



AUM

American University Of The Middle East

2020 SUMMER 2 ONLINE- MAT175-01- ASSESSMENT 1

Name & Surname & ID:

There are 2 pages and 4 questions. To get the full credit please show all your work.

Q1] $f(x) = \frac{2x^2+3x-5}{x^3-2x+1}$

$$f(2) = \frac{2(2)^2+3(2)-5}{(2)^3-2(2)+1} = \frac{8+6-5}{8-4+1} = \frac{9}{5}$$

$$g(x) = \sqrt{x^2 + 6x + 9}$$

$$g(3) = \sqrt{3^2 + 6(3) + 9} = \sqrt{9 + 18 + 9} = \sqrt{36} = 6$$

$$f(2) + g(3) = \frac{9}{5} + 6 = \frac{39}{5} \text{ or } 7.8$$

Q2] a) domain of $f(x) = \frac{x^2+x-1}{x^2+7x+10}$

The domain of a function is the set of input or argument values for which the function is real and defined. Set,

$$x^2 + 7x + 10 = 0, \text{ factorizing:}$$

$$(x + 2)(x + 5) = 0$$

$$x = -2, x = -5$$

The function domain;

$$x < -5, -5 < x < -2, x > -2$$

$$\text{Interval notation: } (-\infty, -5) \cup (-5, -2) \cup (-2, \infty)$$

$$\text{b) } f(x) = \sqrt{x^2 + 8x + 15}$$

The domain of a function is the set of input or argument values for which the function is real and defined. Set,

$$x^2 + 8x + 15 = 0, \text{ factorizing:}$$

$$(x + 3)(x + 5) = 0$$

$$x = -3, x = -5$$

The function domain;

$$x \leq -5, x \geq -3$$

$$\text{Interval notation: } (-\infty, -5] \cup [-3, \infty)$$

$$\text{Q3] } f(x) = -2x^2 + 3x - 5, g(x) = 2x - 1$$

$$\text{a) } (f \circ g)(x) = -2(2x - 1)^2 + 3(2x - 1) - 5$$

$$(f \circ g)(x) = -2(4x^2 - 4x + 1) + 6x - 3 - 5$$

$$(f \circ g)(x) = -8x^2 + 8x - 2 + 6x - 8$$

$$(f \circ g)(x) = -8x^2 + 14x - 10$$

$$\text{b) } (f \circ g)(2) = -8(2)^2 + 14(2) - 10$$

$$(f \circ g)(2) = -8(4) + 28 - 10$$

$$(f \circ g)(2) = -32 + 28 - 10$$

$$(f \circ g)(2) = -14$$

Q4] $f(x) = 2x^2 + 4x - 6$

a) x- intercepts, $f(x) = 0$

$$2x^2 + 4x - 6 = 0$$

Simplifying

$$x^2 + 2x - 3 = 0$$

Factorizing

$$(x - 1)(x + 3) = 0$$

$$x = 1, x = -3$$

x- intercepts, (1,0) and (-3,0)

$$\text{y- intercepts } f(0) = 2(0)^2 + 4(0) - 6$$

$$f(0) = -6$$

y- intercepts (0,-6)

b) vertex, $x = \frac{-b}{2a}$

$$a = 2, b = 4, c = -6$$

$$\text{vertex, } x = \frac{-4}{2 \times 2} = \frac{-4}{4} = -1$$

$$\text{at } x = -1$$

$$f(1) = 2(-1)^2 + 4(-1) - 6$$

$$f(1) = 2 - 4 - 6$$

$$f(1) = -8$$

$$\text{vertex } (-1, -8)$$

c) sketch $f(x) = 2x^2 + 4x - 6$

$$\text{vertex } (-1, -8)$$

x- intercepts, (1,0) and (-3,0)

y- intercepts (0,-6)

