

Classwork 8/29

#4 $f(x) = x^3 - 8$

$$= (x-2)(x^2+2x+4) = 0$$

$x = 2$

$$x = \frac{-2 \pm \sqrt{4-16}}{2}$$

$$x = \frac{-2 \pm 2i\sqrt{3}}{2}$$

$x = -1 \pm i\sqrt{3}$

$$\sqrt{4-16} = \sqrt{-12}$$

$$= \sqrt{(-1)(4)(3)}$$
$$= i \cdot 2 \cdot \sqrt{3}$$

#8 $f(x) = x^4 - 13x^2 + 36$

$$(x^2 - 4)(x^2 - 9)$$

$$(x+2)(x-2)(x-3)(x+3) = 0$$

Zeros: $\pm 2, \pm 3$

#12 $x^3 + 2x^2 - 4x - 8$ } grouping

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

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

$$(x+2)(x-2)(x+2) = 0$$

Zeros: $x = -2$, $x = 2$
 double root

#16 $x^4 - 5x^3 - x + 5$ } grouping

$$x^3(x-5) - 1(x-5)$$

$$(x-5)(x^3-1)$$

$$(x-5)(x-1)(x^2+x+1)$$

$$x = 5$$

$$x = 1$$

$$x = \frac{-1 \pm \sqrt{1-4}}{2}$$

$$x = \frac{-1 \pm i\sqrt{3}}{2}$$

#32

$$x^3 - 7x - 6$$

± 1
 ± 2
 ± 3
 ± 6

$$\begin{array}{r} \downarrow \quad 1 \quad 0 \quad -7 \quad -6 \\ \quad \quad \quad 1 \quad \quad 1 \quad -6 \\ \hline \quad \quad 1 \quad 1 \quad -6 \end{array}$$

$$\begin{array}{r} \downarrow \quad 1 \quad 0 \quad -7 \quad -6 \\ \quad \quad \quad -1 \quad \quad 1 \quad \quad 6 \\ \hline x^2 - 1x - 6 \quad \quad \quad 0 \end{array}$$

$$(x+1)(x^2 - x - 6) = 0$$

$$(x+1)(x+2)(x-3) = 0$$

zeros: $-1, -2, 3$

#37

$$\begin{array}{r|rrrrr} -1 & 1 & 4 & 6 & 4 & 1 \\ & & -1 & -3 & -3 & -1 \\ \hline & 1 & 3 & 3 & 1 & 0 \end{array}$$

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

$$\begin{array}{r|rrrr} -1 & 1 & 3 & 3 & 1 \\ & & -1 & -2 & -1 \\ \hline & 1 & 2 & 1 & 0 \end{array}$$

$$(x+1)(x+1)(x^2 + 2x + 1) = 0$$

$$(x+1)(x+1)(x+1)(x+1) = 0$$

Zeros: $x = -1$ quadruple root

#38

$$x^4 + 2x^3 - 13x^2 - 14x + 24$$

$$\begin{array}{r|rrrrr} 1 & 1 & 2 & -13 & -14 & 24 \\ & & 1 & 3 & -10 & -24 \\ \hline & 1 & 3 & -10 & -24 & 0 \end{array}$$

$$(x-1)(x^3 + 3x^2 - 10x - 24) = 0$$

$$\begin{array}{r|rrrr} -1 & 1 & 3 & -10 & -24 \\ & & -1 & -2 & 12 \\ \hline & 1 & 2 & -12 & \end{array}$$

$$\begin{array}{r|rrrr} 2 & 1 & 3 & -10 & -24 \\ & & 2 & 10 & 0 \\ \hline & 1 & 5 & 0 & \end{array}$$

$$\begin{array}{r|rrrr} -2 & 1 & 3 & -10 & -24 \\ & & -2 & -2 & 24 \\ \hline & 1 & 1 & -12 & 0 \end{array}$$

$$(x-1)(x+2)(x^2 + x - 12) = 0$$

$$(x-1)(x+2)(x+4)(x-3)$$

zeros

$$\begin{array}{|c} 1 \\ -2 \\ 3 \\ -4 \end{array}$$

HW quiz 8/29

① Factor and give the zeros

$$x^3 - 3x^2 - 10x + 24$$

Homework: # 37-42 (finish)

Review factoring patterns
for the quiz.
