Series : Mathematics - from zero to engineer (26).

Evaluating expressions.

$2\pi\sqrt{\frac{l}{g}}$ $\quad \pi = 3,1415 \; , \; l = 2 \; , \; g = 9,81$

$$2 \cdot 3,1415\sqrt{\frac{2}{9,81}} = 6,2830\sqrt{0,2039} = 6,2830 \cdot 0,4516 = 2,84$$

- correct to two decimal places

$V = \frac{\pi h}{6}(3R^2 + h^2)$ $\quad h = 2,85 \; , \; R = 6,24 \; , \; \pi = 3,142$

$$V = \frac{3,142 \cdot 2,85}{6}(3 \cdot 6,24^2 + 2,85^2) = 1,492(116,8128 + 8,1225) =$$

$$= 1,492 \cdot 124,9353 = 186,40$$

- correct to two decimal places

$R = \frac{R_1 R_2}{R_1 + R_2}$ $\quad R_1 = 276 \; , \; R_2 = 145$

$$R = \frac{276 \cdot 145}{276 + 145} = \frac{40020}{421} = 95,06$$

- correct to two decimal places

$V = \frac{\pi b}{12}(D^2 + Dd + d^2)$ $\quad b = 1,46 \; , \; D = 0,864$ $\quad d = 0,517 \; , \; \pi = 3,142$

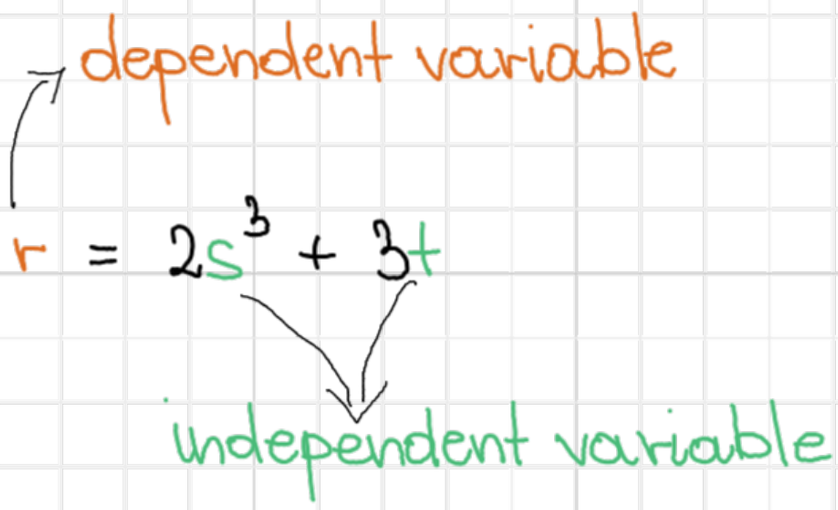
$$V = \frac{3,142 \cdot 1,46}{12}(0,864^2 + 0,864 \cdot 0,517 + 0,517^2)$$

$$V = 0,382(0,746 + 0,447 + 0,267)$$

$$V = 0,382 \cdot 1,46 = 0,558$$

- correct to three significant figures.

Equations



Evaluating independent variables and rearranging formulae.

Calculate l.

$T = 2\pi\sqrt{\frac{l}{g}}$ $\quad \pi = 3,14$, $g = 9,81$, $T = 1,03$

$T = 2\pi\sqrt{\frac{l}{g}} \;/:2\pi$

$\frac{T}{2\pi} = \sqrt{\frac{l}{g}} \;/^2$

$\frac{T^2}{4\pi^2} = \frac{l}{g} \;/\cdot g$

$l = \frac{gT^2}{4\pi^2}$

$l = \frac{9,81 \cdot 1,03^2}{4 \cdot 3,14^2}$

$l = \frac{9,81 \cdot 1,0609}{4 \cdot 9,8596}$

$l = 0,264$

- correct to three significant figures.

Calculate r.

$y = \frac{nE}{R + nr}$ $\quad n = 6$, $E = 2,01$, $R = 12$, $y = 0,98$

$y = \frac{nE}{R + nr} \;/\cdot (R + nr)$

$y(R + nr) = nE$

$yR + ynr = nE$

$ynr = nE - yR \;/: y_n$

$r = \frac{nE - yR}{y_n}$

$r = \frac{6 \cdot 2,01 - 0,98 \cdot 12}{0,98 \cdot 6}$

$r = \frac{12,06 - 11,76}{5,88} = 0,051$

- correct to two significant figures.

Rearrange the formula to make 'a' the dependent variable.

$v = u + at$

$v - u = at \;/: t$

$a = \frac{v - u}{t}$

Make 'u' the dependent variable.

$a = \frac{2(ut - s)}{t^2} \;/\cdot t^2$

$at^2 = 2ut - 2s$

$at^2 + 2s = 2ut \;/: 2t$

$u = \frac{at^2 + 2s}{2t}$