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$$f(x) = ax^2 + bx + c$$

$$f'(x) = 2ax + b$$

$$f'(x) = 0$$

$$2ax + b = 0$$

$$x = -\frac{b}{2a}$$

$\therefore$  tangent is horizontal  
at the AOS.

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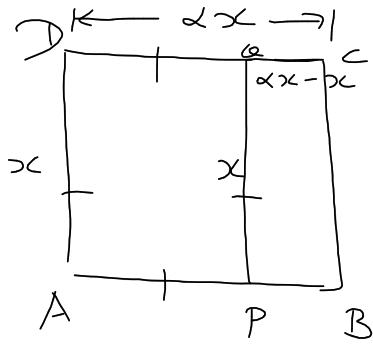
$$a) \alpha = \frac{1}{2}(\sqrt{5} + 1)$$

$$\begin{aligned} (i) \alpha^2 &= \frac{1}{4}(\sqrt{5} + 1)^2 \\ &= \frac{1}{4}(5 + 2\sqrt{5} + 1) \\ &= \frac{1}{4}(6 + 2\sqrt{5}) \\ &= \frac{1}{2}(3 + \sqrt{5}) \\ &= \alpha + 1 \\ &= \underline{\underline{\quad}} \end{aligned}$$

$$\begin{aligned} (ii) \frac{1}{\alpha} &= \frac{2}{\sqrt{5} + 1} \times \frac{\sqrt{5} - 1}{\sqrt{5} - 1} \\ &= \frac{2\sqrt{5} - 2}{4} \\ &= \frac{1}{2}(\sqrt{5} - 1) \\ &= \underline{\underline{\alpha - 1}} \end{aligned}$$

$$\begin{aligned} (m) \quad \alpha^6 &= (\alpha^2)^3 \\ &= (\alpha+1)^3 \\ &= \alpha^3 + 3\alpha^2 + 3\alpha + 1 \\ &= \alpha(\alpha+1) + 3(\alpha+1) + 3\alpha + 1 \\ &= \alpha^2 + \alpha + 3\alpha + 3 + 3\alpha + 1 \\ &= \alpha^2 + 7\alpha + 4 \\ &= \alpha + 1 + 7\alpha + 4 \\ &= \underline{\underline{\alpha + 5}} \end{aligned}$$

b)



$$\frac{PQ}{QC} = \frac{x}{x - x}$$

$$= \frac{1}{x - 1}$$

$$= \frac{1}{x - 1}$$

$$= \frac{1}{x - 1}$$

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