

Case 1. Call fm_find_min to find a relative minimum between 1 and 2
for $f(x) = x^3 - 9x + 17$.
Use kprt = 0, so no output will be done in the routine, then
write the results from the main program.

A minimum for function 1 is

x = 1.73205080756887729352744634150587236694280525381038
f(x) = 6.60769515458673623883532195096476579834316847713772

Error for x = 0.0000000000M 0

Case 2. Find a relative maximum between -5 and 1.
Use kprt = 1, so fm_find_min will print the results.

fm_find_min. Function 1 19 iterations. A relative maximum on interval
-5.0000000000E+00 to 1.0000000000E+00 is
x = -1.73205080756887729352744634150587236694280525381038M+0
f(x) = 2.73923048454132637611646780490352342016568315228623M+1

Case 3. Find a relative maximum between -5 and 5.
Use kprt = 2, so fm_find_min will print all iterations,
as well as the final results.

fm_find_min. Begin trace of all iterations.
Search for a relative maximum on the interval
-5.0000000000E+00 to 5.0000000000E+00

j = 1 x = -1.18033988749894848204586834365638117720309179805763M+0
f(x) = 2.59786068004374314689187690389454302835138120080265M+1

j = 2 x = 1.18033988749894848204586834365638117720309179805763M+0
f(x) = 8.02139319956256853108123096105456971648618799197351M+0

j = 3 x = -2.63932022500210303590826331268723764559381640388474M+0
f(x) = 2.23683476450242170410490021819957305250303884086986M+1

j = 4 x = -1.44105244939971398711647618947453568019924096907167M+0
f(x) = 2.69769361811590675101405767698458811273804175971998M+1

j = 5 x = -1.67464248342058283245771608457771090510110126045443M+0
f(x) = 2.73753690059043490509929936174900738543719809945382M+1

j = 6 x = -1.75636689299073000196468969364550262386659303868158M+0
f(x) = 2.73892181285040532036056650582404996317140430850056M+1

j = 7 x = -1.73289581341219400586847108437818812057992675685335M+0
f(x) = 2.73923011345758532470808094697841576048106245849590M+1

j = 8 x = -1.73191293624894933418792300191322538889662996959080M+0
f(x) = 2.73923047466448166994285983732914750369431654557573M+1

j = 9 x = -1.73205244304741444372974750822080149542772535003507M+0
f(x) = 2.73923048453993651400150692288465792844927486003774M+1

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j = 10      x = -1.73205079647125862027246535686556879347939802949486M+0
           f(x) = 2.73923048454132631212214069037174591409553453818084M+1

j = 11      x = -1.73205080754732484992094881638026610836105864891021M+0
           f(x) = 2.73923048454132637611622643955728673256392139176329M+1

j = 12      x = -1.73205080756887554368262197617869526343110210516598M+0
           f(x) = 2.73923048454132637611646780490193238068440470080351M+1

j = 13      x = -1.73205080756887729355046339705955027283432550039002M+0
           f(x) = 2.73923048454132637611646780490352342016540786800494M+1

j = 14      x = -1.73205080756887729352744634513480130468355809895472M+0
           f(x) = 2.73923048454132637611646780490352342016568315228623M+1

j = 15      x = -1.73205080756887729352744634150587236306721822265359M+0
           f(x) = 2.73923048454132637611646780490352342016568315228623M+1

j = 16      x = -1.73205080756887729352744634150587236694280525381842M+0
           f(x) = 2.73923048454132637611646780490352342016568315228623M+1

j = 17      x = -1.73205080756887729352744634150587236694280525381038M+0
           f(x) = 2.73923048454132637611646780490352342016568315228623M+1

j = 18      x = -1.73205080756887729352744634150587236694280525381038M+0
           f(x) = 2.73923048454132637611646780490352342016568315228623M+1

j = 19      x = -1.73205080756887729352744634150587236694280525381038M+0
           f(x) = 2.73923048454132637611646780490352342016568315228623M+1

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fm_find_min.  Function 1 19 iterations. A relative maximum on interval
              -5.0000000000E+00 to 5.0000000000E+00 is
              x = -1.73205080756887729352744634150587236694280525381038M+0
              f(x) = 2.73923048454132637611646780490352342016568315228623M+1

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Case 4. The gamma function has one minimum for positive x.
Find it, printing all iterations.

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fm_find_min.  Begin trace of all iterations.
              Search for a relative minimum on the interval
              1.0000000000E-01 to 3.0000000000E+00

j = 1      x = 1.20770143262530494020669818033964945861110337856329M+0
           f(x) = 9.16161483362486862415087380678684850077692347939627M-1

j = 2      x = 1.89229856737469505979330181966035054138889662143671M+0
           f(x) = 9.59150802480982168526544860224804200179851954052638M-1

j = 3      x = 7.8459713474939011958660363932070108277793242873425M-1
           f(x) = 1.18198955614569412428450483132497418612053444308497M+0

j = 4      x = 1.49967395113189359545300601030521228435992559489798M+0
           f(x) = 8.86216425656526453090492637703973766360691989480875M-1

j = 5      x = 1.47544919770403273440456160014406821107759891446928M+0

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$$f(x) = 8.85684658277468210205552391103912784017709709317751M-1$$

$$j = 6 \quad x = 1.46395979235259887390540535747997252607073412965308M+0$$
$$f(x) = 8.85605514284151352034204346541209883587951650716095M-1$$

$$j = 7 \quad x = 1.46153829248390005080374542873982272473686192718282M+0$$
$$f(x) = 8.85603198185232401327604802282358743839283715163289M-1$$

$$j = 8 \quad x = 1.46162754090904971277058193915980953895928980239083M+0$$
$$f(x) = 8.85603194419971503248809802183159625661067811409280M-1$$

$$j = 9 \quad x = 1.46163217978321360459778894803676840576769129053316M+0$$
$$f(x) = 8.85603194410889219636482875354312727399393404282866M-1$$

$$j = 10 \quad x = 1.46163214490297565184539322798447896902611875286361M+0$$
$$f(x) = 8.85603194410888700280647861321920821941202171373163M-1$$

$$j = 11 \quad x = 1.46163214496838674290130160565005369852391235244153M+0$$
$$f(x) = 8.85603194410888700278815900837726909308459406400013M-1$$

$$j = 12 \quad x = 1.46163214496836234160972710582170167422788761875860M+0$$
$$f(x) = 8.85603194410888700278815900582588733259565295982905M-1$$

$$j = 13 \quad x = 1.46163214496836234126265978567858597799454048963922M+0$$
$$f(x) = 8.85603194410888700278815900582588733207951533669929M-1$$

$$j = 14 \quad x = 1.46163214496836234126265954232572003678719883695113M+0$$
$$f(x) = 8.85603194410888700278815900582588733207951533669903M-1$$

$$j = 15 \quad x = 1.46163214496836234126265954232572132846819619112477M+0$$
$$f(x) = 8.85603194410888700278815900582588733207951533669903M-1$$

$$j = 16 \quad x = 1.46163214496836234126265954232572132846819620400645M+0$$
$$f(x) = 8.85603194410888700278815900582588733207951533669903M-1$$

$$j = 17 \quad x = 1.46163214496836234126265954232572132846819620400645M+0$$
$$f(x) = 8.85603194410888700278815900582588733207951533669903M-1$$

$$j = 18 \quad x = 1.46163214496836234126265954232572132846819620400645M+0$$
$$f(x) = 8.85603194410888700278815900582588733207951533669903M-1$$

fm_find_min. Function 2 18 iterations. A relative minimum on interval
1.0000000000E-01 to 3.0000000000E+00 is
x = 1.46163214496836234126265954232572132846819620400645M+0
f(x) = 8.85603194410888700278815900582588733207951533669903M-1