Stefan's Quintet galaxy

a) apparent magnitude of big clump is

$$m \approx 23.4$$

b) Since these stars are at the Tip of the Red Giant Branch, we expect

$$M = -6.5$$

thus,

$$(m - M) \approx 23.4 - (-6.5) \approx 29.9 \qquad \text{distance modulus}$$

c) The distance can be calculated from distance modulus

$$(m - M) = 5 \log d - 5$$

$$\rightarrow \quad 5 \log d = (m - M) + 5$$

$$\log d = 0.2 * ((m - M) + 5)$$

$$\rightarrow \quad d = 10^{0.2 * [(m-M) + 5]}$$

$$= 10^{0.2 [29.9 + 5]} \qquad = 10^{0.2(34.9)}$$

$$= 10^{6.98}$$

$$= 9.5 \times 10^{6} \, pc = \boxed{9.5 \, Mpc}$$

d) This is NGC 7320

e) NED lists distances ranging from 9.4 – 19.1 Mpc

f) My distance lies at the lower end of this range.