Section 3.2 Business Calculus problems 12 and 14

```
> y := 0.0231*x^4 - 0.4445*x^3 + 2.1579*x^2+2.0013*x+108.18;
```

$$y := 0.0231\,x^4 - 0.4445\,x^3 + 2.1579\,x^2 + 2.0013\,x + 108.18$$

```
> derivy:= diff(y,x);
```

$$derivy := 0.0924\,x^3 - 1.3335\,x^2 + 4.3158\,x + 2.0013$$

```
> solve(derivy=0, x);
```

$$5.912684319,\ 8.929370722,\ -0.4102368585$$

first model # 14

```
> sales := -98.67*price+1166.9;
```

$$sales := -98.67\,price + 1166.9$$

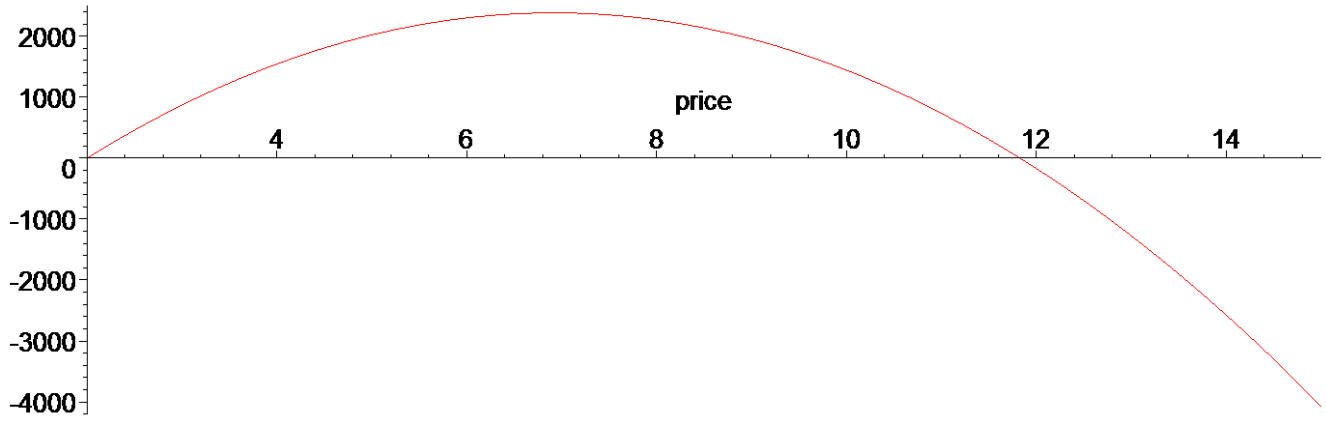
```
> costperitem := 2;
```

$$costperitem := 2$$

```
> profit := sales*(price - costperitem);
```

$$profit := (-98.67\,price + 1166.9)\,(price - 2)$$

```
> plot(profit, price = 2..15);
```




```
> derivprofit := diff(profit, price);
```

$$derivprofit := -197.34\,price + 1364.24$$

```
> solve(derivprofit=0,price);
```

$$6.913144826$$

second model # 14

```
> sales := 1580.6*exp(-0.1896*price);
```

$$sales := 1580.6\,\mathbf{e}^{(-0.1896\,price)}$$

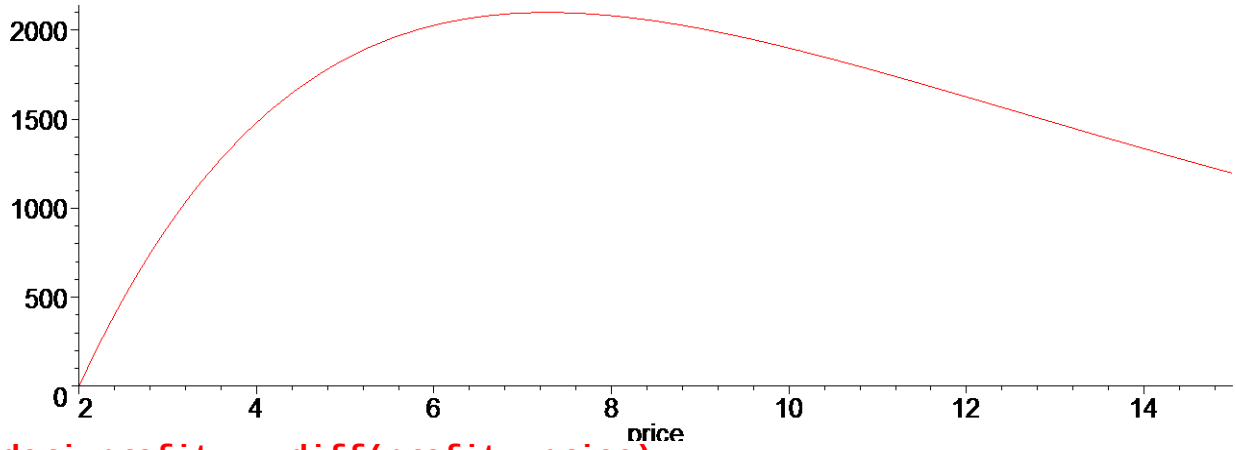
```
> costperitem := 2;
```

$$costperitem := 2$$

```
> profit := sales*(price - costperitem);
```

$$profit := 1580.6\,\mathbf{e}^{(-0.1896\,price)}\,(price - 2)$$

```
> plot(profit, price = 2..15);
```




```
> derivprofit := diff(profit, price);
```

$$derivprofit := -299.68176\, \mathbf{e}^{(-0.1896\, price)}\, (price - 2) + 1580.6\, \mathbf{e}^{(-0.1896\, price)}$$

```
> solve(derivprofit=0,price);
```

$$7.274261603$$

third model #14

```
> sales := 3390.4*price^(-1.1235);
```

$$sales := \frac{3390.4}{price^{1.1235}}$$

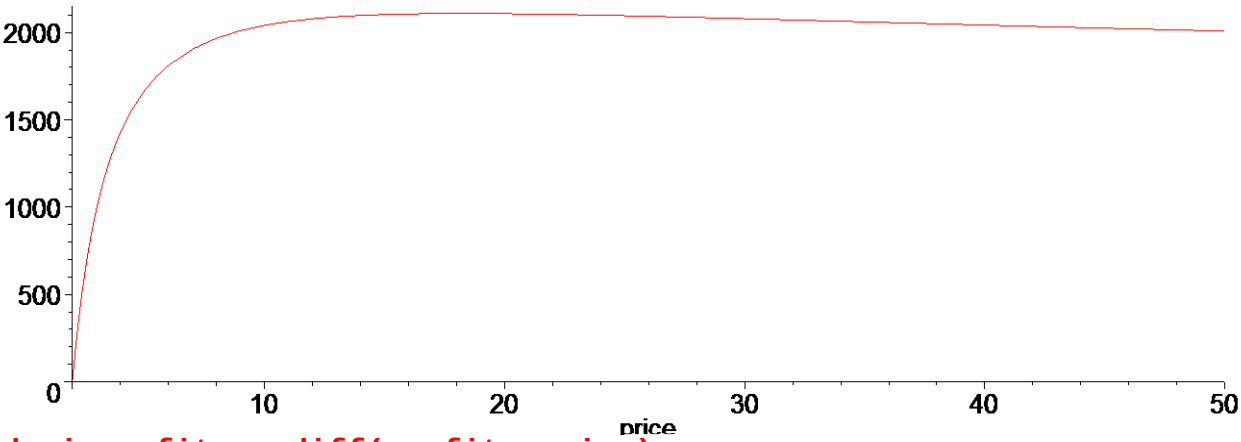
```
> costperitem := 2;
```

$$costperitem := 2$$

```
> profit := sales*(price - costperitem);
```

$$profit := \frac{3390.4\, (price - 2)}{price^{1.1235}}$$

```
> plot(profit, price = 2..50);
```




```
> derivprofit := diff(profit, price);
```

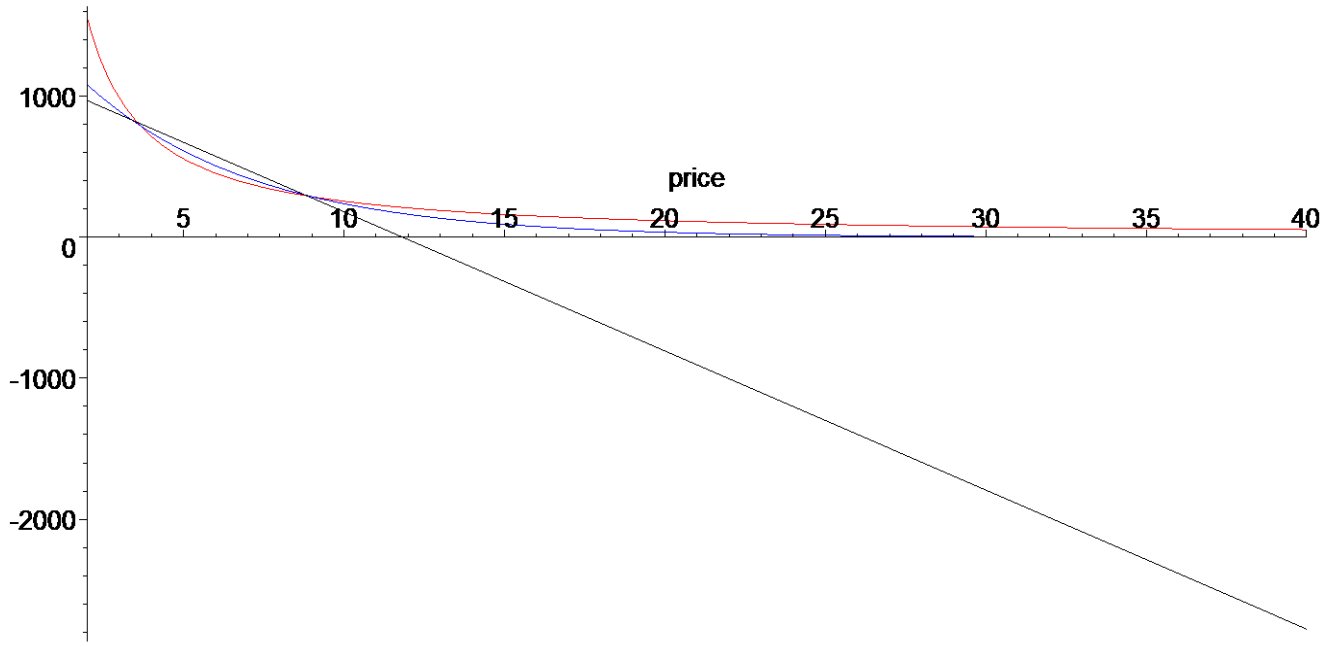
$$derivprofit := -\frac{3809.11440\, (price - 2)}{price^{2.1235}} + \frac{3390.4}{price^{1.1235}}$$

```
> solve(derivprofit=0,price);
```

$$18.19433198$$

```
>
> plot([-98.67*price+1166.9, 1580.6*exp(-0.1896*price),
  3390.4*price^(-1.1235)], price = 2..40,  color = [black, blue,
  red]);
```

?




```
>
>
```