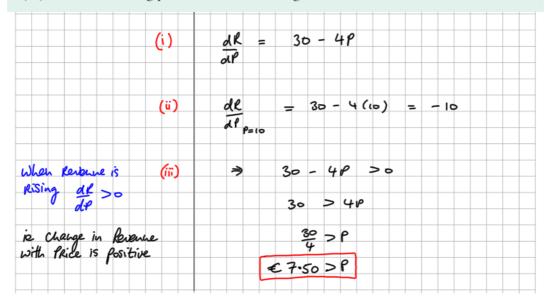
Example 2

A marketing director of a company found that the revenue, $\in R$, from selling a fixed number of produced items at $\in P$ each is given by the formula

$$R = 30P - 2P^2.$$

- (i) Find $\frac{dR}{dP}$ and explain what this means.
- (ii) Calculate $\frac{dR}{dP}$ when P = 10.
- (iii) For what selling prices is revenue rising?



- 12. A particle moving in a straight line is x cm from the point O at time t seconds $(t \ge 0)$, where $x = t^3 11t^2 + 24t 3$.
 - (i) Find its initial position and velocity.
 - (ii) Find its velocity at any time.
 - (iii) At what times is the particle stationary?
 - (iv) What is the position of the particle when it is stationary?
 - (v) For how long is the particle's velocity negative?
 - (vi) Find its acceleration at any time.
 - (vii) When is the particle's acceleration zero, and what is its velocity and position at that time?

(ii) DISTANCE (vi) VELOUTY ACCESSATION	$x = 6^3 - 116^2 + 246 - 3$ cm $y = 36^2 - 226 + 24$ cm/s
(ri) VELOCITY ACCELERATION	$a = 6t - 22 \qquad \text{cm/s}^2$
"Initial" means toos (i)	X = ? When $t = 0$ $X = -3$ cm $V = ?$ When $t = 0$ $V = 24$ cm/s
"Stationary" means V=0 (iii)	$(3t-4)(t-6)=0 \Rightarrow t=4/3 s \text{ or } t=6s$
use t=4 e t=6 (iv)	V= 0 , X=? X = (45)3 - 11 (4/3)2+24 (1/3)-3 =11.8 an X=(6)3-11 (6)2+24(1)-3 = 39 an
V-hegative Wen (v)	V-6 → 3t21t+24 < 6
a=0, t=?, x=?	(inside values) $4/3 < t < 6$ $6-4/3 = 4^{2}/3$ \$ $0 = 6t - 22 = 0 \Rightarrow 6t = 22 \Rightarrow t = \frac{22}{6}$ \$ $0 = 6t - 22 = 0 \Rightarrow 6t = 22 \Rightarrow t = \frac{22}{6}$ \$ \$ $0 = 6t - 22 = 0 \Rightarrow 6t = 22 \Rightarrow 6t =$
E=22 X=? E=25/6 V=?	$X = {\binom{226}{5}}^3 - {\binom{22}{2}}^2 + 24 {\binom{23}{6}} - 3 \\ V = 3({\binom{23}{6}})^2 - 22({\binom{23}{6}}) + 24 \\ V = 4\frac{3}{6} \text{and} V = -\frac{43}{6} and$