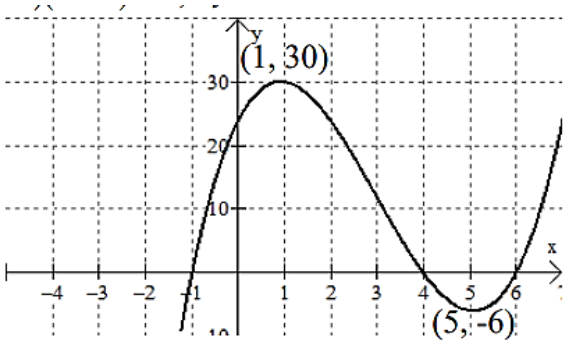
MHF4U Unit 1 -4 Review

Q1. Given $y = f(x)$

a) State the degree of the function
b) State the coordinates of the zeros, local minimums and local maximums.
c) State the intervals of increasing and decreasing.
d) Find the equation of the function.



Q2.a) Find the quotient and the remainder when $3x^3 - 4x + 3$ is divided by x-2.

b) Find the value of k in $x^3 - 2x^2 + kx - 3$ if $(x + 3)$ is a factor.

Q3. Factor a) $x^3 - 4x^2 - 4x + 16$ b)$8x^3 + 27$ c)$x^4 - 11x^2 + 18$

(Show your all your working)

Q4. Solve each a) $2x^3 + x^2 - 18x - 9 = 0$ b)$x(x^2 + 9x + 3) = -5(2x + 1)$

c) $-2x(x + 3)(x - 2)(x - 5) < 0$ d) $-x^3 - 5x^2 + 6x \geq 0$

Q5. Find the cubic polynomial function with two of its zeros 2 and -3+$\sqrt{2}$ and a y-intercept of 7.

Q6. Given $ax^3 + x^2 + x + b$, find the value of a and b if the remainder when divided by (x-1) and (x+1) are 6 and 2 respectively.

Q7. Find the vertical and horizontal asymptotes for $f(x) = \frac{x+2}{3x-2}$.

Q8. Given $f(x) = \frac{x^2}{x^3-2x^2-5x+6}$. Find the domain, intercepts and VA and HA. Sketch the graph.

Q9. Given $g(x) = \frac{x-2}{x^2+5x+6}$. Determine x and y intercepts, domain, asymptotes, and any holes.

Q10. Solve and state any restrictions

a) $\frac{x-1}{x-3} = \frac{x+3}{x+4}$
b) $\frac{x}{x+1} + \frac{1}{x+1} = \frac{2}{x^2-1}$

Q11. Solve the following rational inequalities

a) $\frac{-x+5}{2x+3} \geq 2$ b) $\frac{1}{x-1} < \frac{-1}{x+2}$

Q12. Sketch the graph for the following functions

a) $f(x) = \frac{x}{1-x^2}$

b) $f(x) = \frac{x^2-4}{x-2}$

c) $f(x) = \frac{x^2-1}{x+2}$

d) $f(x) = \frac{-2x}{1+x^2}$

e) $f(x) = \frac{x-3}{x^2-9}$

Q13. Sketch the graph of the polynomial function $f(x) = -2x^2(x-1)(x+2)^3(x+1)^4$

Q14. Use the long division to find the quotient and the remainder for the following division of two polynomials:

$$\frac{6x^5 + 4x^4 + x^3}{x^3 - 2}$$

Q15. Solve the following inequality and verify your results graphically

$x^4 + x^3 - 7x^2 - x + 6 > 0.$

Q16. Salt water is flowing into a large tank that contains pure water. The concentration of salt, c, in the tank at t minutes is given by $c(t) = \frac{10t}{25+t}$ where c is measured in grams per litre. When does the salt concentration in the tank reach 3.75 g/L?

Q17. Write an equation for a rational function whose graph of the form $f(x) = \frac{ax+b}{cx+d}$ has all the indicated features: X-intercept of $\frac{1}{4}$, Y-intercept of $-\frac{1}{2}$, VA with equation $x = -\frac{2}{3}$, HA with equation $y = \frac{4}{3}$

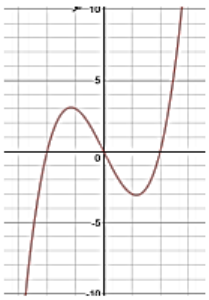
Q18. If the constant differences for the quadratic $ax^2 + 6x - 8$ is equal to 18, determine the value of a.

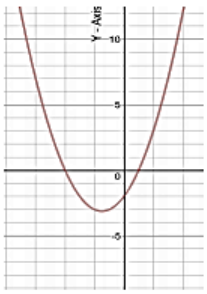
Q19. (1,2) is a point on the graph of y = f(x). Find the corresponding mapping rule that maps f(x) onto each of the following functions and then the image point of (1,2).

a) $y = -2f\big(2(x+3)\big) + 1$

b) $y = \frac{1}{3}f\left(\frac{1}{2}x - 1\right) - 2$

Q20. Graphically determine whether the following functions are even, odd and neither.

1. 

2. 

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