

CSC 240

ALGEBRA REVIEW

Fractions

Inequalities

Polynomials

Equations

Exponents

Fractions – Multiplication

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

$$\frac{2}{3} \cdot \frac{1}{2} = \frac{2}{6}$$

Fractions – Multiplication

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$$

$$\frac{2}{3} \cdot \frac{1}{2} = \frac{2}{6}$$

$$\frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \cdot \frac{2}{1} = \frac{6}{4}$$

Fractions - Addition

$$\frac{a}{b} + \frac{c}{b} = \frac{(a + c)}{b}$$

$$\frac{a}{b} + \frac{c}{d} = \frac{ad}{bd} + \frac{cb}{bd}$$

$$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$$

$$\frac{1}{3} + \frac{1}{2} = ?$$

Fractions - Addition

$$\frac{a}{b} + \frac{c}{b} = \frac{(a + c)}{b}$$

$$\frac{a}{b} + \frac{c}{d} = \frac{ad}{bd} + \frac{cb}{bd}$$



$$\left(\frac{2}{2} \times \frac{1}{3} \right) + \left(\frac{1}{2} \times \frac{3}{3} \right)$$

$$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

Inequalities

$$m < n \equiv m + 1 \leq n$$

$$2 < x < 3$$

$$2 < x \equiv 3 \leq x$$

"is equivalent to..."



Polynomials

$$x^2 = (2y)^2$$

$$x^2 = (2y)(2y)$$

$$x^2 = 4y^2$$

Polynomials

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

$$(x^2 - y^2) = (x + y)(x - y)$$

$$x^2 = (2y + 1)^2$$


$$x^2 = (2y + 1)(2y + 1)$$

$$x^2 = 4y^2 + 2y + 2y + 1$$

$$x^2 = 4y^2 + 4y + 1$$

$$2x + 3 = 5$$

$$2x + 3 - 3 = 5 - 3$$

$$2x = 2$$

$$2x / 2 = 2 / 2$$

$$x = 1$$



Equations – Algebraic Manipulation

The collage illustrates the progression of algebraic manipulation in the game 'Dragon Book' through four stages:

- Top Panel:** The title screen for 'Dragon Book' featuring a dragon character and various dragon creatures on floating islands.
- Second Panel (0/15):** A yellow background with the text 'SECRETLY TEACHES ALGEBRA'. The equation $x - 8 + 3 = 5 + 2 + 1$ is shown using block letters.
- Third Panel (0/18):** A red background with the text 'AFTER 1 HOUR'. The equation $x - a + \frac{x + e}{-h} + 1 = \frac{d}{d} + a \left(\frac{1}{a} + \frac{1}{a} \right)$ is shown using block letters.
- Bottom Panel (4/28):** A brown background with the text 'AFTER 4 HOURS'. The equation $\frac{(3 \cdot x + (-3) \cdot x)}{(-2) \cdot x + 5} + \frac{(x + (-3))}{6} = \left(\frac{2 \cdot x}{3} + (-5) \right) \cdot 2$ is shown using block letters.

Equations – Chaining

$$\begin{aligned}(2x + 2)^2 - (3x)^2 &= 4x^2 + 8x + 4 - 9x^2 \\ &= (4x^2 - 9x^2) + 8x + 4 \\ &= -5x^2 + 8x + 4\end{aligned}$$

Exponents

$$x^a \cdot x^b = x^{(a+b)}$$

$$x^{(n+1)} = x \cdot x^n$$

$$(x^a)^b = x^{(a \cdot b)}$$

$$(x^a)^b = x^{(a \cdot b)} = (x^b)^a$$

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

$$x^{\frac{1}{a}} = \sqrt[a]{x}$$