Prefix/Infix/Postfix Notation Worksheet
Created by Sam Craig for the West Lafayette High School ACSL Club of
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In prefix, the operator comes before the operands; infix between; and postfix after. Only infix has parentheses, as the operator will always only have two operands in the other two notations. $\uparrow$ designates an exponent such that e^x in prefix is $\uparrow e\ x$. Use asterisks (*) instead of times signs ($\times$) when using prefix or postfix. Convert square and n-th roots $\sqrt[n]{x}$ to, in prefix, $\uparrow x\ /\ 1\ n$. ACSL will probably not have a problem on their test including a square root.

Questions

1. Translate the following equation into prefix.

   $$E = mc^2$$

2. Translate the following equation into postfix.

   $$x = \frac{\sqrt{b^2 - 4ac} - b}{2a}$$

3. Translate the following prefix expression into infix.

   $$+\ A - B \uparrow C\ D$$

4. Evaluate the following postfix expression with $A = 5, B = 10, C = 15$.

   $$A\ A\ B + C\ A\ B\ /\ -\ /\ *$$

Answers

1.

$$E = mc^2 \rightarrow (E = (m \times (c^2)))$$
$$\rightarrow (E = (m \times (c \uparrow 2)))$$
$$\rightarrow (= E \ (\times \ m \ (\uparrow \ c \ 2)))$$
$$\rightarrow \ = E \times m \uparrow c \ 2$$
$$\rightarrow \ = E * m \uparrow c \ 2$$

2.

$$x = \frac{\sqrt{b^2 - 4ac} - b}{2a} \rightarrow \left(x = \left(\frac{\left(\left(\sqrt{((b^2) - (4ac))} \right) - b \right)}{(2a)} \right) \right)$$
$$\rightarrow \left(x = \left(\frac{((((b \uparrow 2) - (4ac)) \uparrow (1/2)) - b)}{(2a)} \right) \right)$$
$$\rightarrow (x = (((((b \uparrow 2) - (4ac)) \uparrow (1/2)) - b)/(2a)))$$
$$\rightarrow (x = (((((b \uparrow 2) - (4 \times a \times c)) \uparrow (1/2)) - b)/(2 \times a)))$$
$$\rightarrow (x \ (((((b \ 2 \ \uparrow)(4 \ a \times c \times) \ -)(1 \ 2 \ /) \uparrow) \ b \ -)(2 \ a \ \times) \ /) =)$$
$$\rightarrow x \ b \ 2 \uparrow 4 \ a \times c \ \times - \ 1 \ 2 \ / \uparrow \ b \ - 2 \ a \ \times \ / =$$
$$\rightarrow x \ b \ 2 \uparrow 4 \ a * c \ * - \ 1 \ 2 \ / \uparrow \ b \ - 2 \ a \ * \ /$$

3.

$$+ \ A - B \uparrow C \ D \rightarrow (+ \ A \ (- \ B \ (\uparrow C \ D)))$$
$$\rightarrow (A + (B - (C \uparrow D)))$$
$$\rightarrow A + B - C^D$$