Questions From Homework

① h) $3x^4+7x^3+2x^2$ Common Factor (x^2)

$x^2(3x^2+7x+2)$ Trinomial Decomp: $1\times 6=6$, $1+6=7$

$x^2((3x^2+6x)(x+2))$

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

$\boxed{x^2(3x+1)(x+2)}$

② d) y^3-9y Common Factor (y)

$y(y^2-9)$ Diff of Squares

$\boxed{y(y+3)(y-3)}$

② f) x^6+8 Sum of Cubes:

$\boxed{(x^2+2)(x^4-2x^2+4)}$

③ a) $(x^3-x^2)(-16x+16)$ Group for a common factor:

$x^2(x-1)-16(x-1)$

$(x-1)(x^2-16)$ Diff of Squares

$\boxed{(x-1)(x-4)(x+4)}$

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

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

Factor Further:

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

$(x+2)[4x^2-2x+6x-3]$

$(x+2)[2x(2x-1)+3(2x-1)]$

$\boxed{(x+2)(2x+3)(2x-1)}$

④ a) $x^{\frac{8}{3}}-x^{\frac{1}{3}}$ Common Factor $(x^{\frac{1}{3}})$

$x^{\frac{1}{3}}(x^{\frac{8}{3}}-x^0)$

$x^{\frac{1}{3}}(x^2-1)$ Diff of Squares

$\boxed{x^{\frac{1}{3}}(x+1)(x-1)}$

⑤ $(x^2+1)^{\frac{1}{3}}+3(x^2+1)^{-\frac{1}{3}}$ Common Factor $(x^2+1)^{-\frac{1}{3}}$

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

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

Synthetic Substitution

Find a value of x that makes it equal 0

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

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

$8 - 28 - 8 + 28$

0

(x-value) **(Coefficients of the polynomial)**

2 | 1 -7 -4 28

2 -10 -28

1 -5 -14

1. **Bring down the first coefficient**
2. **Multiply the first coefficient by the *x-value* and place under the second coefficient. ADD.**
3. **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 $2 \times -7 = -14$, $2 + -7 = -5$

$x^3 + 5x^2 - 2x - 24$ **Find a value of x that makes it equal 0**

$(2)^3+5(2)^2-2(2)-24$

$8+20-4-24$

0

(x-value) **(Coefficients of the polynomial)**

2 | 1 5 -2 -24

2 14 24

1 7 12

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

$\boxed{(x-2)(x+3)(x+4)}$

Homework

30 $(x+2)$ is a factor of x^3+2x^2+kx+6

↳ $x=-2$

$(-2)^3+2(-2)^2+k(-2)+6=0$

$-8+8-2k+6=0$

$6=2k$

$3=k$