math165_3graphs.mw
Maple 10 Worksheet Math 165 - Calculus for Business.
Graphs for Problems in Section 3.2
First load plots and student:

```
> Zstd:= x=-10..10,y= -10..10;
```

$$Zstd := x = -10..10, y = -10..10 \tag{1}$$

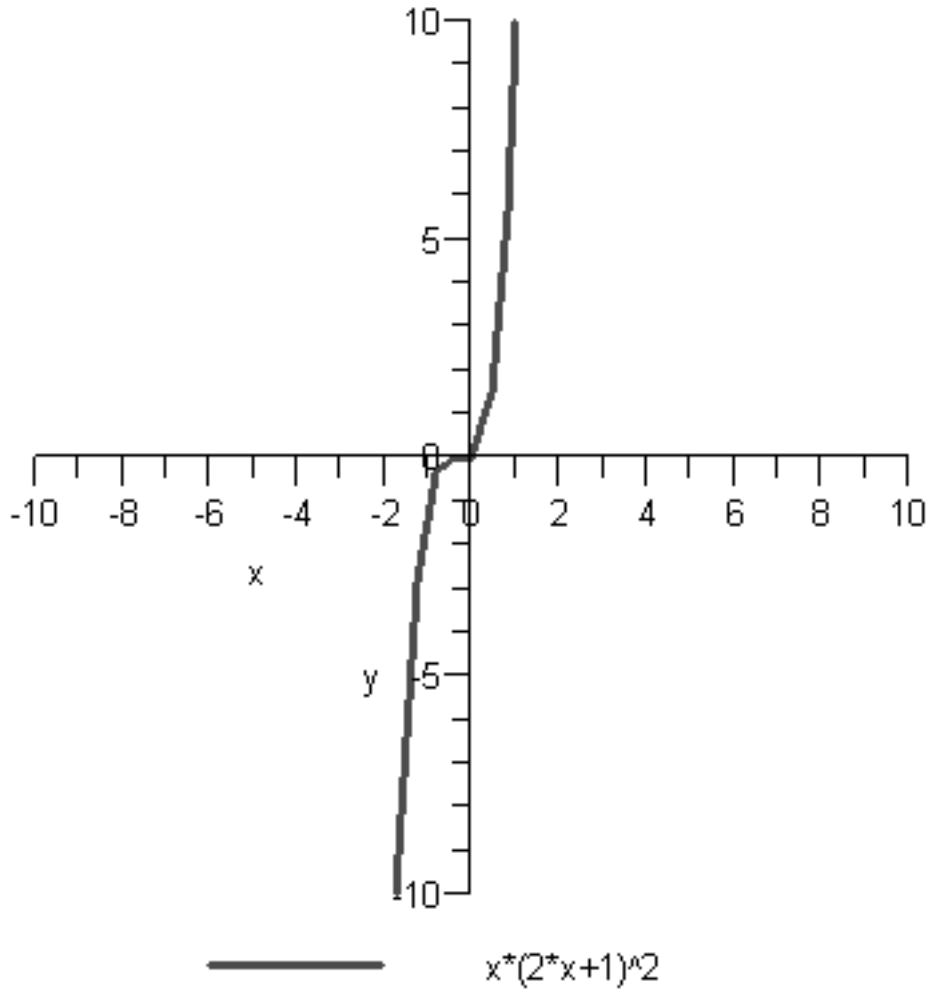
```
> restart: with( student):with (plots):
>
```

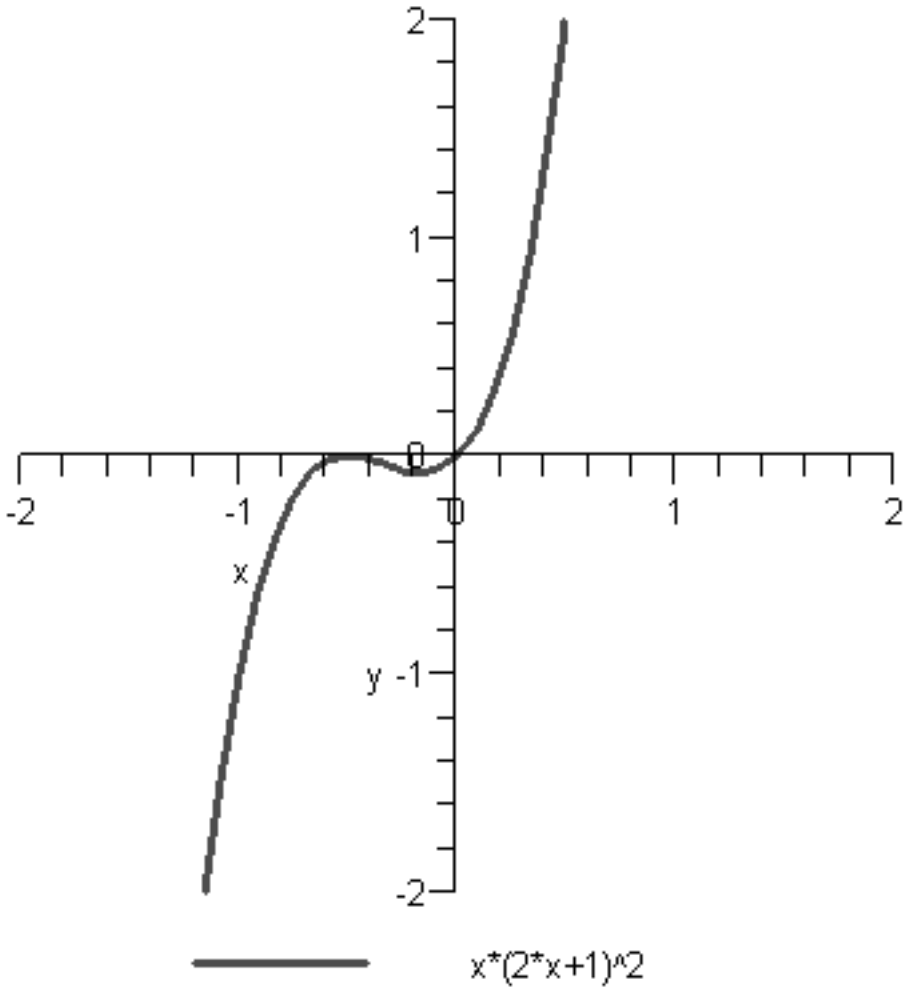
Prob3.2.7

```
f_9 := proc (x) x*(2*x+1)^2 end proc:
f_9_x:=f_9(x);
```

$$f\_9\_x := x\,(2\,x+1)^2 \tag{2}$$

```
> plot_9:=plot(f_9(x),x=-10..10,y=-10..10,thickness=2,legend=
  convert(f_9_x,string)):display(plot_9);
  plot_9a:=plot(f_9(x),x=-2..2,y=-2..2,
    thickness=2,legend= convert(f_9_x,string)):display(plot_9a);
```

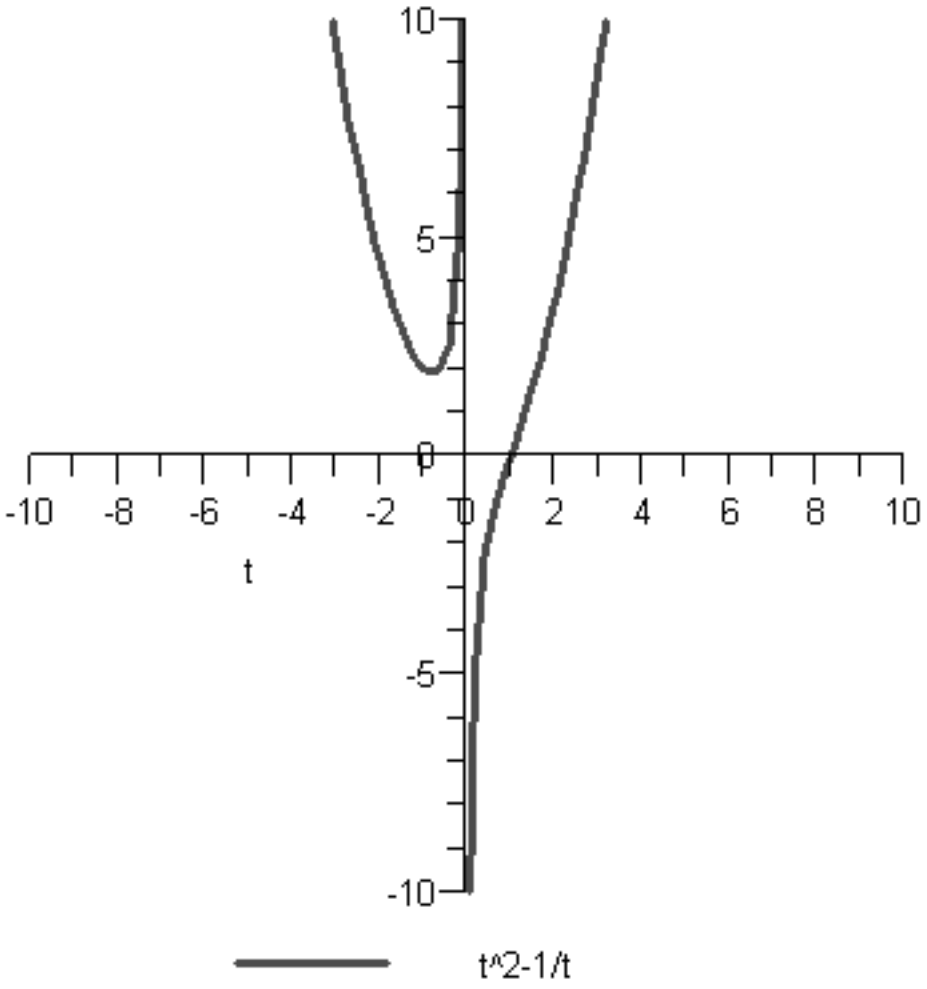


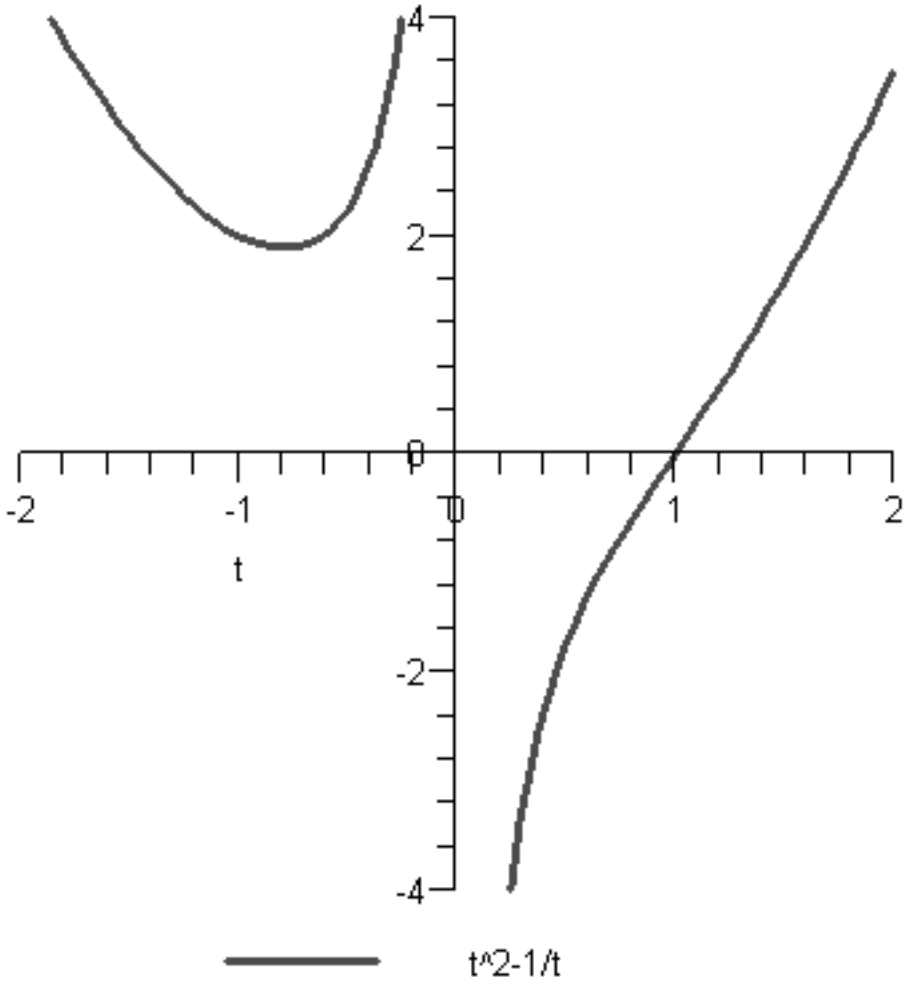


Prob 3.2.9

```
> g_9:= proc(t);
     t^2 - 1/t;
  end proc:
  g_9_t:=g_9(t);
  plot(g_9(t), t= -10..10,-10..10,thickness=2,discont=true, legend=
  convert(g_9_t,string));
  plot(g_9(t), t= -2..2,-4..4,thickness=2,discont=true,legend=
  convert(g_9_t,string));
```

$$g\_9\_t := t^2 - \frac{1}{t}$$

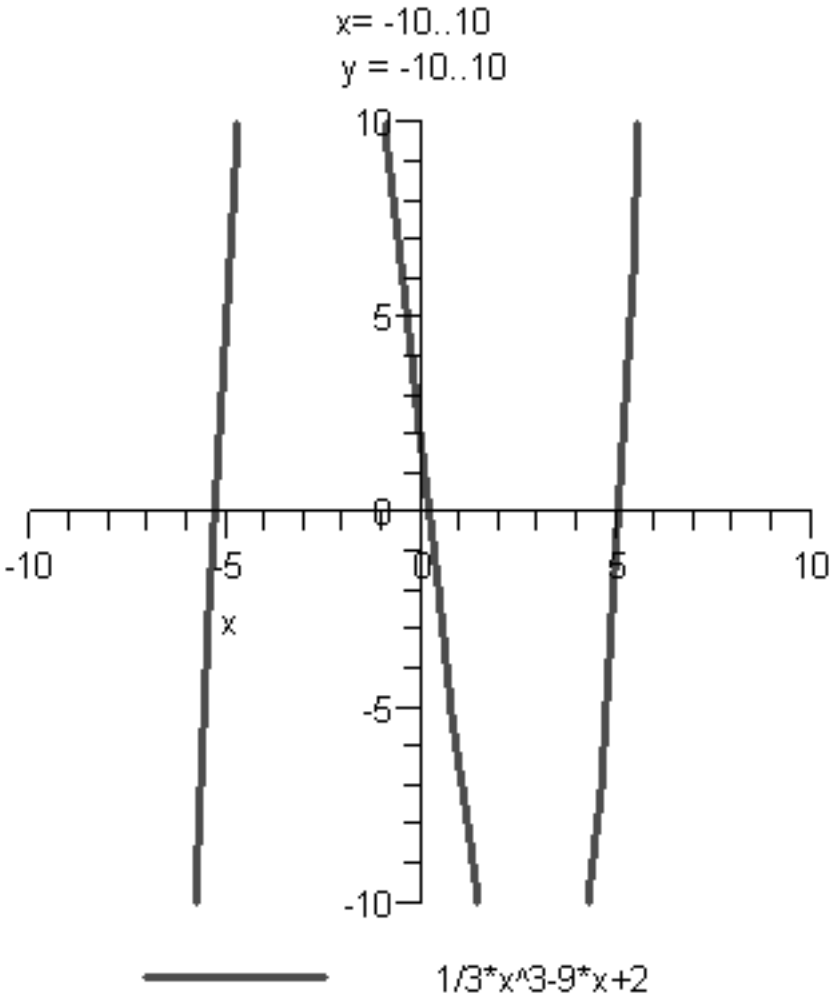

10
5
0
-5
-10
-10
-8
-6
-4
-2
0
2
4
6
8
10
t
t^2-1/t

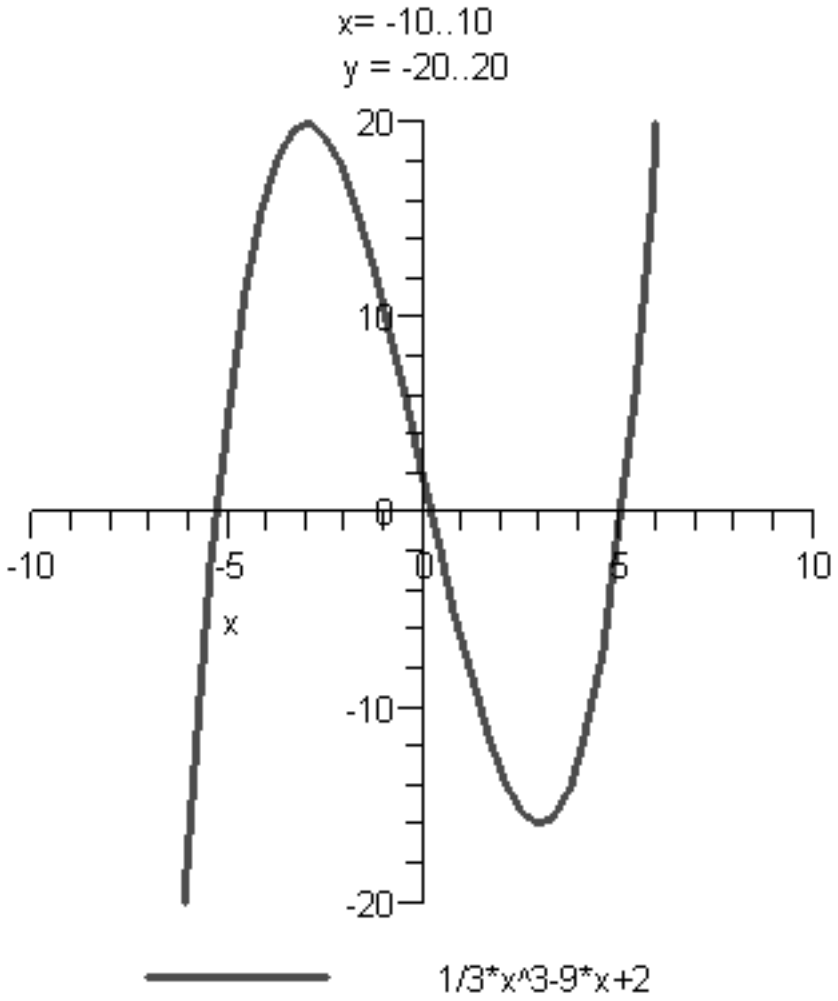


Prob 3.2.13

```
> f_13:=proc(x);
     (1/3)*x^3 - 9*x +2;
  end proc:
  f_13_x:=f_13(x);
  plot(f_13(x),x= -10..10,-10..10,thickness=2,legend=convert(f_13_x,
  string),title=
     `x= -10..10\n y = -10..10`);
  plot(f_13(x),x= -10..10,-20..20,thickness=2,legend=convert(f_13_x,
  string),
  title=
     `x= -10..10\n y = -20..20`);
```

$$f\_13\_x := \frac{1}{3}\, x^3 - 9\, x + 2$$

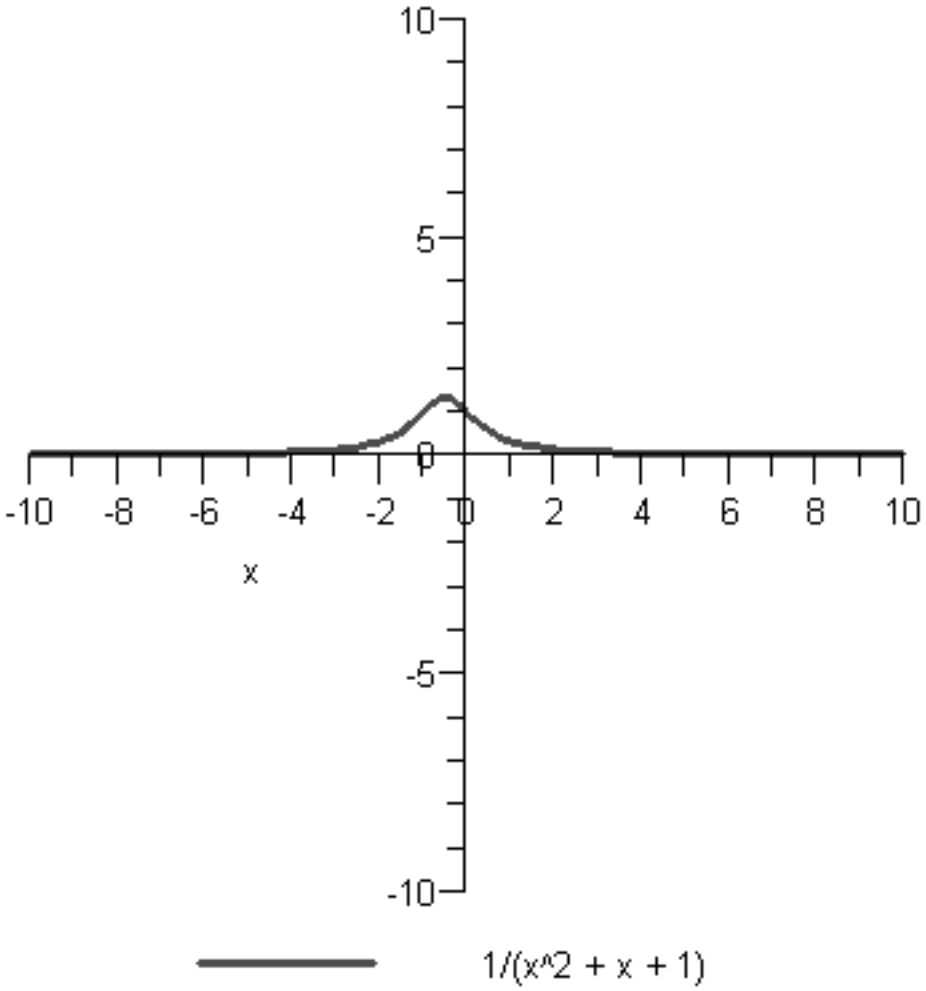

x= -10..10
y = -10..10
10
5
0
-5
-10
-10
-5
0
5
10
x
1/3*x^3-9*x+2

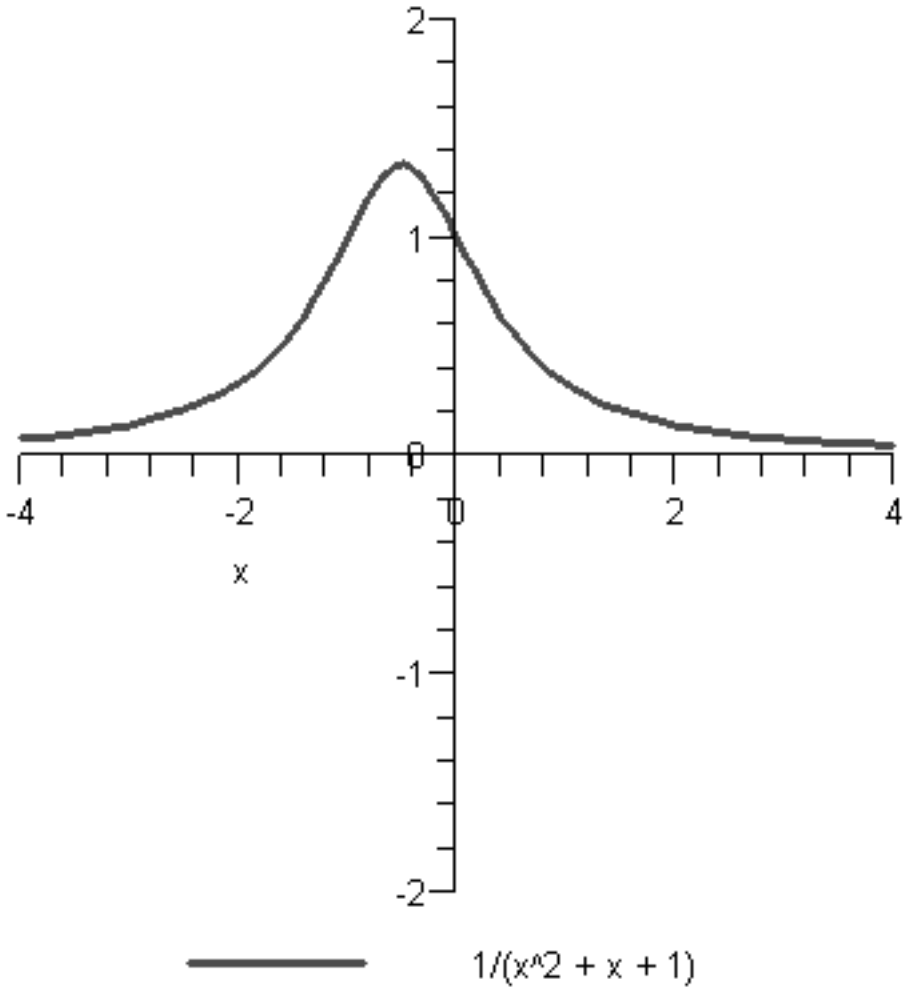


Prob 3.2.25

```
> f_25:= proc(x);
     1/(x^2 + x + 1);
  end proc:
  f_25_x:= f_25(x);
  plot(f_25(x), x= -10 .. 10, -10..10, thickness=2,legend=`1/(x^2 +
  x + 1)`);
  plot(f_25(x), x= -4..4, -2..2, thickness=2,legend=`1/(x^2 + x + 1)
  `);
```

$$f\_25\_x := \frac{1}{x^2 + x + 1}$$


10
5
0
-5
-10
-10
-8
-6
-4
-2
0
2
4
6
8
10
x
1/(x^2 + x + 1)



dy/dx

```
> df_25_dx:=proc(x);
      diff(f_25(x),x);
  end proc:
  dy_dx:=df_25_dx(x);
```

$$dy\_dx := -\frac{2x+1}{\left(x^2+x+1\right)^2} \tag{3}$$

second derivative

```
> d2_f_25_dx2:=proc(x);
      diff(df_25_dx(x),x);
  end proc:
  d2y_dx2:=d2_f_25_dx2(x);normal(%);
```

$$d2y\_dx2 := \frac{2\,(2x+1)^2}{\left(x^2+x+1\right)^3} - \frac{2}{\left(x^2+x+1\right)^2} \tag{4}$$

$$\frac{6\,x\,(x+1)}{\left(x^2+x+1\right)^3} \tag{4}$$

>