

Functions

Please simplify your answers wherever possible.

Question 1 Calculate for $f(t) = 5t^3 - t^2 + 10$

- a. $f(-2)$
- b. $f(1/2)$

Question 2 We are preparing a solution for our chemistry class. We mix 1 liter of a mysterious solution of pH 4 and 0.1 liter of another solution with pH 5. What will be the new pH value?

Question 3 Simplify the following:

- a. $(x^{(1/2)})^3$
- b. $10^{-2} * 25^{3/2}$
- c. $\frac{(x^2)^{1/2} * x^3}{x^{2/5}}$

Question 4 Solve the following equations for x and plot the functions.

- a. $4x^2 - 4x + 1 = 0$
- b. $(3x + 1)(x + 2) - 5 = 0$
- c. $x^2 - x - 6 = 0$

Question 5 Plot $y = x^3$.

Question 6 For $f(x) = 1/x$, $g(x) = x - 3$ and $h(x) = |x|$

- a. What is $f(g(x))$? Plot the function.
- b. What is $g(f(x))$? Plot the function.
- c. What is $g(h(x))$? Plot the function.
- d. What is $h(g(x))$? Plot the function.

Question 7 Find the intersection points of the curves $y = x^2 + 1$ and $y = 4x$, and plot them.

Question 8 Solve for x:

- a. $e^{x^2 - 4x} = e^{-4}$

b. $e^{x-5} = 1$

c. $e^x(x^2 - 1) = 0$

d. $\ln(4 - x) = \frac{1}{2}$

e. $(e^2)^x \cdot e^{\ln 1} = 4$

Question 9 Simplify:

a. $\frac{\ln(a)}{\ln(b^x) + \ln(c^x)} e^{\ln(e^5)}$

b. $e^{\ln 4 + 2\ln 3}$

c. $5\ln x - \frac{1}{2}\ln y + 3\ln z$