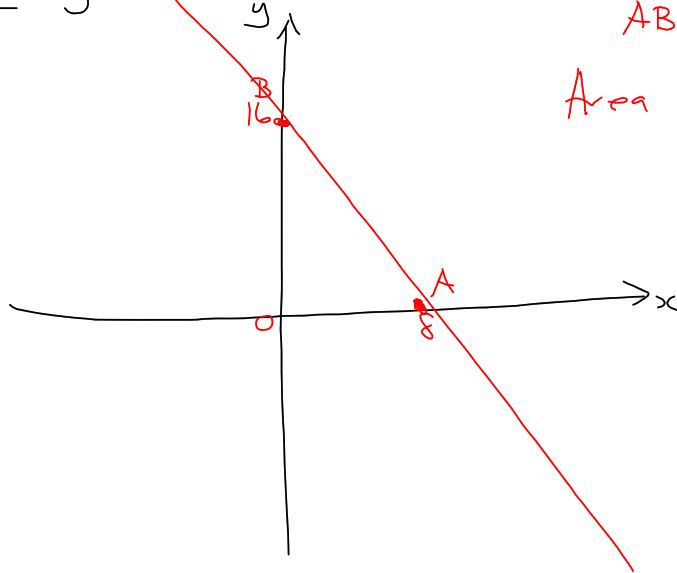


$$12/ f(x) = 10x - x^3, P(2, 12)$$

tangent at P: $y = -2x + 16$



$$AB = 8\sqrt{5} \text{ units}$$

$$\begin{aligned} \text{Area } \triangle AOB &= \frac{1}{2} \times 8 \times 16 \\ &= \underline{64 \text{ units}^2} \end{aligned}$$

$$13b) \quad f(x) = x^3 - 12x + 24$$

$$f'(x) = 3x^2 - 12$$

tangent \parallel x axis when $f'(x) = 0$

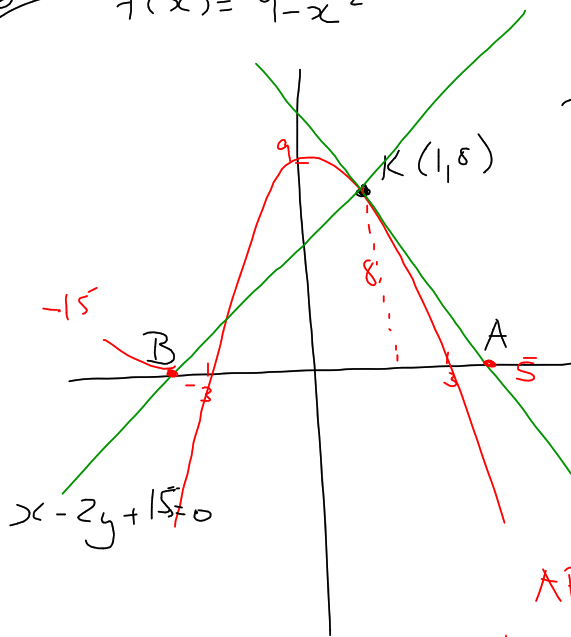
$$\text{i.e. } 3x^2 - 12 = 0$$

$$x^2 = 4$$

$$x = \pm 2$$

\therefore points are $(-2, 40)$ and $(2, 8)$

16 $f(x) = 9 - x^2$



when $x=1$, $f'(x) = -2$

T: $y - 8 = -2(x - 1)$
 $y - 8 = -2x + 2$

$y = -2x + 10$

N: $y - 8 = \frac{1}{2}(x - 1)$
 $2y - 16 = x - 1$

$x - 2y + 15 = 0$

$AB = \underline{20 \text{ units}}$

Area $\Delta AKB = \frac{1}{2} \times 20 \times 8$
 $= \underline{\underline{80 \text{ units}^2}}$

21c)

$$Q(k) = ak^2 - a^2k$$

$$Q'(k) = 2ak - a^2$$

$$Q'(a) = 2a^2 - a^2 \\ = a^2$$

$$Q'(0) = -a^2$$

$$|Q'(0) - Q'(a)| = |-a^2 - a^2| \\ = \underline{2a^2}$$