

math165\_1\_3\_43.mw

Maple 10 Worksheet for Problems in Math 165 - Calculus for Business.

First load plots and student:

```
> with( student):with( plots):
```

Chapter 1 1.3 Problem 43 STOCK PRICES

1.3 Problem 43 (c): ... The IPO .price is \\$10 per share.

Sketch the graph over a two year period under the scenario:

(c) The price rises steadily to \\$60 per share during the first year, at which time, an accounting scandal is uncovered. The price gaps down to \\$25 per share, then steadily decreases to \\$5 over the next 3 months before rising at a constant rate at the end of a 2 year period.

We have different rates of change and a "gap". "steadily" and "constant rate" mean "linear"

We need formulas for  $P(t)$  - it is convenient to let  $t$  be in months:

For  $0 \leq t \leq 12$ , the slope (rate) is  $(60 - 10)/12$ , so

```
> p_1 := proc(t);  
    10 + ((60 - 10)/12)*t;  
end proc;
```

```
p_1(0);p_1(12);
```

```
p_1 := proc(t) 10 + 25/6 * t end proc  
10  
60
```

(1)

For  $12 < t \leq 15$ , the slope (rate) is  $(5 - 25)/3$ , so

```
> p_2 := proc(t);  
    25 + ((5 - 25)/3)*(t - 12);  
end proc;  
p_2(12);p_2(15);
```

```
p_2 := proc(t) 105 - 20/3 * t end proc  
25  
5
```

(2)

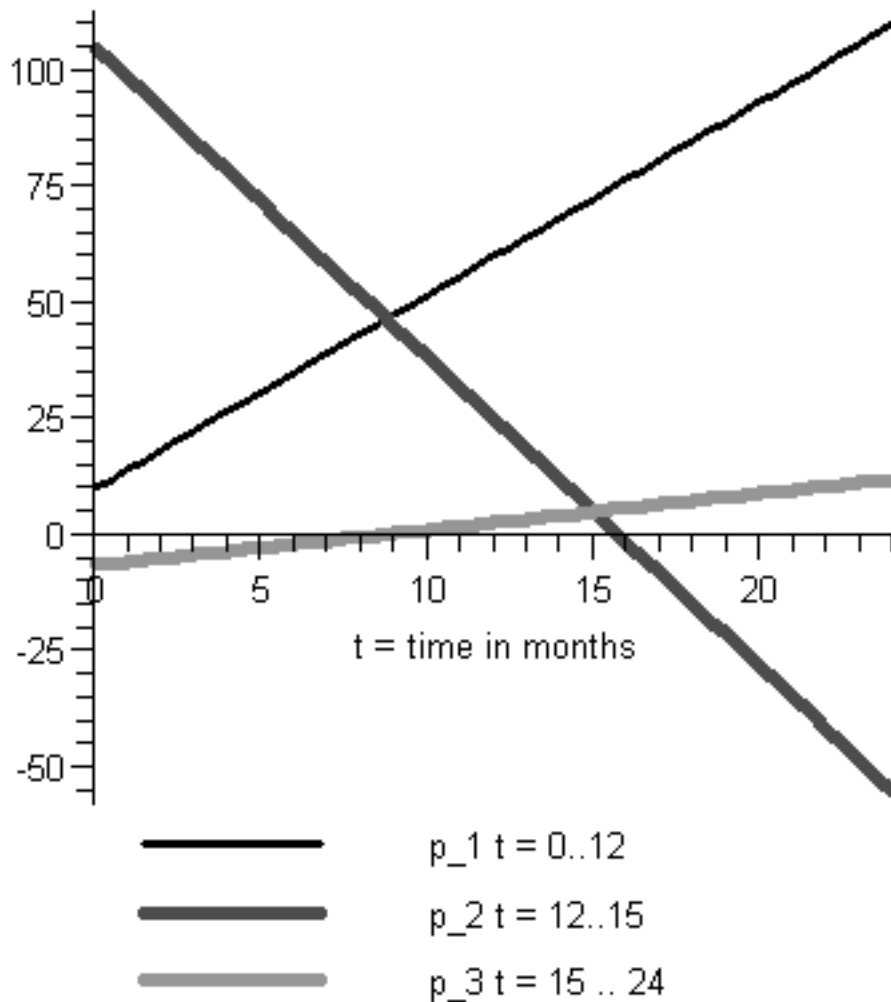
For  $15 < t < 24$ , the slope (rate) is  $(12 - 5)/9$ , so let

```
> p_3 := proc(t);  
    5 + ((12 - 5)/9)*(t - 15);  
end proc;  
p_2(15);p_3(24);
```

```
p_3 := proc(t) -20/3 + 7/9 * t end proc  
5  
12
```

(3)

```
> plot([p_1(t),p_2(t),p_3(t)],t = 0 .. 24, color=[black,red,green],
thickness = [2,3,4],labels = ['t = time in months`,``,``],legend=
['p_1 t = 0..12`,`p_2 t = 12..15`,`p_3 t = 15 .. 24`]);
```



The graph must be understood - which line to follow! We create a 'piecewise defined function'; Graphing of a piecewise defined function may be done on your calculator.

```
> p:= proc(t);
    piecewise(t < 12, p_1(t), t < 15, p_2(t), p_3(t));
end proc;
p := proc(t) piecewise(t < 12, p_1(t), t < 15, p_2(t), p_3(t)) end proc (4)
> plot(p(t), t = 0 .. 24, p = 0..60,discont = true,tickmarks=[8,6],
thickness = 4, labels = ['t = time in months`,`price`]);
```

