This is the definition of the force of mortality for the G82M table.

```
> m := t ->
  0.0005+0.00007585775*10^(0.038*t) ;
```

$$m := t \to 0.0005 + 0.00007585775\ 10^{(0.038\ t)}$$

$$0.001547128445$$

This is the survival function for a life aged 30

```
> evalf(0.00007585775*10^(0.038*30)/(0.038*ln
  (10)));
```

$$0.01196742383$$

```
> p := t ->
  exp(-0.0005*t-0.01196742383*(10^(0.038*t)-1
  ));
```

$$p := t \to \mathbf{e}^{(-0.0005\ t - 0.01196742383\ (10^{(0.038\ t)} - 1))}$$

The following are calculations for part 1

```
> evalf(exp(-0.05*30-0.0005*20)*p(30));
```

$$0.1867043347$$

```
> evalf( Int( exp(-0.0505*t)*p(t)*m(30+t),
  t=0..20 ));
```

$$0.03628695558$$

```
> evalf( Int( exp(-0.05*t)*p(t)*m(30+t),
  t=20..30 ));
```

0.02531506434

```
> evalf(
  100000*(.3628695558e-1+exp(-0.0005*20)*.253
  1506434e-1));
```

6135.013082

```
> evalf( Int( exp(-0.0505*t)*p(t), t=0..20
  ));
```

12.33786986

```
> evalf( Int( exp(-0.05*t)*p(t), t=20..30 ));
```

2.603568065

```
> evalf(
  (12.33786986+exp(-0.0005*20)*2.603568065));
```

14.91553199

So the premium is

```
> evalf((100000*.1867043347+6135.013082)/14.9
  1553199);
```

1663.061470

The probability required in part 3 is calculated below

```
> evalf( Int( 0.01*exp(-0.01*t)*p(t), t=0..30
  ));
```

0.2467562079

```
> evalf((1-exp(-0.01*30))*p(30));
```

0.2190501402

```
> evalf(.2467562079-.2190501402);
```

0.0277060677

>

>