Lösungen zu Formeln umstellen:

Aufgabe 1:

1) $d_f = m(z-2{,}4) \mid : m$

$\frac{d_f}{m} = z - 2{,}4 \mid + 2{,}4$

$\boxed{\frac{d_f}{m} + 2{,}4 = z}$

2) $l = D_m \pi (W+2) \mid : D_m \pi$

$\frac{l}{D_m \pi} = W + 2 \mid - 2$

$\boxed{\frac{l}{D_m \pi} - 2 = W}$

3) $\Delta V = V_1 \cdot \alpha_V (t_2 - t_1) \mid : V_1 \alpha_V$

$\frac{\Delta V}{V_1 \alpha_V} = t_2 - t_1 \mid + t_1$

$\boxed{\frac{\Delta V}{V_1 \alpha_V} + t_1 = t_2}$

4) $Q = mc(t_2 - t_1) \mid : mc$

$\frac{Q}{mc} = t_2 - t_1 \mid + t_1 - \frac{Q}{mc}$

$\boxed{t_1 = t_2 - \frac{Q}{mc}}$

5) $d = d_f + 2(m+c) \mid - d_f$

$d - d_f = 2(m+c) \mid : 2$

$\frac{d - d_f}{2} = m + c \mid - c$

$\boxed{\frac{d - d_f}{2} - c = m}$

6) $l_R = l - z(l_t + s) \mid + z(\ldots) - l_R$

$z(l_t + s) = l - l_R \mid : z$

$l_t + s = \frac{l - l_R}{z} \mid - l_t$

$\boxed{s = \frac{l - l_R}{z} - l_t}$

7) $A_0 = \pi h (2d - h) \mid : \pi h$

$\frac{A_0}{\pi h} = 2d - h \mid + h$

$\frac{A_0}{\pi h} + h = 2d \mid : 2$

$\boxed{\frac{\frac{A_0}{\pi h} + h}{2} = d}$

8) $A_0 = 2(l \cdot h + l \cdot b + b \cdot h) : 2$

$\frac{A_0}{2} = l \cdot h + l \cdot b + b \cdot h \mid - bh$

$\frac{A_0}{2} - bh = l(h + b) \mid : (h+b)$

$\boxed{\frac{\frac{A_0}{2} - bh}{h+b} = l}$

Aufgabe 2:

1) $d_m = \frac{D+d}{2} \quad | \cdot 2$

$2d_m = D+d \quad | -d$

$\boxed{2d_m - d = D}$

2) $V = \frac{\pi d^2}{4} \cdot h \quad | \cdot \frac{4}{\pi d^2}$

$\boxed{\frac{4V}{\pi d^2} = h}$

3) $B = b - \frac{2}{3} \cdot b_s \quad | + \frac{2}{3} b_s - B$

$\frac{2}{3} b_s = b - B \quad | \cdot \frac{3}{2}$

$\boxed{b_s = \frac{3}{2}(b-B)}$

4) $U = \frac{d+D}{2} \cdot \pi \quad | \cdot \frac{2}{\pi}$

$\frac{2U}{\pi} = d+D \quad | -D$

$\boxed{\frac{2U}{\pi} - D = d}$

5) $a = \frac{m}{2}(z_2 - z_1) \quad | \cdot \frac{2}{m}$

$\frac{2a}{m} = z_2 - z_1 \quad | + z_1 - \frac{2a}{m}$

$\boxed{z_1 = z_2 - \frac{2a}{m}}$

6) $L = l_a + \frac{d_1 - d_2}{2} \quad | - l_a$

$L - l_a = \frac{d_1 - d_2}{2} \quad | \cdot 2$

$2(L - l_a) = d_1 - d_2 \quad | + d_2$

$\boxed{2(L-l_a) + d_2 = d_1}$

7) $A = \frac{l_1 + l_2}{2} \cdot b \quad | \cdot 2$

$2A = (l_1 + l_2) b \quad | : (l_1 + l_2)$

$\boxed{\frac{2A}{l_1 + l_2} = b}$

8) $A = \frac{l_B \cdot r - l(r-b)}{2} \quad | \cdot 2$

$2A = l_B r - lr + lb \quad | - lb$

$2A - lb = r(l_B - l) \quad | : (\dots)$

$\boxed{\frac{2A - lb}{l_B - l} = r}$

9) $F_z = \frac{m \cdot v^2}{r} \quad | \cdot \frac{r}{v^2}$

$\boxed{\frac{F_z \cdot r}{v^2} = m}$

10) $C = \frac{D-d}{L} \quad | \cdot L$

$C \cdot L = D - d \quad | + d - CL$

$\boxed{d = D - C \cdot L}$

11) $D = \frac{2V_R \cdot L}{L_W} + d \quad | -d$

$D - d = \frac{2V_R \cdot L}{L_W} \quad | \cdot \frac{L_W}{2L}$

$\boxed{\frac{(D-d) \cdot L_W}{2L} = V_R}$

12) $V_1 = \frac{V_2(p_1 - p_2)}{p_F} \quad | \cdot \frac{p_F}{V_2}$

$\frac{V_1 \cdot p_F}{V_2} = p_1 - p_2 \quad | + p_2$

$\boxed{p_1 = \frac{V_1 \cdot p_F}{V_2} + p_2}$

Aufgabe 3:

1) $F_R = \frac{f \cdot F_N}{r} \quad | \cdot r$

$F_R \cdot r = f \cdot F_N \quad | : F_R$

$$\boxed{r = \frac{f \cdot F_N}{F_R}}$$

2) $r = \frac{F_z}{m \cdot \omega^2} \quad | \cdot m$

$r \cdot m = \frac{F_z}{\omega^2} \quad | : r$

$$\boxed{m = \frac{F_z}{r \cdot \omega^2}}$$

3) $d = \frac{P_R}{F_R \cdot \pi \cdot n} \quad | \cdot n$

$d \cdot n = \frac{P_R}{F_R \cdot \pi} \quad | : d$

$$\boxed{n = \frac{P_R}{F_R \cdot \pi \cdot d}}$$

4) $z_1 = \frac{2a}{m} - z_2 \quad | + z_2$

$z_1 + z_2 = \frac{2a}{m} \quad | \cdot m$

$(z_1 + z_2)\, m = 2a \quad | : (z_1 + z_2)$

$$\boxed{m = \frac{2a}{z_1 + z_2}}$$

5) $p = \frac{l - c}{n - 1} \quad | \cdot (n-1)$

$p(n-1) = l - c \quad | : p$

$n - 1 = \frac{l - c}{p} \quad | + 1$

$$\boxed{n = \frac{l - c}{p} + 1}$$

6) $v_m = \frac{2L}{t_A + t_R} \quad | \cdot (t_A + t_R)$

$v_m (t_A + t_R) = 2L \quad | : v_m$

$t_A + t_R = \frac{2L}{v_m} \quad | - t_A$

$$\boxed{t_R = \frac{2L}{v_m} - t_A}$$

7) $A = \frac{d^2 \pi}{4} \quad | \cdot \frac{4}{\pi}$

$\frac{4A}{\pi} = d^2 \quad | \sqrt{}$

$$\boxed{\sqrt{\frac{4A}{\pi}} = d}$$

8) $A = (D^2 - d^2) \cdot \frac{\pi}{4} \quad | \cdot \frac{4}{\pi}$

$\frac{4A}{\pi} = D^2 - d^2 \quad | + d^2$

$\frac{4A}{\pi} + d^2 = D^2 \quad | \sqrt{}$

$$\boxed{\sqrt{\frac{4A}{\pi} + d^2} = D}$$

9) – 12) siehe nächste Seite! →

zu Afg 3:

9) $m = \frac{2W_K}{v^2} \quad | \cdot v^2$

$m \cdot v^2 = 2W_K \quad | : m$

$v^2 = \frac{2W_K}{m} \quad | \sqrt{\ }$

$$\boxed{v = \sqrt{\frac{2W_K}{m}}}$$

10) $p = \frac{4F_N}{\pi(D^2 - d_N^2)} \quad | \cdot (D^2 - d_N^2)$

$p(D^2 - d_N^2) = \frac{4F_N}{\pi} \quad | : p$

$D^2 - d_N^2 = \frac{4F_N}{\pi p} \quad | + d_N^2 - \frac{4F_N}{\pi p}$

$D^2 - \frac{4F_N}{\pi p} = d_N^2 \quad | \sqrt{\ }$

$$\boxed{\sqrt{D^2 - \frac{4F_N}{\pi p}} = d_N}$$

11) $d = 2 \cdot \sqrt{h_s^2 - h^2} \quad | : 2$

$\frac{d}{2} = \sqrt{h_s^2 - h^2} \quad |^2$

$\left(\frac{d}{2}\right)^2 = h_s^2 - h^2 \quad | + h^2$

$\left(\frac{d}{2}\right)^2 + h^2 = h_s^2 \quad | \sqrt{\ }$

$$\boxed{\sqrt{\left(\frac{d}{2}\right)^2 + h^2} = h_s}$$

12) $h = r - \sqrt{r^2 - \left(\frac{d}{2}\right)^2} \quad | + \sqrt{\dots} - h$

$\sqrt{r^2 - \left(\frac{d}{2}\right)^2} = r - h \quad |^2$

$r^2 - \left(\frac{d}{2}\right)^2 = (r-h)^2 \quad | + \left(\frac{d}{2}\right)^2 - (\dots)^2$

$r^2 - (r-h)^2 = \left(\frac{d}{2}\right)^2 \quad | \sqrt{\ }$

$\sqrt{r^2 - (r-h)^2} = \frac{d}{2} \quad | \cdot 2$

$$\boxed{2 \cdot \sqrt{r^2 - (r-h)^2} = d}$$

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zu 12) freiwillige Kosmetik!

Ausdruck unter der Wurzel vereinfachen:

$$\begin{aligned} r^2 - (r-h)^2 &= r^2 - (r^2 - 2rh + h^2) \\ &= r^2 - r^2 + 2rh - h^2 \\ &= 2rh - h^2 = h(2r-h) \end{aligned}$$

somit

$$\boxed{d = 2 \cdot \sqrt{h(2r-h)}}$$