PLANO α

10º ANO | PROPOSTA RESOLUÇÃO MINITESTE 1 | 2023

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1.

1.1.

$$\frac{\sqrt{3}}{9\sqrt{6}}=\frac{\sqrt{3}}{9\sqrt{6}}\times\frac{\sqrt{6}}{\sqrt{6}}=\frac{\sqrt{18}}{9\times(\sqrt{6})^2}=\frac{3\sqrt{2}}{9\times 6}=\frac{\sqrt{2}}{3\times 6}=\frac{\sqrt{2}}{18}$$

1.2.

$$\frac{1-\sqrt{5}}{2+2\sqrt{5}}=\frac{1-\sqrt{5}}{2+2\sqrt{5}}\times\frac{2-2\sqrt{5}}{2-2\sqrt{5}}=$$

$$=\frac{2-2\sqrt{5}-2\sqrt{5}+2\times 5}{2^2-(2\sqrt{5})^2}=\frac{2-4\sqrt{5}+10}{4-4\times 5}=$$

$$=\frac{12-4\sqrt{5}}{-16}=-\frac{3}{4}+\frac{\sqrt{5}}{4}$$

2.

2.1.

$$\sqrt{75}-\frac{1}{2}\sqrt{108}+\sqrt{147}=5\sqrt{3}-\frac{1}{2}(6\sqrt{3})+7\sqrt{3}=12\sqrt{3}-3\sqrt{3}=9\sqrt{3}$$

2.2.

$$(2\sqrt{14}-3\sqrt{2})^2+\sqrt{63}=$$

$$=(2\sqrt{14})^2-2\times 2\sqrt{14}\times 3\sqrt{2}+(3\sqrt{2})^2+3\sqrt{7}=$$

$$=4\times 14-12\sqrt{28}+9\times 2+3\sqrt{7}=74-24\sqrt{7}+3\sqrt{7}=74-21\sqrt{7}$$

2.3.

$$(\sqrt{3}-4)(\sqrt{3}+4)-\sqrt{2}(\sqrt{6}-3\sqrt{2})=(\sqrt{3})^2-4^2-\sqrt{12}+3\times 2=3-16-2\sqrt{3}+6=-7-2\sqrt{3}$$

2.4.

$$\sqrt[3]{40}-2\sqrt[3]{135}+\frac{3}{10}\sqrt[3]{625}=2\sqrt[3]{5}-2(3\sqrt[3]{5})+\frac{3}{10}(5\sqrt[3]{5})=2\sqrt[3]{5}-6\sqrt[3]{5}+\frac{3}{2}\sqrt[3]{5}=$$

$$=-4\sqrt[3]{5}+\frac{3}{2}\sqrt[3]{5}=-\frac{8}{2}\sqrt[3]{5}+\frac{3}{2}\sqrt[3]{5}=-\frac{5}{2}\sqrt[3]{5}$$

3.

Pelo teorema de Pitágoras,

$$(4x-1)^2=(2x+1)^2+(3x^2)$$
$$\Leftrightarrow\ 16x^2-8x+1=4x^2+4x+1+9x^2$$
$$\Leftrightarrow\ 3x^2-12x=0$$
$$\Leftrightarrow\ 3x(x-4)=0$$
$$\Leftrightarrow\ 3x=0 \vee x-4=0$$
$$\Leftrightarrow\ x=0 \vee x=4$$

No contexto do problema temos que $x>\frac{1}{4}$, pois

$$3x>0 \wedge 4x-1>0 \wedge 2x+1>0$$
$$\Leftrightarrow\ x>0 \wedge x>\frac{1}{4} \wedge x>-\frac{1}{2}$$
$$\Leftrightarrow\ x>\frac{1}{4}$$

Assim, $x=4$ e temos que $\overline{AB}=3\times 4=12$ e $\overline{BC}=2\times 4+1=9$.

Portanto, $\text{Área}_{\Delta[ABC]}=\frac{\overline{AB}\times\overline{BC}}{2}=\frac{12\times 9}{2}=54$.

4.

Perímetro $\Delta[DEF]=d(D,E)+d(D,F)+d(E,F)$.

Ora,

$$d(D,E)=\sqrt{(2+4)^2+(3-9)^2}=\sqrt{6^2+(-6)^2}=\sqrt{36+36}=\sqrt{72}=6\sqrt{2}$$

$$d(D,F)=\sqrt{(4+4)^2+(5-9)^2}=\sqrt{8^2+(-4)^2}=\sqrt{64+16}=\sqrt{80}=4\sqrt{5}$$

$$d(E,F)=\sqrt{(4-2)^2+(5-3)^2}=\sqrt{2^2+2^2}=\sqrt{4+4}=\sqrt{8}=2\sqrt{2}$$

Portanto, Perímetro $\Delta[DEF]=6\sqrt{2}+4\sqrt{5}+2\sqrt{2}=8\sqrt{2}+4\sqrt{5}$.

5.

O ponto P pertence ao terceiro quadranto se a abcissa e a ordenada forem negativas, pelo que,

$$8-4k<0 \wedge -7+2k<0 \Leftrightarrow -4k<-8 \wedge 2k<7$$
$$\Leftrightarrow\ 4k>8 \wedge k<\frac{7}{2} \Leftrightarrow k>2 \wedge k<\frac{7}{2} \Leftrightarrow 2<k<\frac{7}{2}$$

Logo, $k\in\left]2,\frac{7}{2}\right[$.

FIM