Review

1. Given the function $f(x)=\dfrac{3x}{x+2}$

Find

a) f(3), f(-4),f(-2)
b) f(-x), f(x+3), f(1/x), f(x+h), f(4+x)
c) x-intercepts
d) y-intercepts
e) all x for which f(x) = 1
f) all x for which the graph is above x-axis
g)Is the point (2,1/2) on the graph of f(x)?

2. Find the domain of the following functions

a) $f(x)=\dfrac{3x^2-4}{(x^2-4)(x^2+x+1)}$

b) $f(x)=\sqrt{\dfrac{x-1}{x^2+x-12}}$

c) $f(x)=3x^3-4x+2$

d) $f(x)=\log_3(4x-7)+2x$

e) $f(x)=\sin(2x^2+3)$

f) $f(x)=\dfrac{3\tan(4x-\pi/3)}{x^2+7}$

g) $f(x)=\dfrac{2x-1}{2\sin x+1}$

3. For a given function, find and simplify the difference quotient $\dfrac{f(x+h)-f(x)}{h}$

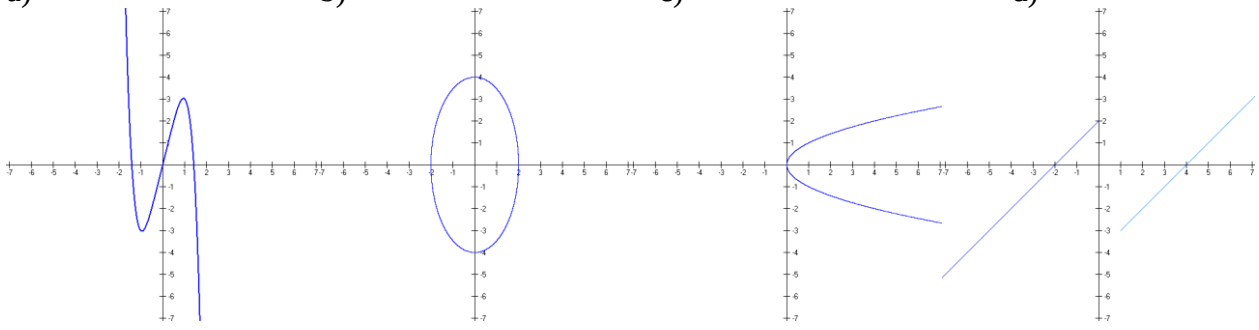
a) f(x) = 3x- 4
b) f(x) = $2x^2$ + 4x - 5
c) $f(x)=\dfrac{2x}{x+1}$

4. Given functions $f(x)=\dfrac{x+1}{2x-3}$ and $g(x)=\dfrac{2}{x}$. Find

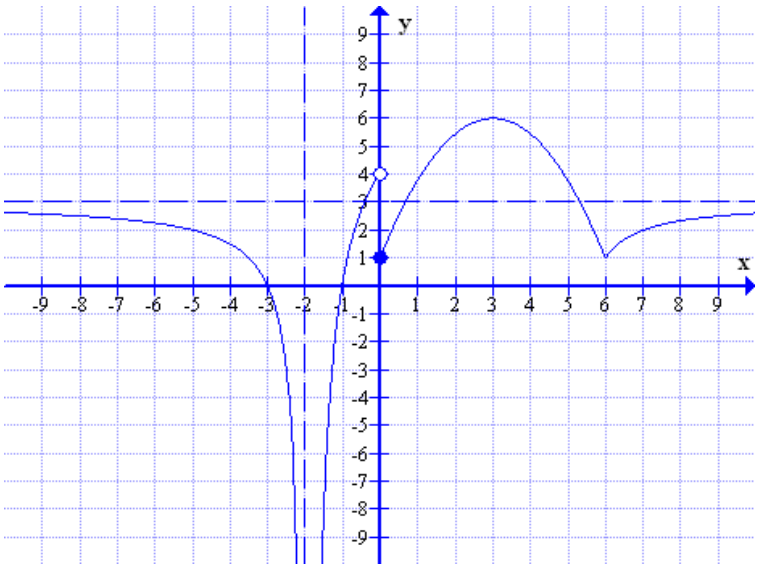
a) (f+g) (3)
b) (f-g)(x)
c) (f/g)(2)
d) domain of (f·g)(x)
e) $f^{-1}(x)$
f) the domain and the range of $f^{-1}(x)$
g) (f o g) (x)
h) (g o f)(-1)
i) the domain of (g o f)(x)

5. Which graph represents a function? Explain.

a) b) c) d)



6. Given the graph of a function f(x)



Find

a) the domain of f(x) b) the range of f(x)

c) x- intercepts d) y – intercept

e) intervals on which f(x) is increasing, decreasing, constant

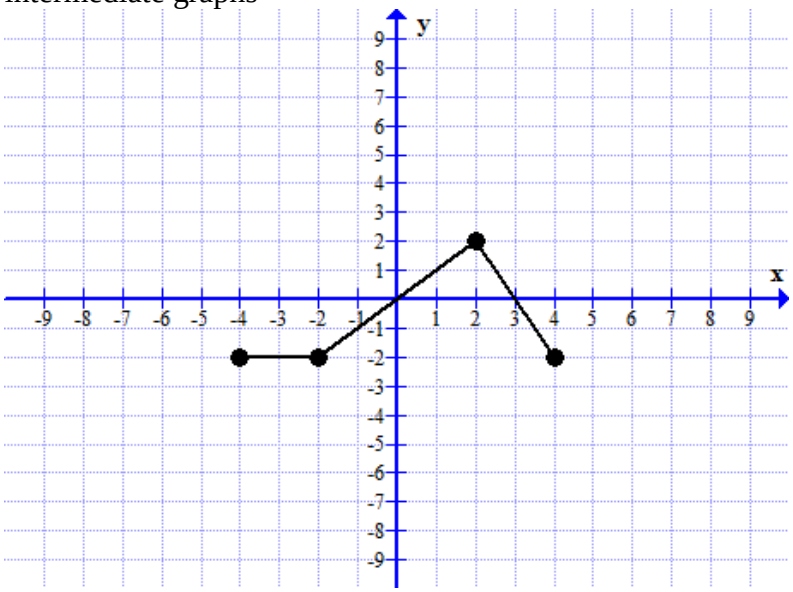
f) intervals on which f(x) > 0

g) Does f(x) have asymptotes? If yes, write their equations.

h) Is this a one-to-one function?. Explain.

i) Is this function even, odd or neither?

7. Given the graph of a function f(x). Use transformations to graph y = 2f(x+1) -3. Show all intermediate graphs



8. Graph, using transformations, the following functions

a) $y = - e^{x+2} + 1$ b) $y = ½ \ln(x-1)$

c) $y = -2|x+1| - 1$

9. Graph, by finding the amplitude, period and phase shift, function $f(x) = -3 \sin(2x - \pi/2)$

10. Find the vertex, axis of symmetry and intercepts of the graph of $f(x) = 2x^2 + x - 1$. Graph it.

11. Does the function $f(x) = -2x^2 - 3x + 1$ have the maximum or minimum?. Find its value.

12. Graph the function

$$f(x) = \begin{cases} x-1 & , x \le -1 \\ 0 & , -1 < x \le 2 \\ x^2 + 2 & , x > 2 \end{cases}$$

13. Write each function H(x) as a composition (f o g)(x) . Write the formulas for f(x) and g(x)

a) $H(x) = \sin(x^2 + 3x - 1)$ b) $H(x) = \sqrt{2x-1}$

c) $H(x) = \log\dfrac{x+1}{x-3}$ d) $H(x) = \dfrac{2}{x^2 - 3}$

14. Write the equation of the straight line with the slope m = 2/3 and passing through the point (-1, 3). Graph the line.

15. Find the equation of the line passing through the points A(1,-3) and B(-2,-4).

16. Are the lines $2x-3y = 1$ and $y = -¾ x - 1$ parallel, perpendicular or neither?. Explain.

17. Write the equation of a) the horizontal line, b) the vertical line passing through the point (-2,1)

18. What can you say about a line whose slope is a) m = 2/3, b) m= - 4/3,c) m = 0,
d) m is not defined?

19. Solve the following equations and inequalities

a) $2 e^{x+2} - 5 = 0$ b) $2^{x-1} = 3^{x+1}$

c) $\log_4 x + \log_4(x-3) = 1$ d) $\log(x-1) - \log(x+6) = \log(x-2) - \log(x+3)$

e) $\sin\theta = 0.56$ f) $2\cos^2\theta + \cos\theta - 1 = 0$

g) $2x^2 - 3 \ge 0$ h) $x^3 \le x^2 + 3x$

20. Graph the equation $\dfrac{x^2}{4} + \dfrac{y^2}{16} = 1$