

Gabarito - lista Mat I - PFV - 3ª série

01) 9

02) Moda = 3500

$$\text{Mediana} = \frac{2800 + 3300}{2} = 3050$$

$$\text{Média} = \frac{17800}{6} \approx 2966,67$$

03) total de alunos = 100%

$$\begin{array}{l} 50\% \rightarrow 4,0 \\ 25\% \rightarrow 6,4 \\ 25\% \rightarrow M \end{array} \left. \vphantom{\begin{array}{l} 50\% \\ 25\% \\ 25\% \end{array}} \right\} \text{médias}$$

$$\frac{4 \times 50 + 6,4 \times 25 + M \times 25}{100} = 5,9$$

$$200 + 160 + 25M = 590$$

$$25M = 590 - 360$$

$$25M = 230$$

$$M = 9,2$$

total de alunos = x

$$\frac{x}{2} \rightarrow 4 \quad \sim \left(\frac{x}{2} - 4 \right) \sim 4$$

$$\frac{x}{4} \rightarrow 6,4 \quad \sim \left(\frac{x}{4} + 6 \right) \sim 6,4$$

$$\frac{x}{4} \rightarrow 9,2 \quad \sim \left(\frac{x}{4} - 2 \right) \sim 9,2$$

$$\left(\frac{x}{2} - 4 \right) \cdot 4 + \left(\frac{x}{4} + 6 \right) \cdot 6,4 + \left(\frac{x}{4} - 2 \right) \cdot 9,2 = 6x$$

x

$$2x - 16 + 1,6x + 38,4 + 2,3x - 18,4 = 6x$$

$$5,9x + 4,0 = 6x$$

$$4,0 = 0,1x$$

$$x = 40 \rightarrow \text{C}$$

04) a) $\frac{6 \cdot 9,5 + 5 \cdot 10}{11} = \frac{57 + 50}{11} = \frac{107}{11} = 9,73$

b) $\frac{7 \cdot 9,5 + 8 \cdot 10}{15} = \frac{66,5 + 80}{15} = \frac{146,5}{15} = 9,77$

c) $\frac{13 \cdot 9,5 + 13 \cdot 10}{26} = \frac{123,5 + 130}{26} = 9,75$

05) $29 + 11i$

06) $-i$

07) $1 - 1 = 0$

08) $\frac{i}{2}$

09) a) z.w = $12 \cos 90^\circ$

b) $\frac{z}{w} = 3 \cos 60^\circ$

10) 256

11) a) $2 - i + 6 + 10i = 8 + 9i$

b) $6 - 3i - 3 - 5i = 3 - 8i$

c) $\frac{2-i}{3+5i} \cdot \frac{3-5i}{3-5i} = \frac{6-10i-3i+5i^2}{9-15i+15i-25i^2} =$

$= \frac{1-13i}{26}$

d) z.w = $6 + 10i - 3i - 5i^2 = 11 + 7i$

12) $\sqrt{\cos^2 a + \sin^2 a} = 1$

13) $(a+bi)^2 = 5-12i$

$a^2 + 2abi + b^2i^2 = 5 - 12i$

$a^2 - b^2 = 5$

$2ab = -12$

$b = \frac{-6}{a}$

$a^2 - \frac{36}{a^2} = 5$

$a^4 - 36 = 5a^2$

$a^4 - 5a^2 - 36 = 0$

$\Delta = 25 + 144 = 169$

$a^2 = \frac{5 \pm 13}{2}$

$a = +3$ or $a = -3$

$b = -2$ or $b = 2$

$(3-2i)$ or $(-3+2i)$

14) $x^4 = \frac{17 \pm \sqrt{225}}{2} = \frac{17 \pm 15}{2}$ 16
1

$x^4 = 16$ or $x^4 = 1$

$2, -2, 2i, -2i$ or $1, -1, i, -i$

$S = \{2, -2, 1, -1, i, -i, 2i, -2i\}$

15) Raizes: $1+i, 1-i, x$

$\frac{1+x+1-x}{x} + x = 4$

$x = 2$

a) $2^3 - 4 \cdot 2^2 + 6 \cdot 2 + k = 0$

$8 - 16 + 12 + k = 0$

$k = -4$

b) $S = \{1-i, 1+i, 4\}$

16) $i^4 + i^3 + i^2 + i + \frac{1}{i} =$

$= 1 - i - 1 + i + \frac{-i}{-i^2} = \frac{-i}{1} = -i$

17) $P(i) = 2i^4 - i^3 - 3i^2 + i + 5 =$

$= 2 + i + 3 + i + 5 = 10 + 2i$

18) $k = -1$

19) $a=3, b=-2, c=4, d=$

20) $P(0) = 2 = 3i^3 + mi^2 + ni + 2$

$2 = -3i - m + ni + 2$

$2 = (-m+2) + i(-3+n)$

$m=0$ or $m=3$

21) $P(-3) = -37 = \text{resto}$

22

$$\begin{array}{r}
 x^4 + x^3 + x^2 + ax + b \\
 \underline{-x^4} \qquad \qquad \qquad \underline{-x^2} \\
 \qquad \qquad \qquad x^3 \qquad \qquad \qquad + ax + b \\
 \qquad \qquad \qquad \underline{-x^3} \qquad \qquad \qquad \underline{-x} \\
 \qquad \qquad \qquad \qquad \qquad \qquad \qquad (a-1)x + b \\
 \qquad \qquad \qquad \qquad \qquad \qquad \qquad \underline{0x + 3}
 \end{array}$$

$$\begin{array}{r}
 x^2 + 1 \\
 \hline
 x^2 + x \\
 \hline
 \end{array}$$

$$\frac{a=1}{b=3}$$

23 erro de digitação, não fazer

24 $P(2) = 0 \rightarrow 8 - 32 + 2k - m = 0 \rightarrow 2k - m = 24$
 $P(-1) = 0 \rightarrow -1 - 8 - k - m = 0 \rightarrow -k - m = 9$

$$\begin{array}{l}
 3k = 15 \\
 \boxed{k=5} \quad \boxed{m=-14}
 \end{array}$$

$$\frac{k}{m} = -\frac{5}{14}$$

25 1 é raiz tripla

26 $x = -1, x = 2,$

$$\begin{array}{c|cccccc}
 -1 & 1 & -7 & 14 & 2 & -20 \\
 \hline
 2 & 1 & -8 & 22 & -20 & 0 \\
 \hline
 & & 1 & -6 & 10 & 0
 \end{array}$$

$$x^2 - 6x + 10 = 0$$

$$\Delta = 36 - 40 = -4$$

$$x = \frac{6 \pm 2i}{2} = 3 \pm i$$

$$S = \{-1, 2, 3+i, 3-i\}$$

27 x, x, y, y (raízes)

$$\begin{cases}
 2x + 2y = -\frac{1}{3} \rightarrow x + y = -\frac{1}{6} \\
 x^2 y^2 = \frac{1}{9}
 \end{cases}$$

$$(xy)^2 = \frac{1}{9}$$

$$\left[x \cdot \left(-\frac{1}{6} - x\right)\right]^2 = \frac{1}{9}$$

$$\left(-\frac{1}{6}x - x^2\right)^2 = \frac{1}{9}$$

$$-\frac{1}{6}x - x^2 = \frac{1}{3} \text{ ou } -\frac{1}{6}x - x^2 = -\frac{1}{3}$$

$$-x - 6x^2 = 2 \text{ ou } -x = 6x^2 = -2$$

~~$$0 = 6x^2 + x + 2$$

$$\Delta = 1 - 48 = -47$$

$$x = \frac{-1 \pm \sqrt{47}i}{2}$$~~

$$0 = 6x^2 + x - 2$$

$$\Delta = 1 + 48 = 49$$

$$x = \frac{-1 \pm 7}{12} \rightarrow \frac{1}{2} \text{ ou } -\frac{2}{3}$$

Raízes: $\frac{1}{2}, \frac{1}{2}, -\frac{2}{3}, -\frac{2}{3}$
 $x = \frac{1}{2} \rightarrow y = -\frac{2}{3}$
 $x = -\frac{2}{3} \rightarrow y = \frac{1}{2}$

(28) $x-1, x, x+1 \rightarrow$ Raízes

$$x - \cancel{1} + x + x + \cancel{1} = 9$$

$$3x = 9$$

$$\boxed{x=3} \quad \text{Raízes: } 2, 3, 4$$

$$3^3 - 9 \cdot 3^2 + 26 \cdot 3 + a = 0$$

$$27 - 81 + 78 + a = 0$$

$$24 + a = 0$$

$$\boxed{a = -24}$$

(29) Raízes: $x-2, x, x+2$

$$x - \cancel{2} + x + x + \cancel{2} = 9$$

$$\boxed{x=3}$$

$$3 \mid \begin{array}{cccc} 1 & -9 & 26 & -24 \\ \hline 1 & -6 & 8 & 0 \end{array}$$

$$x^2 - 6x + 8 = 0$$

$$\Delta = 4$$

$$x = \frac{6 \pm 2}{2} \begin{matrix} 4 \\ 2 \end{matrix}$$

$$S = \{2, 3, 4\}$$