P2.4

$$c' = \frac{-240}{V^2} + 10^{-4}\,(1.5)\,V^{0.5} = 0$$
$$(1.5)\,(10^{-4})\,V^{2.5} = 240$$
$$Taking\ \log s,\ V = 303.14$$
$$c'' = \frac{240}{V^3} + \frac{0.75e-4}{V^{0.5}} > 0$$

Thus $V = 303.14$ is a strict local minimum and the corresponding cost is

$c_{\min} = 1.7685$

P2.11 Using in-house code:

FIBONACCI

Getfun subroutine: `f = 240/x + 1e-4*x^1.5 + 0.45;`

Initial Interval	Final Interval	X-Value within interval	Function Value within interval	No. of Function Calls
[0, 1000]	[292.1, 303.4]	303.26	1.7695	10
[0, 500]	[297.8, 303.4]	303.37	1.7695	10

P2.12 Results from in-house codes:

GOLDINTV:

Getfun subroutine: `F = -1.44/X + 5.9e-6/X^9;`

Initial Interval	No. of Function Calls	Final Interval	X-Value within interval	Function Value within interval
[0, 100]	13	[0.1919, 0.5025]	0.31056	−4.4172
[0, 10]	13	[0.2942, 0.2631]	0.2823	−4.5828

GOLDLINE:

Getfun subroutine: `F = -1.44/X + 5.9e-6/X^9;`

Initial Point	No. of Function Calls	X-Value within interval	Function Value within interval
0.1	15	0.2793	−4.5853
1	17	0.2790	−4.5853
10	28	0.2790	−4.5853

P2.19 Maximizing f = (17-2*x)*(22-2*x)*x*0.1 - 4*x*x*.04 - 4*x*.02 within the interval [0,8.5] gives an optimum height of the box as

x^* = 3.0415, and profit f^* = $0.51, per box manufactured.