Lista 2 de CM300

1. Calcule os valores abaixo.

(a) $(-25)^1$ (b) $(-25)^0$ (c) $25^{-\frac{1}{2}}$ (d) 25^{-2} (e) $(-25)^2$

(f) $(-25)^{-\frac{1}{2}}$ (g) $\left(-\frac{27}{8}\right)^{\frac{1}{3}}$ (h) $8^{-\frac{1}{3}}$ (i) $(8^{-1})^{-2}$ (j) $\left(\frac{16}{49}\right)^{-\frac{1}{2}}$

(k) $16^{\frac{1}{3}}$ (l) 0^0 (m) 0^{-1} (n) $(-1)^0$ (o) $\left(-\frac{8}{3}\right)^{\frac{2}{3}}$

(p) $\left(\frac{1}{25}\right)^{-\frac{3}{2}}$ (q) $(-25)^{-\frac{2}{3}}$ (r) $32^{\frac{2}{5}}$ (s) $\left(-\frac{1}{32}\right)^{\frac{1}{5}}$ (t) $\left(-\frac{1}{16}\right)^{\frac{1}{4}}$

2. Calcule, quando possível, as expressões abaixo.

(a) $36^{\frac{1}{2}}9^{\frac{1}{2}}$ (b) $\left(\frac{1}{2}\right)^{\frac{1}{3}}\left(\frac{1}{2}\right)^{\frac{2}{3}}$ (c) $25\sqrt{125}$ (d) $\sqrt{2}+\sqrt{2}$

(e) $-49^{-\frac{1}{2}}+\frac{2^3}{7}$ (f) $(-49)^{-\frac{1}{2}}+\frac{2^3}{7}$ (g) $\sqrt{\left(-\frac{1}{4}\right)^2}$ (h) $\left(\sqrt{-\frac{1}{4}}\right)^2$

(i) $(\sqrt[3]{-8})^3$ (j) $\sqrt[3]{(-8)^3}$ (k) $4^{\frac{2}{3}}4^{\frac{1}{3}}4^{\frac{1}{3}}4^0$ (l) $4^{\frac{1}{3}}+4^{\frac{1}{3}}+4^{\frac{1}{3}}$

(m) $\left[\left(\frac{1}{121}\right)^{\frac{1}{2}}\right]^{-1}$ (n) $\sqrt{[(-2)^3]^2}$ (o) $(8^{\frac{2}{5}})^3$

3. Simplifique as expressões abaixo.

(a) $\frac{x^3y^5}{x^4y^2}$ (b) $\frac{x^2y}{|x|}$ (c) $\sqrt[4]{x^4y^8}$ (d) $\sqrt[3]{x^3y^6}$

(e) $\sqrt[3]{-x^3y^6}$ (f) $\sqrt[4]{-x^4y^8}$ (g) $\frac{x^{-5}y^{-2}}{x^5y^2}$ (h) $x^2\sqrt{x^4}$

(i) $\frac{2y^0y^2}{y^3y^4}$ (j) $\sqrt[4]{-x^3y^8}$ (k) $\frac{x^{\frac{2}{3}}y^{\frac{1}{3}}}{x^{-\frac{2}{3}}y^3}$ (l) $\frac{\sqrt[3]{x^2}}{\sqrt{y^3}}$

4. Escreva as expressões abaixo na forma expandida.

(a) $(x+3)^2$ (b) $(x+4)(x-4)$ (c) $(y-7)^2$

(d) $(x+\sqrt{6})^2$ (e) $(2x+3y)^2$ (f) $x^2(2x+4)(2x-4)$

(g) $(x+5)^2$ (h) $(5x-1)^2$ (i) $(6x^2-7)(6x^2+7)$

(j) $(x^2+x)^2$ (k) $(-x-1)^2$ (l) $2x(x^2+3)$

(m) $(x+2x^2+1)(2x+3)$ (n) $(x^2+x-1)^2$ (o) $(x-2y+2)^2$

(p) $2x(x^2+1)(2x+2)$

5. Fatore o máximo possível as expressões.

(a) $x^2 + 6x + 9$

(b) $4x^2 - 4x + 1$

(c) $x^2 - 16$

(d) $8x^3 + 6x^2 + 2x^4$

(e) $3x^3y^2 + 30x^2y^2 + 75xy^2$

(f) $8x^4y + 24x^3y^3 + 4x^3y^2$

(g) $x^4 - 1$

(h) $7x^6 - 28x^4 + 28x^2$

(i) $9x^7 + 27x^6 + 9x^5$

(j) $6xy^2 + 36xy + 54x$

(k) $25x^7 - 4x$

(l) $x^{100} + 4x^{60} + 4x^{20}$

(m) $4x^7 + 12x^5 + 9x^3$

(n) $x^6y^2 + 2x^4y^4 + x^2y^6$

(o) $x^2 + 4$

6. Simplifique e fatore o máximo possível as expressões abaixo.

(a) $\dfrac{x^2 + 6x + 9}{x^2 - 9}$

(b) $\dfrac{2x^8 - 8x^2}{3x^7 - 12x^4 + 12x}$

(c) $(18x^4y^2)^{\frac{1}{2}}(9y^2x^2)^{-1}$

(d) $\dfrac{16x^5 + 16x^3y + 4xy^2}{16x^3 + 8x^2y}$

(e) $\dfrac{9x^3 - 4x}{3x^3 + 2x^2}$

(f) $\dfrac{1}{x+1} + \dfrac{1}{x-1}$

(g) $(-27x^4y^6 - 27x^3y^6)^{\frac{1}{3}}(x+1)^{-\frac{2}{3}}$

(h) $\dfrac{3x^3 - 12x^2 + 12x}{4x^6 - 16x^4}$

(i) $\dfrac{2}{x+1} - \dfrac{x}{x^2 + 2x + 1}$

(j) $\dfrac{\sqrt{y^4x^8z^6}}{x^4y^2z^2 + 3x^4yz^2 + 2x^3y^2z^2}$

(k) $\dfrac{4x^4}{6x^3 - 4x}$

(l) $\dfrac{4x}{4x+3}$

(m) $\dfrac{\sqrt{162x^5}}{27x^3 + 54x}$

(n) $\sqrt{x^2 + 2x + 1}$

(o) $\dfrac{\sqrt{12x^5 + 12x^3 + 3x}}{4x^4 + 4x^2 + 1}$

(p) $\dfrac{x^7 + 6x^4 + 9x}{x^6 - 9}$

(q) $\dfrac{x^4 - 16}{x+2}$

Respostas:

1. (a) -25

(b) 1

(c) $\dfrac{1}{5}$

(d) $\dfrac{1}{625}$

(e) 625

(f) $(-25)^{-\frac{1}{2}} \notin \mathbb{R}$

(g) $-\dfrac{3}{2}$

(h) $\dfrac{1}{2}$

(i) 64

(j) $\dfrac{7}{4}$

(k) $2\sqrt[3]{2}$

(l) $0^0 \notin \mathbb{R}$

(m) $0^{-1} \notin \mathbb{R}$

(n) 1

(o) $\dfrac{4}{\sqrt[3]{9}}$

(p) 125

(q) $\dfrac{1}{5\sqrt[3]{5}}$

(r) 4

(s) $-\dfrac{1}{2}$

(t) $\left(-\dfrac{1}{16}\right)^{\frac{1}{4}} \notin \mathbb{R}$

2. (a) 18

(b) $\dfrac{1}{2}$

(c) $5^{\frac{7}{2}} = 125\sqrt{5}$

(d) $2\sqrt{2}$

(e) 1

(f) $(-49)^{-\frac{1}{2}} + \dfrac{2^3}{7} \notin \mathbb{R}$

(g) $\dfrac{1}{4}$

(h) $\left(\sqrt{-\dfrac{1}{4}}\right)^2 \notin \mathbb{R}$

(i) -8

(j) -8

(k) $4^{\frac{4}{3}} = 4\sqrt[3]{4}$

(l) $3\sqrt[3]{4}$

(m) 11

(n) 8

(o) $8\sqrt[5]{8}$

3. (a) $\dfrac{y^3}{x}$

(b) $|x|y$

(c) $|x|y^2$

(d) xy^2

(e) $-xy^2$

(f) $\sqrt[4]{x^4y^8} \notin \mathbb{R}$

(g) $\dfrac{1}{x^{10}y^4}$

(h) x^4

(i) $\dfrac{2}{y^5}$

(j) $y^2\sqrt[4]{-x^3}$

(k) $x^{\frac{4}{3}}y^{-\frac{8}{3}} = \dfrac{x}{y^2}\sqrt[3]{\dfrac{x}{y^2}}$

(l) $\dfrac{\sqrt[3]{x^2}}{|y|\sqrt{y}}$

4. (a) $x^2 + 6x + 9$
(b) $x^2 - 16$
(c) $y^2 - 14y + 49$
(d) $x^2 + 2\sqrt{6}x + 6$
(e) $4x^2 + 12xy + 9y^2$
(f) $4x^4 - 16x^2$
(g) $x^2 + 10x + 25$
(h) $25x^2 - 10x + 1$
(i) $36x^4 - 49$
(j) $x^4 + 2x^3 + x^2$
(k) $x^2 + 2x + 1$
(l) $2x^3 + 6x$
(m) $4x^3 + 8x^2 + 5x + 3$
(n) $x^4 + 2x^3 - x^2 - 2x + 1$
(o) $x^2 - 4xy + 4x + 4y^2 - 8y + 4$
(m) $4x^4 + 4x^3 + 4x^2 + 4x$

5. (a) $(x + 3)^2$
(b) $(2x - 1)^2$
(c) $(x + 4)(x - 4)$
(d) $2x^2(4x + 3 + x^2)$
(e) $3xy^2(x + 5)^2$
(f) $4x^3y(y + 2x + 6y^2)$
(g) $(x^2 + 1)(x - 1)(x + 1)$
(h) $7x^2(x^2 - 2)^2$
(i) $9x^5(x^2 + 3x + 1)$
(j) $6x(y + 3)^2$
(k) $x(5x^3 + 2)(5x^3 - 2)$
(l) $x^{20}(x^{40} + 2)^2$
(m) $x^3(2x^2 + 3)^2$
(n) $x^2y^2(x^2 + y^2)^2$
(o) $x^2 + 4$

6. (a) $\dfrac{x + 3}{x - 3}$
(b) $\dfrac{2x(x^3 + 2)}{3(x^3 - 2))}$
(c) $\dfrac{\sqrt{2}}{3|y|}$
(d) $\dfrac{(2x^2 + y)^2}{2x(2x + y)}$
(e) $\dfrac{3x - 2}{x}$
(f) $\dfrac{2x}{(x + 1)(x - 1)}$
(g) $-\dfrac{3xy^2}{\sqrt[3]{x + 1}}$
(h) $\dfrac{3(x - 2)}{4x^3(x + 2)}$
(i) $\dfrac{x + 2}{(x + 1)^2}$
(j) $\dfrac{yx|z|}{3x + 2y + xy}$
(k) $\dfrac{2x^3}{3x^2 - 2}$
(l) $\dfrac{4x}{4x + 3}$
(m) $\dfrac{x\sqrt{2x}}{3(x^2 + 2)}$
(n) $|x + 1|$
(o) $\dfrac{\sqrt{3x}}{2x^2 + 1}$
(p) $\dfrac{x(x^3 + 3)}{x^3 - 3}$
(q) $(x - 2)(x^2 + 4)$