```
velocity, m/s 6.15   contact, bending lives, khr    45.19 large  20.00 large
module, mm    8.00   pitting geom factor 0.1113    contact ratio 1.312
width, mm    104.7   commercial, 8 accuracy level gears

problem 15b   pinion volume = 0.25p*85.1*sq( 6*13) =  407 cc
power, kW    100.0   PINION, WHEEL - speeds, rpm        1450.0        471.2
appl'n factor 1.00   tooth number, profile shift       13  0.51     40  0.17
rel'y factor  1.00   all. contact, bending stresses  1450   400   1300   350 MPa
dist'n factor 1.29   bending geom & max life fctrs  0.447  1.04  0.389  1.04
vel'y factor  1.29   contact, bending life factors  0.715 0.286  0.798 0.375
velocity, m/s 6.39   contact, bending lives, khr    45.69 large  20.00 large
module, mm    6.00   pitting geom factor 0.1219    contact ratio 1.411
width, mm     85.1   commercial, 8 accuracy level gears

problem 15c   pinion volume = 0.25p*70.4*sq( 5*17) =  399 cc
power, kW    100.0   PINION, WHEEL - speeds, rpm        1450.0        474.0
appl'n factor 1.00   tooth number, profile shift       17  0.49     52  0.05
rel'y factor  1.00   all. contact, bending stresses  1450   400   1300   350 MPa
dist'n factor 1.25   bending geom & max life fctrs  0.468  1.04  0.393  1.04
vel'y factor  1.30   contact, bending life factors  0.715 0.361  0.797 0.492
velocity, m/s 6.83   contact, bending lives, khr    45.96 large  20.00 large
module, mm    5.00   pitting geom factor 0.1259    contact ratio 1.486
width, mm     70.4   commercial, 8 accuracy level gears
```

PROBLEM 16

This is similar to the worked example. Let life be L khr

	block		1	2	3
	contact stress, σ	GPa	1.0	1.1	0.9
	speed, N	rpm	500	400	300
	duration, t	h	2	1	3
cycles over life L,	n = (t/Σt)L*N	Mc	10L	4L	9L
cycles to failure,	n* = (1.2/σ)**17.93	Mc	262.8	47.6	1738

Applying Miner : (10/262.8 + 4/47.6 + 9/1738)*L = 1 ; L = 7.9 khr

PROBLEM 17

Contact stresses aren't given directly as they were in the previous problem. It is possible to evaluate the contact stress for each block, by repeating (**20**) and the subsequent analysis which led to the contact design equation (**21**). However it's much easier to use (**21**) as has been done previously to determine for each block the life as if the block loading were the only load acting - and this after all is the essence of n*.

So, first solve (**21**) using *Steel Spur Gears* to determine each block's life independently (allowable bending stresses are unknown so artifically large values are used in the program to force pitting failure) :

```
problem 17, block 1
power, kW     60.0   PINION, WHEEL - speeds, rpm        200.0         97.9
appl'n factor 1.25   tooth number, profile shift       23  0.39     47  0.09
rel'y factor  1.00   all. contact, bending stresses  1200   500   1100   500 MPa
dist'n factor 1.25   bending geom & max life fctrs  0.465  1.04  0.414  1.04
vel'y factor  1.21   contact, bending life factors  0.818 0.308  0.893 0.346
velocity, m/s 1.99   contact, bending lives, khr    29.95 large  12.94 large
module, mm    8.00   pitting geom factor 0.1123    contact ratio 1.556
width, mm    100.0   commercial, 7 accuracy level gears

problem 17, block 2
power, kW     45.0   PINION, WHEEL - speeds, rpm        150.0         73.4
appl'n factor 1.25   tooth number, profile shift       23  0.39     47  0.09
rel'y factor  1.00   all. contact, bending stresses  1200   500   1100   500 MPa
dist'n factor 1.25   bending geom & max life fctrs  0.465  1.04  0.414  1.04
```