

## Questions From Homework

① h)  $3x^4 + 7x^3 + 2x^2$   
 $x^2 (3x^2 + 7x + 2)$  ← Trinomial Decomposition  
 $x^2 (3x^2 + 6x + 1x + 2)$   $\frac{6}{x} \frac{1}{-} = 6$   
 $\frac{6}{+} \frac{1}{-} = 7$   
 $x^2 [3x(x+2) + 1(x+2)]$   
 $x^2 (x+2)(3x+1)$

② g)  $x^4 - 16$  ← Difference of Squares  
 $(x^2 + 4)(x^2 - 4)$   
 $(x^2 + 4)(x+2)(x-2)$

③ e)  $4x^3 + 12x^2 + 5x - 6$  ← Factor Theorem  
 $4(-2)^3 + 12(-2)^2 + 5(-2) - 6$   $(x+2)$  is a factor  
 $-32 + 48 - 10 - 6$   
 $0$

Trinomial Decomp  
↓

$$\begin{array}{r} \underline{\underline{x+2}} \overline{) 4x^3 + 12x^2 + 5x - 6} \\ \underline{-(4x^3 + 8x^2)} \phantom{+ 5x - 6} \\ 4x^2 + 5x \phantom{- 6} \\ \underline{-(4x^2 + 8x)} \phantom{- 6} \\ -3x - 6 \\ \underline{-(-3x - 6)} \\ 0 \end{array}$$

$(x+2)(4x^2 + 4x - 3)$   
 $(x+2)(4x^2 - 2x)(x-3)$   
 $(x+2)[2x(2x-1) + 3(2x-1)]$   
 $\boxed{(x+2)(2x-1)(2x+3)}$

# Synthetic Substitution

Factor using synthetic substitution  $x^3 - 7x^2 - 4x + 28$

$(x-2)$  is a factor

Find a value of  $x$  that makes it equal 0

$$(2)^3 - 7(2)^2 - 4(2) + 28$$

$$8 - 28 - 8 + 28 = 0$$

( $x$ -value)

2

(Coefficients of the polynomial)

1      -7      -4      28

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1

Bring down the first coefficient

( $x$ -value)

2

(Coefficients of the polynomial)

1      -7      -4      28

2

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1      -5

Multiply the first coefficient by the  $x$ -value and place under the second coefficient. ADD.

( $x$ -value)

2

(Coefficients of the polynomial)

1      -7      -4      28

2      -10      -28

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1      -5      -14      0

Repeat the steps. The coefficients of the other factor are in the bottom row.

$(x-2)(x^2 - 5x - 14)$

$(x-2)(x+2)(x-7)$

← Simple Trinomial

$$-7 \times 2 = -14$$

$$-7 + 2 = -5$$

$$x^3 + 5x^2 - 2x - 24$$

Find a value of x that makes it equal 0

$$\begin{aligned} (2)^3 + 5(2)^2 - 2(2) - 24 \\ 8 + 20 - 4 - 24 = 0 \end{aligned}$$

$(x-2)$  is a factor.

(x-value)

2 |



(Coefficients of the polynomial)

1	5	-2	-24
	2	14	24
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1	7	12	0



$$(x-2)(x^2 + 7x + 12)$$

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

← Simple Trinomial

# Homework

③ a)

$$\begin{array}{r} \underline{x-2} \overline{) x^3 - x^2 - 14x + 24} \\ \underline{-(x^3 - 2x^2)} \phantom{+ 24} \\ \phantom{x^3 - } 1x^2 - 14x \phantom{+ 24} \\ \phantom{x^3 - } \underline{-(x^2 - 2x)} \phantom{+ 24} \\ \phantom{x^3 - } \phantom{x^2 - } -12x + 24 \\ \phantom{x^3 - } \phantom{x^2 - } \underline{-(-12x + 24)} \\ \phantom{x^3 - } \phantom{x^2 - } \phantom{-12x + } 0 \end{array}$$

$$\frac{(x-2)(x^2+x-12)}{(x-2)(x-3)(x+4)}$$