Problem 1

Given the sets $A = \{2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $B = \{1, 3, 5, 7, 11\}$, and $C = \{5, 6\}$, find $(A \cap B) \cup C$

First, using order of operations, you need to find the intersection between A and B.

$$\begin{aligned} A \cap B &= \{2, 3, 4, 5, 6, 7, 8, 9, 10\} \cap \{1, 3, 5, 7, 11\} \\ &= \{3, 5, 7\} \end{aligned}$$

Now you look at the union of the two sets remaining.

$$\begin{aligned} (A \cap B) \cup C &= \{3, 5, 7\} \cup \{5, 6\} \\ &= \{3, 5, 6, 7\} \end{aligned}$$

Problem 2

Express the interval $(|-3|, 8]$ in terms of inequalities

We first have to look at the absolute value inside of the problem before creating the inequality.

$$|-3| = 3$$

Thus, our interval becomes $(3, 8]$. Thus, our inequality would be

$$3 < x \leq 8$$

Problem 3

For $x = 7$, solve the following expression using proper order of operations $\left(\dfrac{x^2 + x + 10}{11}\right) \cdot 3 - x$

We first substitute our value of x into the expression and simplify.

$$\begin{aligned}\frac{7^2 + 7 + 10}{11} \cdot 3 - 7 &= \frac{49 + 7 + 10}{11} \cdot 3 - 7 \\ &= \left(\frac{66}{11}\right) \cdot 3 - 7 \\ &= (6) \cdot 3 - 7 \\ &= 18 - 7 \\ &= 11\end{aligned}$$

Problem 4

Find and simplify the product of the expression $7(5x + 9)$

We use the distributive property to simplify this expression.

$$\begin{aligned}7(5x + 9) &= (7 \cdot 5x) + (7 \cdot 9) \\ &= 35x + 63\end{aligned}$$

Problem 5

Simplify the expression $(x^2 \cdot y)^3$

The power of a power rule says the exponents multiply, so the expression would simplify to $x^{(2 \cdot 3)} \cdot y^{(1 \cdot 3)} = x^6 y^3$.

Problem 6

Simplify the expression $\dfrac{x^3x^4}{x^2}$

You first simplify the numerator. When variables multiply, the exponents add.

$$x^3x^4 = x^{3+4} = x^7$$

Now put the denominator back. When the variables are dividing, the exponents subtract. Thus,

$$\frac{x^7}{x^2} = x^{7-2} = x^5$$

Problem 7

Simplify the expression $\left(\dfrac{x^2y^{-3}}{x^{-4}y^2}\right)^{-2}$ and eliminate any negative exponents.

From class, the quickest way to evaluate is:

$$\begin{aligned}\left(\frac{x^2y^{-3}}{x^{-4}y^2}\right)^{-2} &= \left(\frac{x^{-4}y^2}{x^2y^{-3}}\right)^{2} \\ &= \left(\frac{y^2y^3}{x^2x^4}\right)^{2} \\ &= \left(\frac{y^5}{x^6}\right)^{2} \\ &= \frac{y^{10}}{x^{12}}\end{aligned}$$

Problem 8

Find the intersection of $I_1 = (-2, 3]$ and $I_2 = [1, 5)$

Drawing both number lines out, look for where they overlap.

$$[1, 3]$$

Problem 9

Evaluate: $|5 - | - 8||$

First take the absolute value of -8.

$$\begin{aligned} &= |5 - 8| \\ &= | - 3| \\ &= 3 \end{aligned}$$

Problem 10

Evaluate: -7^0

Recall, something to the zero power is 1.

$$\begin{aligned} &= -1 \cdot 7^0 \\ &= -1 \cdot 1 \\ &= -1 \end{aligned}$$

Problem 11

Simplify: $(2x^4y^{-3})(-9xy^{-2})$

The coefficients multiply and when variables multiply the exponents add. Remember, don't leave negative exponents in your final answer.

$$\begin{aligned} &= (2x^4y^{-3})(-9xy^{-2}) \\ &= (2 \cdot -9)(x^{4+1})(y^{-3+-2}) \\ &= -18x^5y^{-5} \\ &= \frac{-18x^5}{y^5} \end{aligned}$$

Problem 12

Is π a rational or irrational number?

It is irrational because π neither terminates nor repeats.

Problem 13

Find the distance between -2 and 5, by first expressing it using an absolute value.

To find the distance, subtract the values and take the absolute value.

$$\begin{aligned} &= |-2-5| \\ &= |-7| \\ &= 7 \end{aligned}$$

Secret Phrase

What was the secret phrase you found?

BUZZ THE MASCOT