12) If $20000 has bee invested on January 15, 2000, it would have been worth $93300 on January 15, 2010. What interest rate compounded monthly?

$P = 20000\$$, $t = 10$ years (2000 → 2010)

$S = 93300$

$$S = P\left(1 + \frac{r}{12}\right)^{12t}$$

$$93300 = 20000\left(1 + \frac{r}{12}\right)^{12\times 10}$$

$$\rightarrow \frac{93300}{20000} = \frac{20000}{20000}\left(1 + \frac{r}{12}\right)^{120}$$

$$4.665 = \left(1 + \frac{r}{12}\right)^{120}$$

$$(4.665)^{\frac{1}{120}} = \left(\left(1 + \frac{r}{12}\right)^{120}\right)^{\frac{1}{120}}$$

$$1.013 = 1 + \frac{r}{12} \longrightarrow .013 = \frac{r}{12}$$

$$-1 \quad -1$$

$$r = (12)(.013)$$

$$= .156$$

$$= .156 \times 100\%$$

$$= 15.6\%$$

5.7