

1. For the functions  $f(x) = x^2 + 5x$  and  $g(x) = x$

a) Find  $(f + g)(x)$  and give its domain.

$$\begin{aligned} f(x) + g(x) &= x^2 + 5x + x \\ &= x^2 + 6x \end{aligned}$$

Domain:  $(-\infty, \infty)$  or  $\mathbb{R}$  or  $\{x \mid x \in \mathbb{R}\}$

b) Find  $\left(\frac{f}{g}\right)(x)$  and give its domain

$$\frac{f(x)}{g(x)} = \frac{x^2 + 5x}{x} = \frac{x(x+5)}{x} = x+5$$

Domain:  $\{x \mid x \neq 0\}$  ← lost bad pt.

2. P is directly proportional to the square of t.  $\rightarrow P = kt^2$

a) If  $P = 100$  when  $t = 2$ , find the proportionality constant.

$$\frac{100}{4} = k \cdot 2^2 = \frac{4k}{4}; \quad k = 25$$

b) Write a specific equation relating P and t which uses a number value for k.

$$P = 25t^2$$

c) Find the value of P when  $t = 10$ .

$$P = 25(10)^2 = 25(100) = 2500$$

3. a) Solve the system:  $\begin{cases} 4x - 5y = 3 \\ 12x - 15y = 9 \end{cases}$

$$\begin{array}{r} -3 \\ \hline 4x - 5y = 3 \\ 12x - 15y = 9 \\ \hline -12x + 15y = -9 \\ \hline 0 + 0 = 0 \end{array}$$

inf. sol:  $\{(x, y) \mid 4x - 5y = 3\}$

b) Find the determinant:  $\begin{vmatrix} 4 & -5 \\ 12 & -15 \end{vmatrix}$

OR  $y = y$   
 $4x - 5y = 3, x = \frac{3 + 5y}{4}$   
 $(\frac{3}{4} + \frac{5y}{4}, y)$

$$D = 4(-15) - (12)(-5) = -60 + 60 = 0$$

L    H

4. Two loans are taken out, at 4% and 10%. The amount borrowed at 4% is twice the amount at 10%, and the total interest charged is \$180.

- a) Write a system of 2 equations, representing the amounts invested in the 2 loans.

$$\begin{aligned} L &= 2H \\ .04L + .1H &= 180 \end{aligned}$$

- b) Calculate how much was borrowed at each rate.

By substitution of "L"

$$.04(2H) + .1H = 180$$

$$.08H + .1H = 180$$

$$.18H = 180$$

$$H = \$1000$$

$$L = 2(1000) = 2000 @ 4\%$$

5. Solve:  $|4x - 1| = 7$

①  $4x - 1 = 7$

$$4x = 8$$

$$x = 2$$

②  $4x - 1 = -7$

$$4x = -6$$

$$x = -\frac{3}{2}$$

$$\{-\frac{3}{2}, 2\}$$

