Tonbridge 8 ½ 16+

Tom Linton

1) $(1, -\frac{1}{3})$ 2) £2500 3a) $p^2+3p-28$ b) $12x^5y^6$

c) $(x-y)(x+y)$ d) $c(c+2d)$

e) $(2w+3)(w-1)$

4) 46.6° 5a) $\frac{8}{27}$ b) $\frac{4}{9}$

6a)i) 116° ii) Angle at the centre is twice the angle at the circumference

b)i) 122° ii) Opposite angles in a cyclic quadrilateral added to 180°

7) 7.55 km 8) 280°

9a) $\frac{x}{x-2}$ b) $\frac{3}{(2x-1)(x+1)}$ c) $e = \frac{T-n}{T+n}$

10) $d = 26$cm 11) $(3, -5)$ and $(\frac{3}{5}, \frac{29}{5})$

12a) $n = 3$ b) $2^{-\frac{3}{2}}$

13a) $y = -\frac{1}{2}x + 6$ b) $y = 3x - 2$ c)i) $(x-3)^2 - 7$ ii) $(3, -7)$

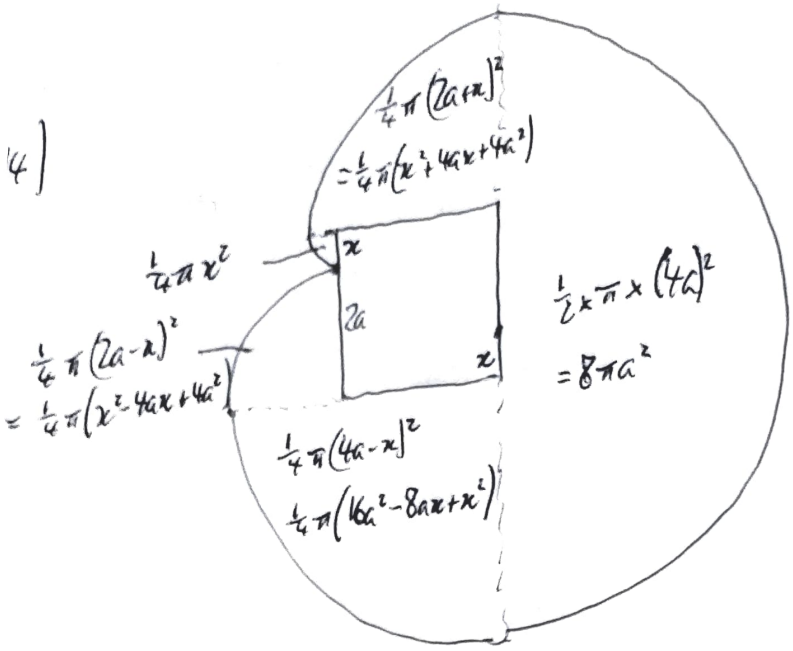
d)i) $f(x) = (x+4)(2x-3)(x+1)$

ii) $f(x-4) = (x-4+4)(2(x-4)-3)(x-4+1)$

$= x(2x-11)(x-3)$

$= 2x^3 - 17x^2 + 33x$

4)



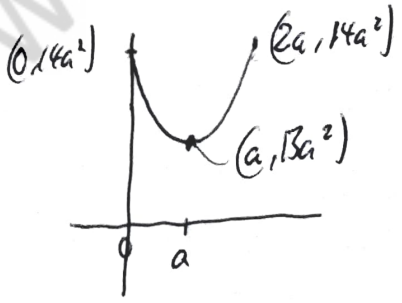
$$\text{Total area} = \pi a^2(8+4+1+1) + \pi ax(-2-1+1) + \pi x^2\left(\tfrac{1}{4}+\tfrac{1}{4}+\tfrac{1}{4}+\tfrac{1}{4}\right)$$

$$= \pi\left(x^2 - 2ax + 14a^2\right)$$

$$= \pi\left[(x-a)^2 + 13a^2\right]$$

Minimum when $x = a \Rightarrow A = 13\pi a^2$

For maximum take $x = 0$ as $x = 2a$



$$13\pi a^2 \leq A \leq 14\pi a^2$$