 + 15 - 5ax - 3x$  *rearrange*

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

33.  $6x^2 - 11x - 10$

$$\begin{aligned} &6x^2 - 15x + 4x - 10 \\ &3x(2x-5) + 2(2x-5) \\ &(3x+2)(2x-5) \end{aligned}$$

34.  $x^4 - x^2 - 12$

$$\begin{aligned} &(x^2-4)(x^2+3) \\ &(x+2)(x-2)(x^2+3) \end{aligned}$$

35.  $16x^2y^2 - 25$

$$(4xy-5)(4xy+5)$$

36.  $8x^3 - 125y^3$

$$(2x-5y)(4x^2+10xy+25y^2)$$

37.  $(x^2 - 3x)^2 - 38(x^2 - 3x) - 80$  *substitution*

$$\begin{aligned} &\text{let } y = x^2 - 3x \\ &y^2 - 38y - 80 \\ &(y-40)(y+2) \\ &(x^2-3x-40)(x^2-3x+2) \\ &(x-8)(x+5)(x-2)(x-1) \end{aligned}$$

38.  $x^2(x^2 - 1) - 9(x^2 - 1)$  *substitution*

$$\begin{aligned} &\text{let } y = x^2 - 1 \\ &x^2y - 9y \\ &y(x^2 - 9) \\ &(x^2-1)(x^2-9) \\ &(x-1)(x+1)(x+3)(x-3) \end{aligned}$$

39.  $4(x^2 - 1)^2 - 13(x^2 - 1) - 12$

$$\begin{aligned} &\text{let } y = x^2 - 1 \\ &4y^2 - 13y - 12 \\ &4y^2 - 16y + 3y - 12 \\ &4y(y-4) + 3(y-4) \\ &(4y+3)(y-4) \\ &(4(x^2-1)+3)(x^2-1-4) \\ &(4x^2-4+3)(x^2-5) \\ &(4x^2-1)(x^2-5) \\ &(2x+1)(2x-1)(x^2-5) \end{aligned}$$

40.  $7x^2 + 10xy + 3y^2$

$$7x^2 + 7xy + 3xy + 3y^2$$

$$7x(x+y) + 3y(x+y)$$

$$(7x+3y)(x+y)$$

multiply to  $21x^2y^2$   
add to  $10xy$