

PC Final Review worksheet 1.

①  $8x^3 - 27 = (2x-3)(4x^2 + 6x + 9)$

②  $4x^3 - 8x^2 - 25x + 50$   
 $= 4x^2(x-2) - 25(x-2)$   
 $= (x-2)(4x^2 - 25)$   
 $= (x-2)(2x-5)(2x+5)$

③  $5x^2 - 3x - 2 = 0$   
 $5x^2 - 5x + 2x - 2 = 0$   
 $5x(x-1) + 2(x-1) = 0$   
 $(x-1)(5x+2) = 0$   
 $x=1, x = -\frac{2}{5}$

④  $2x^2 + 12x + 13 = 0$

$$x = \frac{-12 \pm \sqrt{12^2 - 4(2)(13)}}{2(2)}$$

$$= \frac{-12 \pm \sqrt{40}}{4}$$

$$= \frac{-12 \pm 2\sqrt{10}}{4}$$

$$x = -3 \pm \frac{\sqrt{10}}{2}$$

⑤  $x+6 \geq 0$   
 $x \geq -6$

⑥  $x-1 = 0$   
 $x=1$

domain:  $x \neq 1$ .

⑦  $\mathbb{R}$ .

⑧  $(g \circ f)(x) = g(f(x))$   
 $= 4(3x^2 - 7x) + 2$   
 $= 12x^2 - 28x + 2$

⑨  $(f \circ g)(4) = f(g(4))$

$$= f(18)$$

$$= 8.46$$

⑩  $y = \sqrt[3]{x^2 + 7}$

$$x = \sqrt[3]{y^2 + 7}$$

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

$$x^3 - 7 = y^2$$

$$y = \sqrt{x^3 - 7}$$

⑪  $f(x) = \sqrt{x}$

$$g(x) = \sqrt{x-5} - 3$$

⑫ a. horizontal:  
 $y=0$

b. none

c.  $y = \frac{3}{2}$

vertical:

$$2x^2 - 16 = 0$$

$$2x^2 = 16$$

$$x^2 = 8$$

$$x = \pm \sqrt{8}$$

$$\textcircled{13} \quad -1 \left| \begin{array}{cccc|c} 5 & 0 & -2 & 0 & 1 \\ & -5 & 5 & -3 & 3 \\ \hline 5 & -5 & 3 & -3 & 4 \end{array} \right.$$

$$= \boxed{5x^3 - 5x^2 + 3x - 3 + \frac{4}{x+1}}$$

$$\textcircled{14} \quad 5 \left| \begin{array}{cccc|c} 3 & 2 & 0 & -3 & 1 \\ & 15 & 85 & 425 & 2110 \\ \hline 3 & 17 & 85 & 422 & 2111 \end{array} \right.$$

$$= \boxed{3x^3 + 17x^2 + 85x + 422 + \frac{2111}{x-5}}$$

$$\textcircled{15} \quad f(x) = 3x^4 + 6x^2 - 25x - 21 \Rightarrow 1 \text{ positive real zero.}$$

$$\textcircled{a} \quad f(-x) = 3x^4 + 6x^2 + 25x - 21 \Rightarrow 4 \text{ ~~negative~~ real zeros.}$$

$$\textcircled{b} \quad \pm \frac{21, 7, 3, 1}{3, 1} = \pm 7, \pm 21, \pm \frac{7}{3}, \pm 1, \pm 3, \pm \frac{1}{3}$$

Handwritten notes and calculations on the right side of the page, including some algebraic expressions and possibly a graph or diagram that is mostly illegible.

Handwritten notes and calculations, possibly showing a polynomial division or factoring process.

Handwritten notes and calculations, possibly related to the Rational Root Theorem.

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