Guía del Curso Previo de Matemáticas

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1 Ejercicio 7 – Escribir en forma más simple

1.1 $3\sqrt{3} + 5\sqrt{3}$

$$3\sqrt{3} + 5\sqrt{3} = (3+5)\sqrt{3} = \boxed{5\sqrt{3}}$$

1.2 $3\sqrt{2} + \sqrt{8}$

$$3\sqrt{2} + \sqrt{8} = 3\sqrt{2} + \sqrt{4 \cdot 2} = 3\sqrt{2} + 2\sqrt{2} = \boxed{5\sqrt{2}}$$

1.3 $\sqrt{72} + \sqrt{98}$

$$\sqrt{72} + \sqrt{98} = \sqrt{36 \cdot 2} + \sqrt{49 \cdot 2} = 6\sqrt{2} + 7\sqrt{2} = \boxed{12\sqrt{2}}$$

1.4 $\frac{\sqrt{3}+\sqrt{8}}{\sqrt{3}-\sqrt{12}}$

$$\frac{\sqrt{3}+\sqrt{8}}{\sqrt{3}-\sqrt{12}} = \frac{\sqrt{3}+\sqrt{2\cdot 4}}{\sqrt{3}-\sqrt{3\cdot 4}} = \frac{\sqrt{3}+2\sqrt{2}}{\sqrt{3}-2\sqrt{3}} = \frac{\sqrt{3}+2\sqrt{2}}{-\sqrt{3}} = -\frac{\sqrt{3}+2\sqrt{2}}{\sqrt{3}} = -\frac{(\sqrt{3}+2\sqrt{2})\sqrt{3}}{3} = \boxed{-\frac{3+2\sqrt{6}}{3}}$$

1.5 $\frac{\sqrt{5}-\sqrt{7}}{\sqrt{5}+\sqrt{7}}$

$\frac{\sqrt{5}-\sqrt{7}}{\sqrt{5}+\sqrt{7}} =$

$= \frac{\sqrt{5}-\sqrt{7}}{\sqrt{5}+\sqrt{7}} \cdot \frac{\sqrt{5}-\sqrt{7}}{\sqrt{5}-\sqrt{7}} =$

$= \frac{5-2\sqrt{35}+7}{-2} =$

$= -\frac{5-2\sqrt{35}+7}{2} =$

$= -\frac{12-2\sqrt{35}}{2} =$

$= -\frac{2(6-\sqrt{35})}{2} =$

$= -(6 - \sqrt{35}) =$

$= \boxed{-6 + \sqrt{35}}$

2 Ejercicio 8 - Simplificar la escritura y eliminar los exponentes negativos

2.1 $((\frac{1}{3})^4 \cdot 3^{-5})^{\frac{2}{9}}$

$((\frac{1}{3})^4 \cdot 3^{-5})^{\frac{2}{9}} =$

$= ((\frac{1}{3})^4 \cdot (\frac{1}{3})^5)^{\frac{2}{9}} =$

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

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

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

$= \sqrt{(\frac{1}{9})} =$

$= \boxed{\frac{1}{3}}$

2.2 $((\frac{3}{7})^{-2} \cdot (\frac{7}{3})^3)^{\frac{2}{5}}$

$((\frac{3}{7})^{-2} \cdot (\frac{7}{3})^3)^{\frac{2}{5}} =$

$((\frac{7}{3})^2 \cdot (\frac{7}{3})^3)^{\frac{2}{5}} =$

$((\frac{7}{3})^5)^{\frac{2}{5}} =$

$(\frac{7}{3})^{\frac{5}{1} \cdot \frac{2}{5}} =$

$(\frac{7}{3})^2 =$

$\boxed{\frac{49}{9}}$

2.3 $((81)^{\frac{3}{4}})^{-\frac{2}{3}}$

$((81)^{\frac{3}{4}})^{-\frac{2}{3}} =$

$= 81^{\frac{3}{4}\cdot -\frac{2}{3}} =$
$= 81^{-\frac{1}{2}} =$

$= (\frac{1}{81})^{\frac{1}{2}} =$

$= \sqrt{(\frac{1}{81})} =$

$= \boxed{\frac{1}{9}}$

2.4 $((\frac{5}{2})^2 + (\frac{3}{2})^2)^{-1}$

$((\frac{5}{2})^2 + (\frac{3}{2})^2)^{-1} =$

$((\frac{25}{4}) + (\frac{9}{4}))^{-1} =$

$(\frac{25+9}{4})^{-1} =$

$(\frac{34}{4})^{-1} = (\frac{17}{2})^{-1} =$

$= \boxed{\frac{2}{17}}$

2.5 $((\frac{1}{7})^2 \cdot 7^{-3})^{\frac{2}{5}}$

$((\frac{1}{7})^2 \cdot 7^{-3})^{\frac{2}{5}} =$

$((\frac{1}{7})^2 \cdot (\frac{1}{7})^3)^{\frac{2}{5}} =$

$(\frac{1}{7})^5)^{\frac{2}{5}} =$

$(\frac{1}{7})^{\frac{5}{1}\cdot\frac{2}{5}} =$

$(\frac{1}{7})^2 =$

$\boxed{\frac{1}{49}}$

2.6 $((32)^{\frac{5}{2}})^{-\frac{3}{2}}$

$((32)^{\frac{5}{2}})^{-\frac{3}{2}} =$

$(32)^{(\frac{5}{2})\cdot(-\frac{3}{2})} =$

$(32)^{(-\frac{15}{4})} =$

$\frac{1}{32}^{(\frac{15}{4})} =$

$\frac{1}{32^{(\frac{15}{4})}} =$

$\frac{1}{\sqrt[4]{32^{15}}} =$

$\frac{1}{32^3 \cdot \sqrt[4]{32^3}} =$

$\frac{1}{32^3 \cdot \sqrt[4]{32^3}} \cdot \frac{\sqrt[4]{32}}{\sqrt[4]{32}} =$

$\frac{1}{32^3 \cdot \sqrt[4]{32^3}} \cdot \frac{\sqrt[4]{32}}{\sqrt[4]{32}} =$

$\frac{\sqrt[4]{32}}{32^3 \cdot \sqrt[4]{32^3 \cdot 32}} =$

$\frac{2\sqrt[4]{2}}{32^3 \cdot \sqrt[4]{32^4}} = \frac{2\sqrt[4]{2}}{32^3 \cdot 32}$

$= \boxed{\frac{2\sqrt[4]{2}}{32^4}}$

3 Ejercicio 11 - Simplificar la escritura y eliminar los exponentes negativos

3.1 $\frac{3x^2y^{-3}}{2x^{-3}y^4}$

$\frac{3x^2y^{-3}}{2x^{-3}y^4} =$

$= \frac{3}{2} \cdot \frac{x^2}{x^{-3}} \cdot \frac{y^{-3}}{y^4} =$

$= \frac{3}{2} \cdot (\frac{x}{1})^{2-(-3)} \cdot y^{-3+4} =$

$= \frac{3}{2} \cdot (\frac{x}{1})^5 \cdot y^{-7} =$

$= \frac{3}{2} \cdot (\frac{x}{1})^5 \cdot (\frac{1}{y})^7 =$

$= \boxed{\frac{3x^5}{2y^7}}$

3.2 $\frac{6x^4y^{-2}}{4x^{-2}y^{-5}}$

$\frac{6x^4y^{-2}}{4x^{-2}y^{-5}} =$

$= \frac{6}{4} \cdot \frac{x^4}{x^{-2}} \cdot \frac{y^{-2}}{y^{-5}} =$

$= \frac{3}{2} \cdot (\frac{x}{1})^{4-(-2)} \cdot y^{-2+5} =$

$= \frac{3}{2} \cdot (\frac{x}{1})^{6} \cdot y^{3} =$

$= \boxed{\frac{3x^6}{2y^{-3}}}$

3.3 $\frac{(3x)^2 y^{-3}}{2x^3 (2y)^{-4}}$

$\frac{(3x)^2 y^{-3}}{2x^3 (2y)^{-4}} =$

$= \frac{9x^2}{2x^3} \cdot \frac{y^{-3}}{(2y)^{-4}} =$

$= \frac{9}{2} \cdot (\frac{x}{1})^{2-3} \cdot y^{-3+4} =$

$= \frac{9}{2} \cdot (\frac{1}{x})^{1} \cdot y^{1} =$

$= \boxed{\frac{9y}{2x}}$

3.4 $\frac{x+y}{x^{-1}+y^{-1}}$

$\frac{x+y}{x^{-1}+y^{-1}} =$

$= \frac{x+y}{\frac{1}{x}+\frac{1}{y}} =$

$= \frac{x+y}{\frac{x+y}{xy}} =$

$= x + y \cdot \frac{xy}{x+y} =$

$= \boxed{xy}$

3.5 $\frac{x^{-2}+y^{-2}}{x^2+y^2}$

$\frac{x^{-2}+y^{-2}}{x^2+y^2} =$

$= \frac{\frac{1}{x^2}+\frac{1}{y^2}}{x^2+y^2} =$

$= \frac{1}{x^2 y^2} + \frac{1}{x^2 y^2} =$

$= \boxed{\frac{1}{x^2 y^2}}$

4 Ejercicio 12 - Hallar el valor de x

4.1 $\frac{(2x)^5}{3(x^2)^3} = \frac{7}{4}$

$\frac{(2x)^5}{3(x^2)^3} = \frac{7}{4}$

$= \frac{32x^5}{3x^6} = \frac{7}{4}$

$= \frac{32}{3x} = \frac{7}{4}$

$= 32 \cdot 4 = 7 \cdot 3x$

$= x = \frac{32 \cdot 4}{7 \cdot 3}$

$= x = \frac{128}{21}$

4.2 $(4x)^5(8x^2)^{-3} = 1$

$(4x)^5(8x^2)^{-3} = 1$

$= 1024x^5 \cdot \frac{1}{512x^6} = 1$

$= 2x^{-1} = 1$

$= x = \frac{1}{2}$

4.3 $\sqrt{\frac{x-4}{3}} = 2$

$\sqrt{\frac{x-4}{3}} = 2$

$\frac{x-4}{3} = 2^2$

$\frac{x-4}{3} = 4$

$x - 4 = 4 \cdot 3$

$x - 4 = 12$

$\boxed{x = 16}$

4.4 $\frac{2+\sqrt{2x-2}}{2} = 3$

$\frac{2+\sqrt{2x-2}}{2} = 3$

$2 + \sqrt{2x - 2} = 3 \cdot 2$

$\sqrt{2x - 2} = 6 - 2$

$\sqrt{2x - 2} = 4$

$2x - 2 = 4^2$

$2x - 2 = 16$

$2x = 16 + 2$

$2x = 18$

$\boxed{x = 9}$

4.5 $\sqrt[5]{x + 1} = -2$

$\sqrt[5]{x + 1} = -2$

$x + 1 = (-2)^5$

$x + 1 = -32$

$\boxed{x = -32 - 1}$

$\boxed{x = -33}$

4.6 $-5 + \sqrt[3]{x + 2} = -1$

$-5 + \sqrt[3]{x + 2} = -1$

$\sqrt[3]{x + 2} = -1 + 5$

$\sqrt[3]{x + 2} = 4$

$x + 2 = 4^3$

$x + 2 = 64$

$\boxed{x = 64 - 2}$

$\boxed{x = 62}$ ´

5 Ejercicio 13 - Hallar el valor de x

5.1 $(3x-1)^3 = 8$

$= 3x = 2 + 1$

$= 3x = 3$

$= x = \frac{3}{3}$

$= \boxed{x = 1}$

5.2 $(3x)^{-1}(2x)^2 = 1$

$(3x)^{-1}(2x)^2 = 1$

$= \frac{1}{3x} \cdot 4x^2 = 1$

$= \frac{4x}{3} = 1$

$= x = \frac{3}{4}$

5.3 $7 - 5\sqrt{3x+2} = -3$

$7 - 5\sqrt{3x+2} = -3$

$= -5\sqrt{3x+2} = -3 - 7$

$= -5\sqrt{3x+2} = -10$

$= \sqrt{3x+2} = 2$

$= 3x + 2 = 4$

$= 3x = 4 - 2$

$= x = \frac{2}{3}$

5.4 $\sqrt[4]{2x+11} = 3$

$\sqrt[4]{2x+11} = 3$

$= 2x + 11 = 3^4$

$= 2x + 11 = 81$

$= 2x = 81 - 11$

$= x = \frac{70}{2}$

$= x = 35$

5.5 $\sqrt[3]{\frac{3x-2}{2x+5}} = -2$

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

$= \frac{3x-2}{2x+5} = -2^3$

$= \frac{3x-2}{2x+5} = -8$

$= 3x - 2 = -8(2x + 5)$

$= 3x - 2 = -16x - 40$

$= 19x = -38$

$= x = -2$

5.6 $x^{-\frac{1}{3}} = 2$

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

$= x = 2^{-3}$

$= x = \frac{1}{8}$

5.7 $x\sqrt[3]{x^{-2}} = -4$

$x\sqrt[3]{x^{-2}} = -4$

$= x \cdot x^{-\frac{2}{3}} = -4$

$= x^{\frac{1}{3}} = -4$

$= x = -4^3$

$= x = -64$

5.8 $2\frac{x^2 x^{\frac{2}{3}}}{x^{\frac{5}{3}}}$

$2\frac{x^2 x^{\frac{2}{3}}}{x^{\frac{5}{3}}}$

$= 2 \cdot x^{\frac{4}{3}} \cdot x^{-\frac{5}{3}}$

$= 2 \cdot x^{-\frac{1}{3}}$

$= 2 \cdot \frac{1}{x^{\frac{1}{3}}}$

$= \frac{2}{x^{\frac{1}{3}}}$

5.9 $(\sqrt[5]{x})^2 x^{-\frac{3}{5}} = \frac{1}{2}$

$(\sqrt[5]{x})^2 x^{-\frac{3}{5}} = \frac{1}{2}$

$= x^{\frac{2}{5}} \cdot x^{-\frac{3}{5}} = \frac{1}{2}$

$= x^{-\frac{1}{5}} = \frac{1}{2}$

$= x = (2)^{-5}$

$= x = \frac{1}{32}$

6 Ejercicio 20

Un grupo de jóvenes visita al zoológico: la quinta parte del grupo se detiene a ver a los leones, la tercera parte ve a los tigres, el triple de la diferencia entre estos dos fue a ver a las jirafas y un joven quedó sólo viendo a los osos ¿Cuántos jóvenes fueron de visita al zoológico?

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Datos

1. $\frac{1}{5}x$ = Leones
2. $\frac{1}{3}x$ = Tigres
3. $3(\frac{1}{5} - \frac{1}{3})x$ = Jirafas
4. 1= Osos

$\frac{1}{5}x + \frac{1}{3}x + 3(\frac{1}{5} - \frac{1}{3})x + 1 = x$

$\frac{1}{5}x + \frac{1}{3}x + 3(\frac{2}{15})x + 1 = x$

$\frac{1}{5}x + \frac{1}{3}x + \frac{6}{15}x + 1 = x$

$\frac{1}{5}x + \frac{1}{3}x + \frac{6}{15}x - x = -1$

$\frac{3+5+6-15}{15}x = -1$

$-\frac{1}{15}x = -1$

$x = -1 \div -\frac{1}{15}$

$x = -1 \cdot -15$
$x = 15$
La cantidad de chicos que fueron de visita al zoológico fueron: 15