4. $f(x) = \sqrt{9 - x^2}$, $g(x) = \sqrt{x^2 - 4}$

Domain of $\frac{f}{g}$

$D_f \rightarrow 9 - x^2 \geq 0$ $\quad$ $D_g: x^2 - 4 \geq 0$

$x^2 - 9 \leq 0$ $\quad$ $x \leq -2$ or $x \geq 2$

$-3 \leq x \leq +3$

$(-3 \leq x \leq 3) \cap (x < -2 \text{ or } x > 2)$

$-3 \leq x < -2$ or $2 < x \leq 3$

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Exercise 2 The function f is defined for positive integers n by:

$$f(n) = \begin{cases} n+3, & \text{if } n \text{ is odd, } ① \\ n/2, & \text{if } n \text{ is even. } ② \end{cases}$$

Suppose k is an odd integer and that $f(f(k))) = 45$ What is the sum of the digits of k?

(A) 3 **(B)** 6 **(C)** 9 **(D)** 12 **(E)** 15

~~①~~ $\cancel{n+3=45}$
$\cancel{n=42}$

② $\frac{n}{2} = 45$
$n = 90$ ✓

$f(k) = 90$

① $k+3=90$
$k = 87$ ✓

② $\frac{k}{2} = 90$
$\cancel{k = 180}$ ✓

2. $f(x) = x^2 + 2x, \quad g(x) = 3x^2 - 1$

fg

$D_f \cap D_g$

$= x \in \mathbb{R}$

$\frac{f}{g}$

$\underbrace{D_f \cap D_g \cap x \neq \pm\frac{\sqrt{3}}{3}}$

$D_{\frac{f}{g}}: x \neq \pm\frac{\sqrt{3}}{3}$

$D_f: x \in \mathbb{R}$

$D_g: x \in \mathbb{R}$

$3x^2 - 1 \neq 0$

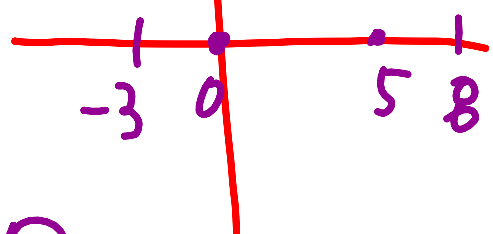
$x \neq \pm\frac{\sqrt{3}}{3}$

Exercise 4 The function f satisfies $f(x)=f(5-x)$ for all real numbers x. Moreover, $f(x)=0$ has exactly four distinct real roots. What is the sum of these roots?

(A) 0 **(B)** 2 **(C)** 4 **(D)** 6 **(E)** 8

(f) 10

Sym. abt $x=2.5$



6) if $f(3)=f(10)=0$.

Find the other roots,

$f(2)$ $f(-5)$, 2 & -5

Exercise 3 Let $f(x) = ax^{8} + bx^{4} + cx^{2} - 5$, where a, b, and c are constants. Suppose that $f(-7) = 7$. What is $f(7)$? $= 7$

(A) -17 **(B)** -7 **(C)** 14 **(D)** 17 **(E)** 21

$$f(x) = ax^8 + bx^4 + 3x - 4$$

$$g(x) = f(x) - 3x \qquad \boxed{\text{Even}}$$

$$g(-7) = f(-7) + 21 = 7 + 21 = 28$$

$$g(7) = 28 = f(7) - 21, \quad f(7) = 49$$