

You must show all your work to receive credit. Simplify your answers.

1.] (2 pts) Compute  $f(3)$  and  $f(2)$  if  $f(t) = (7 - 2t)^{-5/2}$

$$f(3) = (7 - 2 \cdot 3)^{-5/2} = 1^{-5/2} = 1$$

$$f(2) = (7 - 2 \cdot 2)^{-5/2} = 3^{-5/2} = \frac{1}{3^{5/2}} = \frac{1}{\sqrt{3^5}} = \frac{1}{\sqrt{3^4 \cdot 3}} = \frac{1}{3^2 \sqrt{3}} = \frac{1}{9\sqrt{3}}$$

2.] (2 pts) Find the domain of the function

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

$f(x)$  is undefined when  
 $3 - 2x < 0$  or  $x^3 = 0$   
 $-2x < -3$                        $x = 0$   
 $x > \frac{3}{2}$

So the domain is all reals  $x \leq \frac{3}{2}$  except zero.

3.] (2 pts) For  $f(x) = 1 - x^2$ , find the difference quotient of  $f$ :

$$\frac{f(x+h) - f(x)}{h} = \frac{[1 - (x+h)^2] - (1 - x^2)}{h}$$

$$= \frac{[1 - (x^2 + 2xh + h^2)] - 1 + x^2}{h} = \frac{1 - x^2 - 2xh - h^2 - 1 + x^2}{h} = \frac{-2xh - h^2}{h} = -2x - h$$

4.] (2 pts) Sketch the graph of the function; include any intercepts or vertices, if they exist.

y-int:  $x=0 \Rightarrow f(x) = -3x^2 - 6x - 3$   
 $(0, -3)$   $f(0) = -3$

x-int:  $3 + x = 0$                        $(-3, 0)$   
 $x = -3$

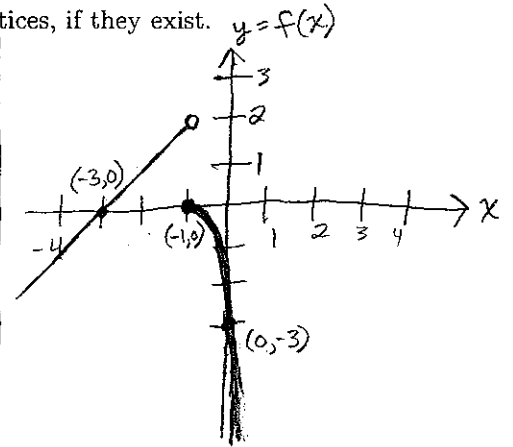
and  $-3x^2 - 6x - 3 = 0$   
 $x^2 + 2x + 1 = 0$   
 $(x+1)(x+1) = 0$   
 $x = -1$                        $(-1, 0)$

$$f(x) = \begin{cases} 3+x & \text{if } x < -1 \\ -3x^2 - 6x - 3 & \text{if } x \geq -1 \end{cases}$$

Opens Down

Vertex:  $x_v = \frac{-B}{2A}$   
 $= \frac{-(-6)}{2(-3)}$   
 $= -1$

$y_v = f(-1) = -3 + 6 - 3 = 0$                        $(-1, 0)$



5.] (2 pts) Find an equation for the line through  $(-3, 5)$  and parallel to the line  $3y - 21x = 0$ .

$y = mx + b$   
 $3y = 21x$   
 $y = 7x \Rightarrow m = 7$   
 Same slope

$y - y_1 = m(x - x_1)$   
 $y - 5 = 7(x - (-3))$   
 $y - 5 = 7x + 21$   
 $y = 7x + 26$