

Higher Homework 03

1) Two functions f and g are defined by,

$$f(x) = 2x + 3$$

and

$$g(x) = 2x - 3$$



a) Find expressions for i) $f(g(x))$ ii) $g(f(x))$

b) Determine the least possible value of the product $f(g(x)) \times g(f(x))$

2) A triangle has vertices S (2,6), T (-4,-4) and V (8,-1).

a) Find the equation of the median from the vertex V.

b) Find the equation of the altitude from the vertex S.

c) Find the coordinates of the point of intersection of these two lines.



3) Find,

a) $\frac{3}{5} + \frac{2}{7}$

b) $7\frac{6}{11} - 4\frac{3}{8}$

c) $7\frac{6}{11} \div 4\frac{3}{8}$



4) The functions f and g are defined on a suitable domain such that

$$s(x) = 3x^2 - 4$$

and

$$t(x) = \frac{x^4 + 3}{2}$$



a) Find expressions for the inverse functions $s^{-1}(x)$ and $t^{-1}(x)$.

b) State the domain and range of the function $t(x)$.

5) Find the equation of the perpendicular bisector of points K (-2,-8) and L (1,1)



6) Functions $f(x) = 3x - 1$ and $g(x) = x^2 + 7$ are defined on the set of real numbers.

a) Find $h(x)$ where $h(x) = f(g(x))$.

b) Write down the coordinates of the minimum turning point of $h(x)$.

c) Hence, state the range of the function h .



7) Find the limit of the recurrence relation $u_{n+1} = 75 - 0.8 u_n$.



8) a) The terms of a sequence satisfy $u_{n+1} = k u_n + 5$. Find the value of k which produces a sequence with a limit of 4.

b) Another sequence satisfies $u_{n+1} = m u_n + 5$, $u_0 = 3$.

i) Express u_1 and u_2 in terms of m .

ii) Given that $u_2 = 7$, find the value of m which produces a sequence with no limit.

