

The file pval2 (Maxima program)

```
kill(all);
load(distrib);
n : 4;
x[1] : 37.6;
x[2] : 40.9;
x[3] : 43.2;
x[4] : 38.7;
xbar : 0;
testmean : 36.5;
for i : 1 step 1 thru n do(xbar : float(xbar+x[i]));
xbar : xbar/n;
sumsq : 0;
for i : 1 step 1 thru n do(sumsq : sumsq+(x[i]-xbar)^2);
sumsq;
ssq : sumsq/(n-1);
s : sqrt(ssq);
"sigma is known"$
sigma : 3.0;
standnorm : abs(xbar-testmean)*sqrt(n)/sigma;
confidence_level : float(cdf_normal(standnorm, 0, 1));
"significance level or p-value:"$
pvalue_2sided : 2*(1-confidence_level);
pvalue_1sided : 1-confidence_level;
"sigma is not known"$
tvar : abs(xbar-testmean)*sqrt(n)/s;
confidence_level_t : float(cdf_student_t(tvar,n-1));
pvalue_2sided : 2*(1-confidence_level_t);
pvalue_1sided : 1-confidence_level_t;
```

The output of the Maxima program pval2

```
Maxima 5.38.1 http://maxima.sourceforge.net
using Lisp GNU Common Lisp (GCL) GCL 2.6.12
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Dedicated to the memory of William Schelter.
The function bug_report() provides bug reporting information.
(%i1) batch("pval2")
```

```
read and interpret file: #p/home/mate/exams/s19/maxima/81/pvalue/pval2
(%i2) kill(all)
(%o0) done
(%i1) load(distrib)
(%o1) /usr/share/maxima/5.38.1/share/distrib/distrib.mac
(%i2) n:4
(%o2) 4
(%i3) x[1]:37.6
(%o3) 37.6
(%i4) x[2]:40.9
(%o4) 40.9
(%i5) x[3]:43.2
(%o5) 43.2
(%i6) x[4]:38.7
(%o6) 38.7
(%i7) xbar:0
(%o7) 0
(%i8) testmean:36.5
(%o8) 36.5
(%i9) for i thru n do xbar:float(xbar+x[i])
(%o9) done
(%i10) xbar:xbar/n
(%o10) 40.1
(%i11) sumsq:0
(%o11) 0
```

```

(%i12) for i thru n do sumsq:sumsq+(x[i]-xbar)^2
(%o12) done
(%i13) sumsq
(%o13) 18.46
(%i14) ssq:sumsq/(n-1)
(%o14) 6.153333333333333
(%i15) s:sqrt(ssq)
(%o15) 2.480591327351874
(%i16) "sigma is known"
(%i17) sigma:3.0
(%o17) 3.0
(%i18) standnorm:(abs(xbar-testmean)*sqrt(n))/sigma
(%o18) 2.400000000000001
(%i19) confidence_level:float(cdf_normal(standnorm,0,1))
(%o19) 0.991802464075404
(%i20) "significance level or p-value:"
(%i21) pvalue_2sided:2*(1-confidence_level)
(%o21) 0.01639507184919209
(%i22) pvalue_1sided:1-confidence_level
(%o22) 0.008197535924596045
(%i23) "sigma is not known"
(%i24) tvar:(abs(xbar-testmean)*sqrt(n))/s
(%o24) 2.902533730812595
(%i25) confidence_level_t:float(cdf_student_t(tvar,n-1))
(%o25) 0.9688131761973982
(%i26) pvalue_2sided:2*(1-confidence_level_t)
(%o26) 0.0623736476052037
(%i27) pvalue_1sided:1-confidence_level_t
(%o27) 0.03118682380260185
(%o27) pval2

```