Steps for Solving Formulas with Rational Equations:

1. identify the variable you are trying to isolate
2. eliminate fractions by multiplying by the denominators
3. distribute and combine like terms
4. isolate the specified variable by using the following techniques:
    a. if the variable appears more than once, group terms with the variable on one side and terms without the variable on the other side, then factor
        i. only factor the variable you are trying to isolate, which is not necessarily the GCF
    b. add or subtract terms that do not contain that variable
    c. divide or multiply by any factors that are included with that variable

Example 1: Solve the formulas for the specified variable

a. $v = \frac{2\pi r}{T}$; for T (circular velocity of an object)

b. $z = \frac{X-\mu}{\sigma}$; for σ (sigma) (z-score formula)

$$\sigma(z) = \sigma\left(\frac{X-\mu}{\sigma}\right)$$

$$\sigma z = X - \mu$$

$$\boldsymbol{\sigma = \frac{X-\mu}{z}}$$

c. $\frac{qf+pf}{q} = p$; for q

$q\left(\frac{qf+pf}{q}\right) = q(p)$

$qf + pf = qp$

$pf = qp - qf$

$pf = q(p - f)$

$\boldsymbol{\frac{pf}{p-f} = q}$

d. $\frac{qf+pf}{q} = p$; for p

e. $t = \frac{A-P}{Pr}$; for P

(Future Value of an Investment)

f. $R = \frac{as}{a+s}$; for a

$R(a + s) = as$

$Ra + Rs = as$

$Rs = as - Ra$

$Rs = a(s - R)$

$\boldsymbol{\frac{Rs}{s-R} = a}$

g. $f = \frac{f_1 f_2}{f_1 + f_2}$; for f_1

$(f_1 + f_2)f = (f_1 + f_2)\left(\frac{f_1 f_2}{f_1 + f_2}\right)$

$ff_1 + ff_2 = f_1 f_2$

$ff_2 = f_1 f_2 - ff_1$

$ff_2 = f_1(f_2 - f)$

$\boldsymbol{\frac{ff_2}{f_2 - f} = f_1}$

h. $V = C - \frac{C-S}{L}N$; for C

$V = C - \frac{(C-S)N}{L}$

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$V = C - \frac{(C-S)N}{L}$

$LV - NS = CL - CN$

$LV - NS = C(L - N)$

$\boldsymbol{\frac{LV - NS}{L - N} = C}$

Answers to Examples:

1a. $T = \frac{2\pi r}{v}$; *1b.* $\sigma = \frac{X-\mu}{z}$; *1c.* $q = \frac{pf}{p-f}$; *1d.* $p = \frac{qf}{q-f}$;

1e. $P = \frac{A}{Tr+1}$; *1f.* $a = \frac{Rs}{s-R}$; *1g.* $f_1 = \frac{ff_2}{f_2-f}$; *1h.* $C = \frac{LV-NS}{L-N}$;