

1 $2, 5, 8, 11, \dots$

$a_1 = 2$ | $a_n = 2 + 3(n-1) = 3n-1$

$d = 3$ | $m = 101 \rightarrow a_{101} = 3 \cdot 101 - 1 = \boxed{302}$

$a_m = 152 \rightarrow 152 = 3m - 1$; $153 = 3m$; $\boxed{m = 51}$

2 $a_n = 5 + 2n$

$d = 2$

$a_m = 115 \rightarrow 115 = 5 + 2m$; $110 = 2m$; $\boxed{m = 55}$

$m = 55 \rightarrow S_{55} = \frac{a_1 + a_{55}}{2} \cdot 55 = \frac{7 + 115}{2} \cdot 55 = \boxed{3355}$

3 $a_1 = -7$ | $S_{20} = 620 \rightarrow 620 = \frac{-7 + a_{20}}{2} \cdot 20$; $620 = 10(-7 + a_{20})$; $62 = -7 + a_{20}$; $a_{20} = 69$

$a_{20} = a_1 + d \cdot 19 \rightarrow 69 = -7 + 19d$; $76 = 19d$; $\boxed{d = 4}$

$a_{78} = a_1 + d \cdot 77 = -7 + 4 \cdot 77 = \boxed{301}$

4 $a_n = 3 - 2n$

$a_1 = \boxed{1}$ $a_2 = \boxed{-1}$ $a_3 = \boxed{-3}$ $a_{20} = 3 - 2 \cdot 20 = \boxed{-37}$

$\sum_{n=1}^{20} (3 - 2n) = \frac{a_1 + a_{20}}{2} \cdot 20 = \frac{1 + (-37)}{2} \cdot 20 = \boxed{-360}$

5 $3000, -1800, 1080, -648, \dots$

$r = \frac{-1800}{3000} = \boxed{-0.6}$

$a_n = 3000 \cdot (-0.6)^{n-1}$

$a_{10} = 3000 \cdot (-0.6)^9 = \boxed{-3023}$

$S_{20} = \frac{3000}{1 - (-0.6)} = \frac{3000}{1.6} = \boxed{1875}$

6 $25, 5, 1, 0.2, \dots$

$r = \frac{5}{25} = \boxed{0.2}$

$a_n = 25 \cdot 0.2^{n-1}$

$a_{10} = 25 \cdot 0.2^9 = \boxed{1.28 \cdot 10^{-5}}$

$S_{20} = \frac{25}{1 - 0.2} = \frac{25}{0.8} = \boxed{31.25}$

7 $\sum_{r=4}^7 2^r = \boxed{2^4 + 2^5 + 2^6 + 2^7}$

$\sum_{r=4}^{30} 2^r = 2^4 + 2^5 + \dots + 2^{30} = \frac{2^{30} \cdot 2 - 2^4}{2 - 1} = 2^{31} - 2^4 = \boxed{2147483632}$

8 $a_1 = 200$ | $S_4 = 3248 \rightarrow 3248 = \frac{a_4 \cdot r - a_1}{r - 1}$; $3248 = \frac{a_1 \cdot r^3 \cdot r - a_1}{r - 1}$;
 $3248 = \frac{a_1(r^4 - 1)}{r - 1}$; $3248 = \frac{200(r^4 - 1)}{r - 1}$; $1624 = \frac{r^4 - 1}{r - 1}$

$1624 = \frac{(r^2 + 1)(r^2 - 1)}{r - 1}$; $1624 = \frac{(r^2 + 1)(r + 1)}{r - 1}$;

$1624 = r^3 + r^2 + r + 1$; $r^3 + r^2 + r - 624 = 0 \Rightarrow \boxed{r = 0.4}$

$a_{10} = a_1 \cdot r^9 = 200 \cdot 0.4^9 = \boxed{0.0524288}$

Resultado com calculadora gráfica

9

$$a_n = a_1 \cdot r^{n-1}$$

$$\begin{aligned} a_1 = 1/81 & \quad \left| \quad \frac{1}{3} = \frac{1}{81} \cdot r^3 ; \quad 27 = r^3 ; \quad \boxed{r=3} \rightarrow a_n = \frac{1}{81} \cdot 3^{n-1} \right. \\ a_4 = 1/3 & \end{aligned}$$

$$S_n = \frac{a_n \cdot r - a_1}{r-1} = \frac{\frac{1}{81} \cdot 3^{n-1} \cdot 3 - 1/81}{3-1} = \frac{3^n - 1}{162}$$

$$S_n > 40 \Rightarrow \frac{3^n - 1}{162} > 40 ; \quad 3^n - 1 > 6480$$

$$n > \log_3 6481 = 7.9888 \rightarrow n = \boxed{8}$$

10

15, 17, 19, ...

$$a_n = 15 + 2(n-1) = \boxed{2n+13}$$

$$a_{20} = 2 \cdot 20 + 13 = \boxed{53}$$

$$S_{20} = \frac{15+53}{2} \cdot 20 = \boxed{680 \text{ butacas}}$$

11

$$\text{a) } \begin{aligned} a_1 = 40 & \quad \left| \quad a_4 = a_1 \cdot r^3 = 40 \cdot \left(\frac{1}{2}\right)^3 = \boxed{5} \right. \\ r = 1/2 & \end{aligned}$$

$$S_\infty = \frac{a_1}{1-r} = \frac{40}{1-1/2} = \boxed{80}$$

$$\text{b) } \begin{aligned} a_1 = -36 & \quad \left| \quad a_8 = a_1 + 7d \right. \\ a_8 = -8 & \quad \left. \begin{aligned} -8 = -36 + 7d ; \quad 28 = 7d ; \quad \boxed{d=4} \end{aligned} \right. \end{aligned}$$

$$S_n = \frac{a_1 + a_n}{2} \cdot n = \frac{a_1 + a_1 + d(n-1)}{2} \cdot n = \frac{-36 - 36 + 4(n-1)}{2} \cdot n =$$

$$= \frac{-72 + 4n - 4}{2} \cdot n = \frac{4n - 76}{2} \cdot n = (2n - 38)n = 2n^2 - 38n \quad \checkmark$$

$$\text{c) } 80 = 2(2n^2 - 38n) ; \quad 80 = 4n^2 - 76n ; \quad 0 = 4n^2 - 76n - 80 ; \quad 0 = n^2 - 19n - 20$$

$$n = \frac{19 \pm \sqrt{361 + 80}}{2} = \frac{19 \pm 21}{2} \rightarrow \begin{cases} \boxed{20} \\ \rightarrow \times \end{cases}$$

12

$$\text{a) } C_f = 1500 \cdot (1 + 0.0525)^3 = 1500 \cdot 1.0525^3 = \boxed{1749 \text{ fr}}$$

$$\text{b) } 3000 = 1500 \cdot 1.0525^m ; \quad 1.0525^m = 2 ; \quad m = \log_{1.0525} 2 \Rightarrow \boxed{m \approx 14 \text{ años}}$$

$$\text{c) } 3000 = 1500 \cdot (1+i)^{10} ; \quad (1+i)^{10} = 2 ; \quad 1+i = \sqrt[10]{2} ; \quad i = \sqrt[10]{2} - 1 = 0.0718 = \boxed{7.18\%}$$

13

$$\text{a) } C_f = \boxed{5000 \cdot 1.063^m}$$

$$\text{b) } C_f = 5000 \cdot 1.063^5 = \boxed{\$6786}$$

$$\text{c) } 5000 \cdot 1.063^m > 10000$$

$$1.063^m > 2 ; \quad m > \log_{1.063} 2 \Rightarrow \boxed{12 \text{ años}}$$

14

$$\text{a) } P = 15.2 \cdot (1 + 0.027)^{-1} = 15.2 / 1.027 = \boxed{14.8 \text{ mill.}}$$

$$P = 15.2 \cdot (1 + 0.027)^{-5} = 15.2 / 1.027^5 = \boxed{13.3 \text{ mill.}}$$

15) a) $A_m = 11000 + 400(m-1)$
 $A_2 = 11000 + 400 = \boxed{11400 \$}$
 $A_3 = 11000 + 800 = \boxed{11800 \$}$
 $S_{10} = \frac{A_1 + A_{10}}{2} \cdot 10 = \frac{11000 + 11000 + 400 \cdot 9}{2} \cdot 10 = \frac{22000 + 3600}{2} \cdot 10 =$
 $= \frac{25600}{2} \cdot 10 = \boxed{128000 \$}$

b) $B_m = 10000 \cdot 1.07^{m-1}$
 $B_2 = 10000 \cdot 1.07 = \boxed{10700 \$}$
 $B_3 = 10000 \cdot 1.07^2 = \boxed{11449 \$}$
 $B_{10} = 10000 \cdot 1.07^9 = \boxed{18384.59 \$}$

c) $S_{Am} = \frac{A_1 + A_m}{2} \cdot m = \frac{11000 + 400 \cdot (m-1)}{2} \cdot m = \frac{400m + 10600}{2} m = 200m^2 + 5300m$
 $S_{Bm} = \frac{B_m \cdot r - B_1}{r-1} = \frac{10000 \cdot 1.07^m - 10000}{1.07 - 1} = \frac{10000 \cdot (1.07^m - 1)}{0.07}$
 $S_{Bm} > S_{Am} \Rightarrow 200m^2 + 5300m > \frac{10000(1.07^m - 1)}{0.07} \Rightarrow m > 6.33 \rightarrow \boxed{m=7 \text{ años}}$

16) a) $C = 1000 \cdot (1 + 0.075)^{10} = 1000 \cdot 1.075^{10} = \boxed{2081 \$}$

b) $S = 1000 \cdot 1.075^{10} + 1000 \cdot 1.075^9 + \dots + 1000 \cdot 1.075 = \left[\text{suma de diez términos} \right]$
 $\left[\text{nos de una P.G.} \right]$
 $= \frac{1000 \cdot 1.075^{10} \cdot 1.075 - 1000 \cdot 1.075}{1.075 - 1} = \frac{1000 \cdot 1.075 \cdot (1.075^{10} - 1)}{0.075} = \boxed{15208 \$}$