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> #Solutions for Lab 3, Friday section
> #Q1: Write a function f1 to convert pounds to kilograms (2.2 lb
  = 1 kg). Do not use the convert function; write your own
  formula.
> f1:=x->x/2.2;
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$$f1 := x \rightarrow \frac{x}{2.2}$$

```
> f1(4.4);
```

$$2.000000000$$

```
> #Q2:  Write a function f2 that takes as input two integers m,n
  and outputs the last digit of m*n. For example f2(31,43) would
  be 3. Call the function on the pairs  (73,14),(11,199). Hint:
  check out the function irem.

> f2:=(m,n)->irem(m*n,10);
```

$$f2 := (m, n) \rightarrow irem(m\,n, 10)$$

```
> f2(73,10); f2(11,19);
```

$$0$$

$$9$$

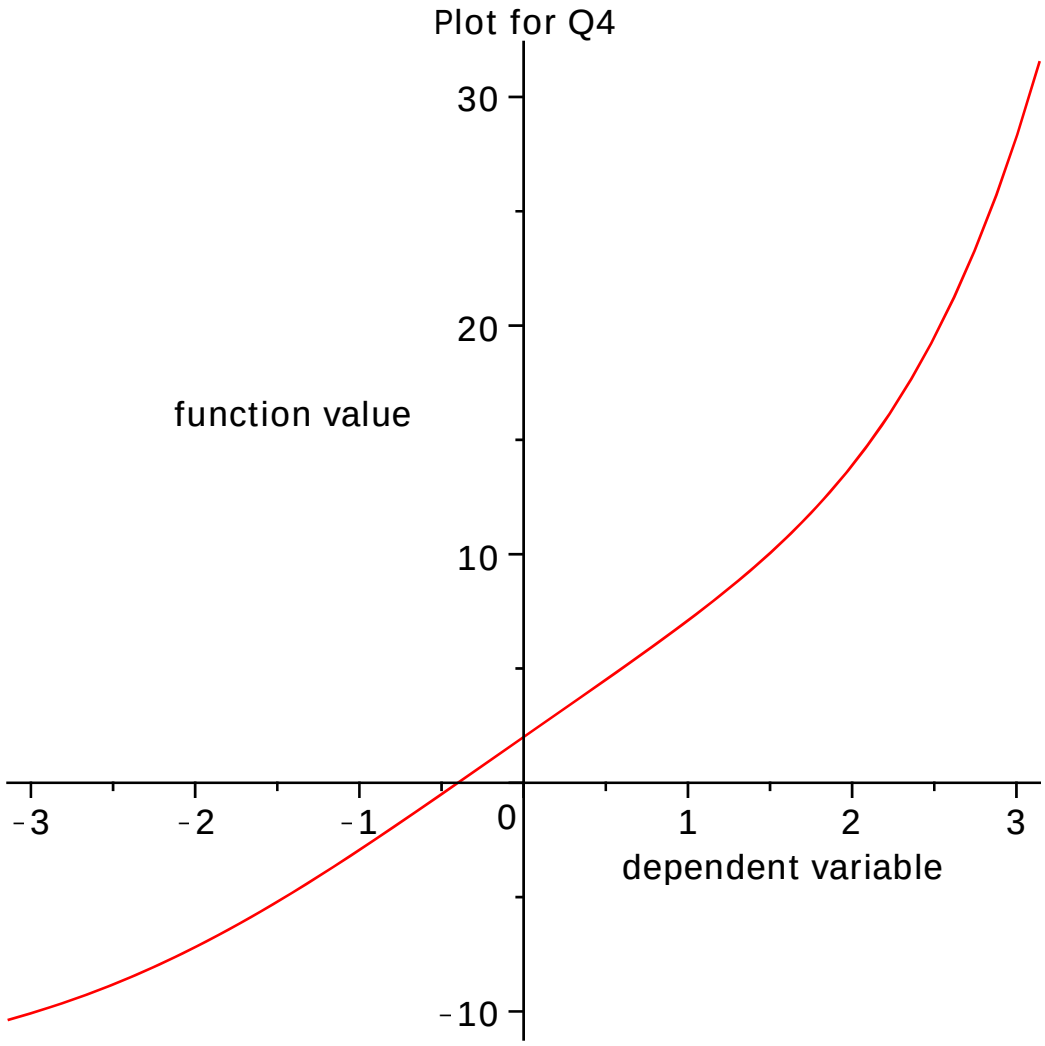
```
> #Q3: Write a function f3 that takes a single real number x as
  input and outputs the value of 3x+exp(x)+cos(x)+sin(x).

> f3:= x->3*x+exp(x)+sin(x)+cos(x);
```

$$f3 := x \rightarrow 3\,x + e^{x} + \sin(x) + \cos(x)$$

```
> #Q4: Plot the above function over -Pi <= x <= Pi and label the
  axes. Give a title to the plot (the title does not have to be
  very informative).

> plot(f3(x),x=-Pi..Pi,labels=["dependent variable","function
  value"],title="Plot for Q4");
```




```
> #Q5: Write a function that takes a single input (an integer n)
  returns the integer 1 if n is prime and 0 otherwise. You will
  only test this function with integers and so no input type
  specification/checking is needed. Call the function with inputs
  23, 871, 873 and 9876543.
```

```
> q5func:=n->piecewise(isprime(n),0,not isprime(n),23);
```

$$q5func := n \rightarrow piecewise(isprime(n), 0, \textbf{not}\ isprime(n), 23)$$

```
> q5func(23);q5func(871); q5func(873); q5func(9876543);
```

$$0$$

$$23$$

$$23$$

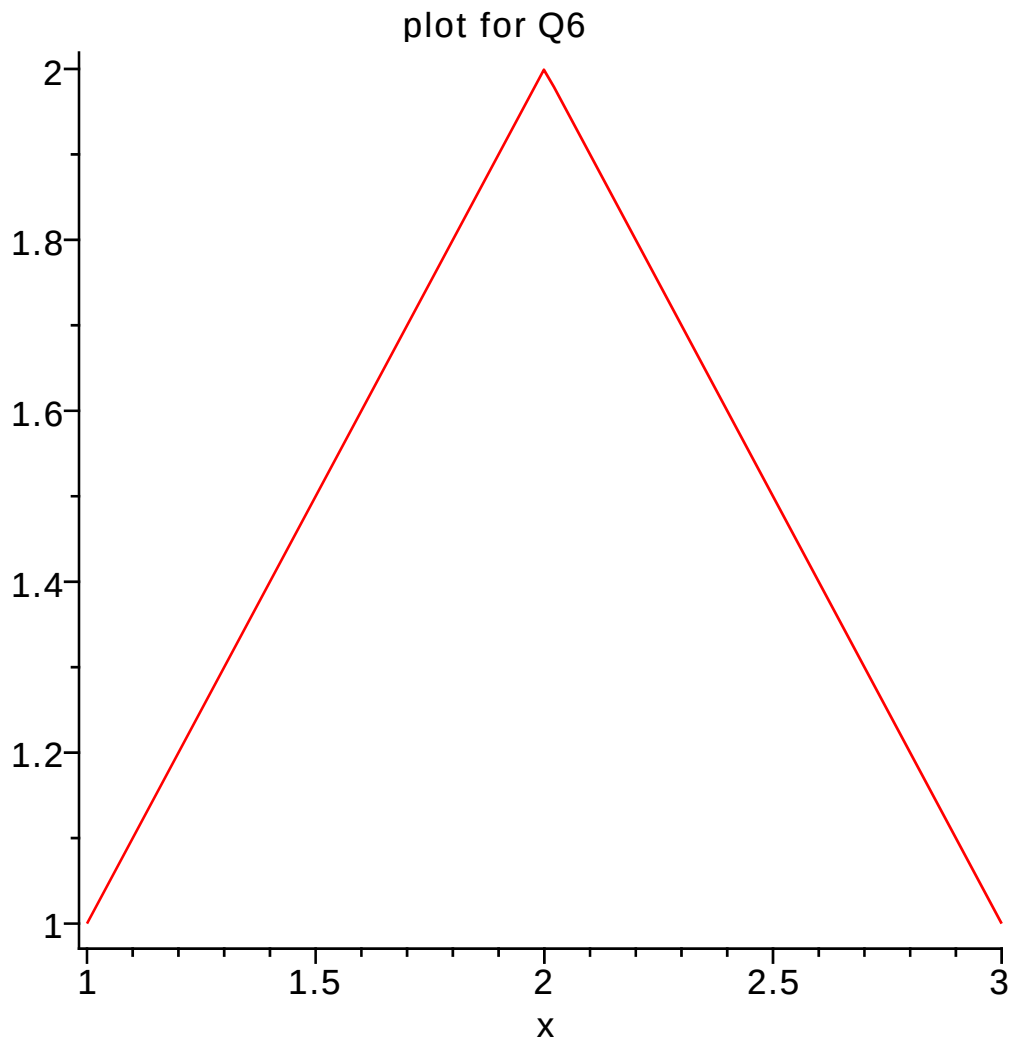
$$23$$

```
> #Q6: In a single plot, draw 2 line segments, one from (1,1) to
  (2,2) and the other from (2,2) to (3,1). Label only the x axis
  (as "x") and give a title to the plot.
```

```
> q6func:=piecewise(1<=x and x<=2,x,2<x and x<=3,4-x);
```

$$q6func := \begin{cases} x & 1 - x \leq 0 \textbf{ and } x - 2 \leq 0 \\ 4 - x & -x < -2 \textbf{ and } x - 3 \leq 0 \end{cases}$$

```
> plot(q6func(x),x=1..3,labels=["x",""],title="plot for Q6");
```

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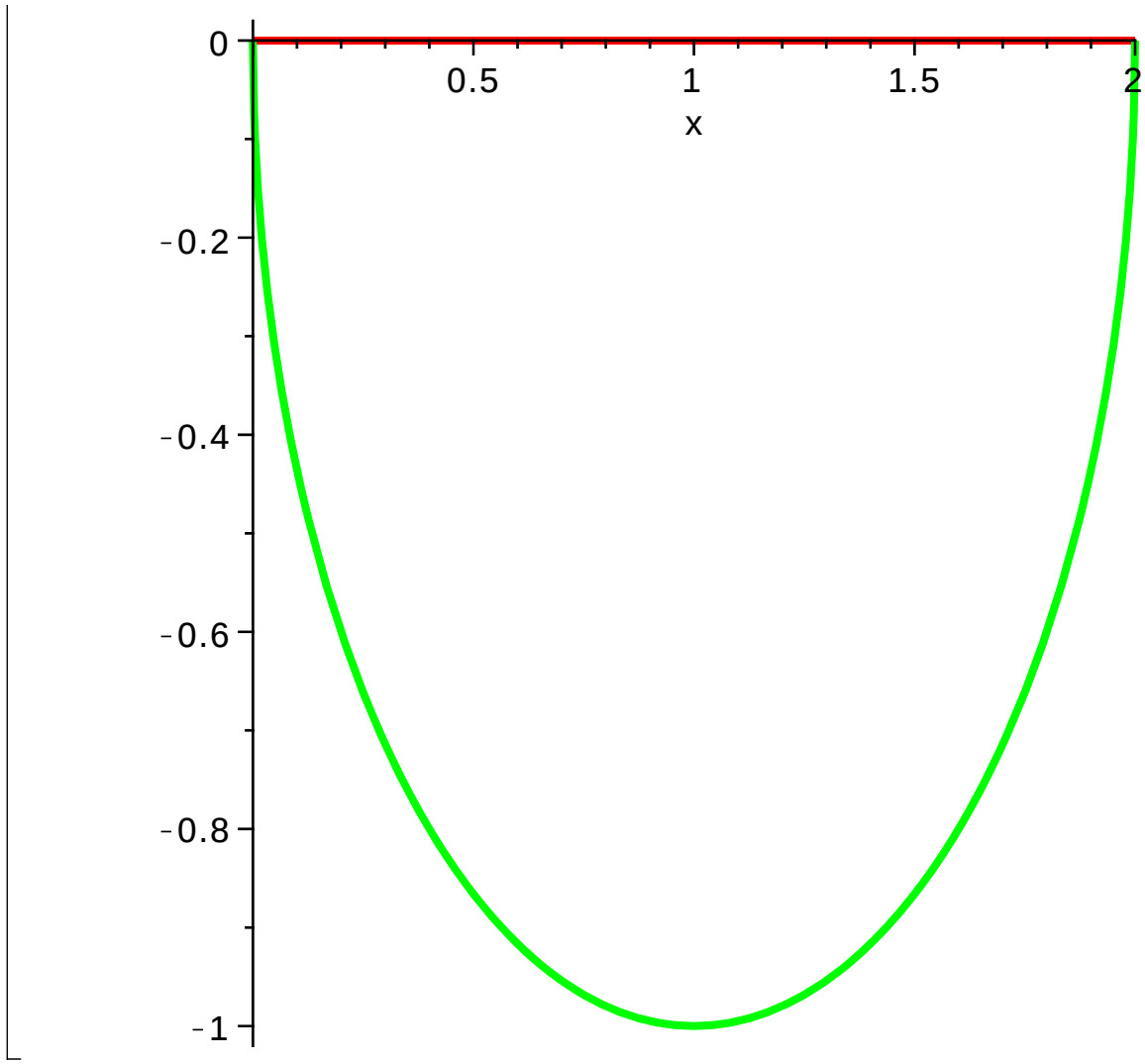
> #Q7:   In the saIn a single plot, draw a semicircle with centre
  (1,0), radius 1 and containing all non-positive y values. Also
  close the semicircle by drawing the diameter that lies on the x
  axis. Use an appropriate color so that the line can be seen on
  the screen. Hint: If you have forgotten the equation of a
  circle, type ?Circle.
> plot({-sqrt(1-(1-x)^2),0},x=0..2,thickness=3);
```


0
-0.2
-0.4
-0.6
-0.8
-1
0.5
1
1.5
2
x