MATHEMATICS ANSWERS

Level Three

Area and Trig

1. a) Trapezium: break the lots into three graphs

$$Area = x\left(\frac{h_1 + h_n}{2} + h_2 + h_3 + ...+ h_{n-1}\right)$$

i) $= 20\left(\left(\frac{25+48}{2}\right)+35\right) = 1430m^2$

ii) $= 20\left(\left(\frac{53+30}{2}\right)+50\right) = 1830m^2$

iii) $= 30\left(\left(\frac{48+53}{2}\right)+55\right) = 3165m^2$

Total area = 1430 + 1830 + 3165 = 6425m²

b) Simpson's:

$$Area = \frac{x}{3}\left(h_1 + h_n + \sum 2(h_{odds}) + \sum 4(h_{evens})\right)$$

$$= \frac{20}{3}\left(25 + 48 + \sum 4(35)\right) = 1420m^2$$

$$= \frac{20}{3}\left(53 + 30 + \sum 4(50)\right) = 1886.667m^2$$

$$= \frac{30}{3}\left(48 + 53 + \sum 4(55)\right) = 3210m^2$$

Total area = 1420 + 1886.67 + 3210 = 6516.67m²

2. Only range horizontal distance is shown
   i. 99.88m – 99.90m
   ii. 249.73m – 249.76m
   iii. 999.925m – 999.886m
   iv. 9.833m – 9.827m
   v. 89.245m – 89.114m
   vi. 249.959m – 249.945m
   vii. 998.763m - 998.614m
   viii. 9.9998m – 9.99996m

3. V = sin (30°22') x 282.18 = 142.65
   ⇒ 142.65-1.56+4.00 =145.09 = total change in height
   ⇒ 361.290-145.09 =216.20m Elevation at the base of the rod