

Unit 4 Review

- 1) A square has a side length of $2x + 2$ and has equal volume to a rectangle with width $x^2 + 2x + 1$. What is the simplified expression for the length of the rectangle?

$$l = 4$$

- 2) The width of a rectangular prism is 6 more than the length. If the volume of the prism is $x^3 + 5x^2 - 6x$, what is the simplified expression for the height of the prism.

$$h = x - 1$$

- 3) A cube and a cylinder have the same volume. If one side length of the cube is $6x$ and the radius of the cylinder is $2x$, find the height of the cylinder.

$$h = \frac{54x}{\pi}$$

Simplify each and state the excluded values.

4) $\frac{90x^3}{18x^2}$

$$5x, x \neq 0$$

5) $\frac{28p}{28p^2}$

$$\frac{1}{p}, p \neq 0$$

6) $-\frac{40x^5}{40x}$

$$-x^4, x \neq 0$$

7) $\frac{12a}{54a^2}$

$$\frac{2}{9a}, a \neq 0$$

$$8) \frac{45n^2}{15n-10}$$

$$\frac{9n^2}{3n-2}, n \neq \frac{2}{3}$$

$$9) \frac{v-2}{7v-14}$$

$$\frac{1}{7}, v \neq 2$$

$$10) \frac{27r^2-81r}{72r^3}$$

$$\frac{3(r-3)}{8r^2}, r \neq 0$$

$$11) \frac{4x-8}{2-x}$$

$$-4, x \neq 2$$

12) When can you cancel expressions in the numerator with expressions in the denominator?

When there is just multiplication on top & bottom

13) Why can you cancel in the situation that you wrote above?

Because division is the inverse operation of multiplication (opposite)

Simplify each and state the excluded values.

$$14) \frac{6n^2-35n+36}{7n} \div \frac{6n^2-35n+36}{3n}$$

$$\frac{3}{7}, n \neq 0, \frac{9}{2}, \frac{4}{3}$$

$$15) \frac{5k+5}{5k^2-20k-25} (k+2)$$

$$\frac{k+2}{k-5}, k \neq 5, -1$$

$$16) \frac{n+5}{30n-90} + \frac{1}{9-3n}$$

$$\frac{-(n+5)}{10}, n \neq 3$$

$$17) \frac{3n-12}{3} + (n+10)$$

$$\frac{n-4}{n+10}, n \neq -10$$

$$18) \frac{40n^2-80n}{5n-10} \cdot \frac{1}{4n^2}$$

$$\frac{2}{n}, n \neq 2, 0$$

$$19) \frac{8b-48}{8} \cdot \frac{1}{b-4}$$

$$\frac{b-6}{b-4}, b \neq 4$$

$$20) \frac{2m^2+21m+27}{m+9} \cdot \frac{1}{2m+3}$$

$$1, m \neq -9, -\frac{3}{2}$$

$$21) \frac{5b+8}{90b^2} + \frac{5b+8}{b+6}$$

$$\frac{b+6}{90b^2} \quad b \neq 0, -6, -\frac{8}{5}$$

Simplify each expression.

$$22) \frac{\frac{x-5}{3}}{\frac{x}{3}}$$

$$\frac{x-5}{x}$$

$$23) \frac{\frac{x}{9}}{\frac{15}{x^2}}$$

$$\frac{x^3}{135}$$

$$24) \frac{\frac{x-2}{9}}{\frac{x+2}{x-2}}$$

$$\frac{x^2 - 4x + 4}{9x + 18}$$

$$25) \frac{\frac{x+5}{4}}{\frac{x+5}{9}}$$

$$\frac{9}{4}$$

$$26) \frac{5}{m-3} + \frac{6m}{m+6}$$

$$\frac{6m^2 - 13m + 30}{(m-3)(m+6)}$$

$$27) 4 + \frac{6x}{30x^3 + 30x^2}$$

$$\frac{20x^2 + 20x + 1}{5x(x+1)}$$

$$28) \frac{2}{n+1} - \frac{6}{5n}$$

$$\frac{4n-6}{5n(n+1)}$$

$$29) \frac{5}{5m^3} + \frac{3}{6m-2}$$

$$\frac{3m^3 + 6m - 2}{2m^3(3m-1)}$$

$$30) \frac{x+5}{4x^2+4x} - \frac{5}{3}$$

$$\frac{-20x^2 - 17x + 15}{12x(x+1)}$$

$$31) \frac{b+5}{2b-6} + \frac{3}{6}$$

$$\frac{b+1}{b-3}$$

$$32) \frac{5k}{6k^3} + \frac{6}{2k^2+14k+20}$$

$$\frac{23k^2 + 35k + 50}{6k^2(k+5)(k+2)}$$

$$33) \frac{b-4}{5b^2-34b+24} + \frac{4b}{2}$$

$$\frac{10b^3 - 68b^2 + 49b - 4}{(b-6)(5b-4)}$$