Changing the Subject of the Formula

1. Transpose $v = u + at$ for $t$.
2. Transpose $A = P + I$ for $P$.
3. Transpose $p = H + h$ for $H$.
4. Transpose $I_1 = I + ma^2$ for $I$.
5. Transpose $I = I_g + MH^2$ for $I_g$.
6. Transpose $I = I_x + I_y$ for $I_x$.
7. Transpose $I = I_1 + I_2$ for $I_2$.
8. Transpose $R = R_1 + R_2$ for $R_1$.
10. Transpose $I = T + A + R$ for $A$.
11. Transpose $t_\alpha + a_\alpha + r_\alpha = 1$ for $r_\alpha$.
12. Transpose $c_p = c_v + R$ for $c_v$.
13. Transpose $v = u + at$ for $u$.
14. Make $d$ the subject of the formula $s = d - x$.
15. Make $w_1$ the subject of the formula $2\pi f = w_1 - w_2$.
16. Make $S_2$ the subject of the formula $e = S_2 - S_1$.
17. Make $I_1$ the subject of the formula $I = I_1 - ma^2$.
18. Make $c_p$ the subject of the formula $R = c_p - c_v$.
19. Make $H$ the subject of the formula $U = H - pV$.
20. Make $\ell_2$ the subject of the formula $\ell_2 - \ell_1 = \alpha \ell t$.
21. Make $T_k$ the subject of the formula $T_k - t = 273$.
22. Make $v$ the subject of the formula $at = v - u$.
23. Make $R$ the subject of the formula $R - mg = ma$.
24. Make $A$ the subject of the formula $p = A - h$.
25. Make $p_2$ the subject of the formula $p_2 - p_1 = \frac{2\gamma}{r}$.
26. Make $p_2$ the subject of the formula $p_2 - p_1 = \frac{2\gamma \cos \theta}{r}$.
27. Transpose the formula $C = RT$ to make $R$ the subject of the formula.
28. Transpose the formula $m = V_p$ to make $p$ the subject of the formula.
29. Transpose the formula $p = hpg$ to make $h$ the subject of the formula.
30. Transpose the formula $F = EA\alpha t$ to make $\alpha$ the subject of the formula.
31. Transpose the formula $pV = nRT$ to make $R$ the subject of the formula.
32. Transpose the formula $C = 4\pi \varepsilon_0 r$ to make $s_0$ the subject of the formula.
33. Transpose the formula $I = nAve$ to make $n$ the subject of the formula.
34. Transpose the formula $H = PRe t$ to make $t$ the subject of the formula.
35. Transpose the formula $F = Bev$ to make $B$ the subject of the formula.
36. Transpose the formula $W = mgh$ to make $h$ the subject of the formula.
37. Transpose the formula $W = IVt$ to make $t$ the subject of the formula.
38. Transpose the formula $W = (V - ay)p$ to make $p$ the subject of the formula.
39. Transpose the formula $IVt = (mc + C)\theta$ to make $\theta$ the subject of the formula.
40. Transpose the formula $p = \frac{F}{A}$ for $F$. 
41. Transpose the formula \( p = \frac{4\gamma}{r} \) for \( r \).
42. Transpose the formula \( p = \frac{m}{V} \) for \( m \).
43. Transpose the formula \( \lambda = \frac{ay}{D} \) for \( y \).
44. Transpose the formula \( W = \frac{neV}{p} \) for \( p \).
45. Transpose the formula \( \mu = \frac{F}{R} \) for \( F \).
46. Transpose the formula \( T = \frac{2\pi}{w} \) for \( w \).
47. Transpose the formula \( T = \frac{kV}{aA} \) for \( A \).
48. Transpose the formula \( \frac{Q}{V} = 4\pi\varepsilon_0r \) for \( V \).
49. Transpose the formula \( B = \frac{\mu_0NI}{2r} \) for \( \mu_0 \).
50. Transpose the formula \( \tan \theta = \frac{F}{mg} \) for \( g \).
51. Transpose the formula \( v_a = -\frac{GM}{a} \) for \( a \).
52. Transpose the formula \( F = EA \frac{e}{A} \) for \( C \).
53. Transpose the formula \( h = \frac{2\gamma \cos \theta}{r p g} \) for \( g \).
54. Transpose the formula \( H_1 = \frac{H_2}{(m_1 + m_2)\theta_1}{(m_2 + m_2)\theta_2} \) for \( \theta \).
55. Transpose the formula \( \frac{F - 32}{c} = \frac{9}{5} \) for \( c \).
56. Transpose the formula \( \frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \) for \( T_2 \).
57. Transpose the formula \( W = \frac{4}{3}\pi a^3 p g \) for \( g \).
58. Transpose the formula \( 4\pi \rho = \frac{3g}{r G} \) for \( G \).
59. Transpose \( V = u + at \) for \( t \).
60. Transpose \( x = ut + \frac{1}{2}at^2 \) for \( a \).
61. Transpose \( v^3 = u^2 + 2ax \) for \( x \).
62. Transpose \( R = mg + ma \) for \( a \).
63. Transpose \( \gamma = \frac{h_1}{h_1 - h_2} \) for \( h_2 \).
64. Transpose \( \gamma = \frac{V_2 - V_1}{V\theta} \) for \( v_2 \).
65. Transpose \( p = P + \frac{2\gamma}{r} \) for \( r \).
66. Transpose \( Q = kA \frac{\theta_2 - \theta_1}{\ell} \) for \( \theta_2 \).
67. Transpose \( n = 1 + \frac{r}{f} \) for \( f \).
68. Transpose \( I = \frac{E}{R + r} \) for \( r \).
69. Transpose \( I_e = \frac{V - E}{R_e} \) for \( E \).
70. Transpose \( u = \ell + \frac{M}{H} \) for \( H \).
71. Transpose \( V = 2f(\ell_1 - \ell) \) for \( \ell \).
72. Transpose \( m\dot{v} + v_0 = \frac{1}{r} \) for \( r \).
73. Transpose \( \ell_2 - \ell_1 = \alpha \ell t \) for \( \ell \).
74. Transpose \( \ell_r = \ell(1 + \alpha t) \) for \( t \).
75. Transpose \( A_2 = A_1(1 + \beta) \) for \( \beta \).
76. Transpose \( V_e = V_0(\frac{273}{273} + \frac{t}{273}) \) for \( t \).
77. Transpose \( R_t = R_0(\ell + \frac{t}{273}) \) for \( t \).
78. Transpose \( q = m(t_2 - t_1) \) for \( t_1 \).
79. Transpose \( IVt = (mc + C)\theta \) for \( \theta \).
80. Transpose \( \frac{Q}{t} = k\theta_1\theta_2 \) for \( \theta_2 \).
81. Transpose \( \frac{1}{l_0} + 1 = \frac{1}{l_0} \) for \( l_0 \).
82. Transpose \( W = (V - ay)p \) for \( a \).
83. Transpose \( \gamma = \frac{mg}{2(a + b)} \) for \( b \).
84. Transpose \( p_2 - p_1 = \frac{2\gamma \cos \theta}{r} \) for \( p_1 \).
85. Make \( W \) the subject of the formula.
\[ W = \sqrt{W_1 W_2} \]
86. Make \( p \) the subject of the formula.
\[ V = \sqrt{\frac{yp}{\rho}} \]
87. Make \( m \) the subject of the formula.
\[ V = \sqrt{\frac{T_v}{m}} \]
88. Make \( k \) the subject of the formula \( V = \sqrt[3]{\frac{k}{\rho}}. \)
89. Make \( \rho \) the subject of the formula \( V = \sqrt[3]{\frac{E}{\rho}}. \)
90. Make \( r \) the subject of the formula \( v = \sqrt{2gr}. \)
91. Make \( r \) the subject of the formula \( v = \sqrt{\frac{2GM}{r}}. \)
92. Make \( e \) the subject of the formula \( v = \sqrt{\frac{2eV}{m}}. \)
93. Make \( E \) the subject of the formula \( v = \sqrt{\frac{1}{uE}}. \)
94. Make \( \ell \) the subject of the formula \( T = \frac{\ell}{\sqrt{8}}. \)
95. Make \( m \) the subject of the formula \( \nu = k \sqrt{\frac{F\ell}{m}}. \)
96. Make \( \ell \) the subject of the formula \( \nu = k \sqrt{\frac{T}{s/\ell}}. \)
97. Make \( g \) the subject of the formula \( t = \sqrt{\frac{3s}{g \sin \alpha}}. \)
98. Make \( \ell \) the subject of the formula \( t = 2\pi \sqrt{\frac{\ell}{g}}. \)
99. Make \( g \) the subject of the formula \( T = 2\pi \sqrt{\frac{2a}{g}}. \)
100. Make \( e \) the subject of the formula \( T = 2\pi \sqrt{\frac{e}{g}}. \)
101. Make \( g \) the subject of the formula \( T = 2\pi \sqrt{\frac{l}{g}}. \)
102. Make \( I \) the subject of the formula \( T = 2\pi \sqrt{\frac{I}{mgh}}. \)
103. Make \( m \) the subject of the formula \( f = \frac{1}{2\ell} \sqrt{\frac{T}{m}}. \)
104. Make \( L \) the subject of the formula \( f_0 = \frac{1}{2\pi \sqrt{LC}}. \)
105. Make \( a \) the subject of the formula \( f = \frac{V}{2\pi \sqrt{\frac{a}{V}}}. \)
106. Make \( s \) the subject of the formula \( T = 2\pi \sqrt{\frac{m + \lambda s}{k}}. \)
107. Make \( p \) the subject of the formula \( \ell = \sqrt{\frac{3Nmc^2}{2p}}. \)
108. Make \( g \) the subject of the formula \( R = \sqrt{\frac{gT^2r^2}{4\pi^2}}. \)
109. Make \( E \) the subject of the formula \( T = \frac{E}{\sqrt{g}}. \)
110. Transpose the formula \( P = PR \) to make \( I \) the subject.
111. Transpose the formula \( a = rv^2 \) to make \( iv \) the subject.
112. Transpose the formula \( H = PRT \) to make \( I \) the subject.
113. Transpose the formula \( E = mc^2 \) to make \( c \) the subject.
114. Transpose the formula \( a = \frac{V^2}{r} \) to make \( v \) the subject.
115. Transpose the formula \( F = \frac{mv^2}{r} \) to make \( v \) the subject.
116. Transpose the formula \( E = \frac{I}{d^2} \) to make \( d \) the subject.
117. Transpose the formula \( P = \frac{V^2}{R} \) to make \( V \) the subject.
118. Transpose the formula \( H = \frac{V^2t}{R} \) to make \( V \) the subject.
119. Transpose the formula \( M = \frac{Gr^2}{G} \) to make \( r \) the subject.
120. Transpose the formula \( W = \frac{1}{2} mu^2 \) to make \( u \) the subject.
121. Transpose the formula \[ F = \frac{GmM}{r^2} \] to make \( r \) the subject.

122. Transpose the formula \( \tan \theta = \frac{v^2}{rg} \) to make \( v \) the subject.

123. Transpose the formula \[ F = \frac{4\pi^2mr}{T^2} \] to make \( T \) the subject.

124. Transpose the formula \[ E = \frac{Q}{4\pi\sigma r^2} \] to make \( r \) the subject.

125. Transpose the formula \[ c = \frac{8\pi ma^3\ell}{(b+c)y} \] to make \( a \) the subject.

126. Transpose the formula \[ I_1 = l + ma^2 \] to make \( a \) the subject.

127. Transpose the formula \[ I_0 = l + Mh^2 \] to make \( h \) the subject.

128. Transpose the formula \[ \ell = \frac{k^2 + h^2}{h} \] to make \( k \) the subject.

129. Transpose the formula \[ n = \sqrt{n_0^2 - \sin^2 \theta} \] to make \( n_0 \) the subject.

130. Transpose the formula \[ Z = \sqrt{X_e^2 + R^2} \] to make \( R \) the subject.

131. Transpose the formula \[ Z = \sqrt{(X_L - X_C)^2 + R^2} \] to make \( R \) the subject.

132. Transpose the formula \[ r = w\sqrt{r^2 - y^2} \] to make \( y \) the subject.

133. Transpose the formula \( P - mg = \frac{mv^2}{\ell} \) to make \( v \) the subject.

134. Transpose the formula \[ R = \frac{1}{2} \left( g - \frac{v^2h}{ra} \right) \] to make \( v \) the subject.

135. Transpose the formula \[ P = \frac{1}{3} \frac{Nm\ell^2}{c^2} \] to make \( \ell \) the subject.

136. Transpose the formula \[ g = \frac{4\pi^2R^3}{r^2T^2} \] to make \( R \) the subject.

137. Transpose the formula \[ T^2 = \frac{4\pi^2R^3}{8r^2} \] to make \( R \) the subject.

138. Transpose the formula \[ E = \sigma T^4 \] to make \( T \) the subject.

139. Transpose the formula \[ \frac{Q}{2\pi} = \frac{T_1^4}{T_2^4} \] to make \( T_2 \) the subject.

140. Transpose the formula \[ \frac{V}{l} = \frac{\pi pd^4}{8\eta \ell} \] to make \( d \) the subject.

141. Given that \( V = \frac{R}{R - r} \), express \( R \) in terms of \( V \) and \( r \).

142. Given that \( V = \frac{5R}{R - r} \), express \( R \) in terms of \( V \) and \( r \).

143. Given that \( g = \frac{f - 1}{f - 2} \), express \( f \) in terms of \( g \).

144. Given that \( x = \frac{y - 4}{y - 7} \), express \( y \) in terms of \( x \).

145. Given that \( \frac{D}{d} = \frac{\ell + p}{\ell - p} \), express \( p \) in terms of \( \ell, d \) and \( D \).

146. Given that \( R = \sqrt{\frac{2x}{x + y}} \), express \( x \) in terms of \( y \) and \( R \).

147. Given that \( p = \sqrt{\frac{1 - m^2}{m}} \), express \( m \) in terms of \( p \).

148. Given that \( k = \sqrt{\frac{1 - \ell^2}{3\ell}} \), express \( \ell \) in terms of \( k \).

149. Given that \( k = \sqrt{\frac{p + 1}{p - 2}} \), express \( p \) in terms of \( k \).

150. Given that \( \gamma = \frac{V_2 - V_1}{V_1 \theta} \), express \( V_1 \) in terms of \( \theta, \gamma \) and \( V_2 \).

151. Given that \( \alpha = \frac{\ell_2 - \ell_1}{\ell_1(\theta_2 - \theta_1)} \), express \( \ell_1 \) in terms of \( \theta_1, \theta_2, \alpha \) and \( \ell_2 \).

152. Given that \( p = \sqrt{\frac{3 + m^2}{m}} \), express \( m \) in terms of \( p \).

153. Given that \( k = \sqrt{\frac{5 + \ell^2}{4\ell}} \), express \( \ell \) in terms of \( k \).

154. Given \( a = p + cr \), make \( r \) the subject of the formula.

155. Given \( s = \pi r(h + r) \), make \( h \) the subject of the formula.
156. Given $V^2 = 2gh$, make $g$ the subject of the formula.

157. Given $A = 2\pi R(R + H)$, make $H$ the subject of the formula.

158. Given $t = 2\pi \sqrt{\frac{W}{gf}}$, make $f$ the subject of the formula.

159. Given $V^2 = 2\rho \left( \frac{1}{x} - \frac{1}{a} \right)$, make $a$ the subject of the formula.

160. Given $t = 2\pi \sqrt{\frac{W}{gf}}$, make $g$ the subject of the formula.

161. Given $a = \sqrt{\frac{9\gamma \rho}{2\rho g}}$, make $\nu$ the subject of the formula.

162. Given $V = \frac{4\pi \rho d^3}{9e}$, make $a$ the subject of the formula.

163. Given $\gamma = \frac{1}{\beta^2} \sqrt{\frac{2mV}{e}}$, make $e$ the subject of the formula.

164. Given $I = \frac{mV}{R + R_a}$, make $R_a$ the subject of the formula.

165. Given $2d \sin \theta = n\lambda$, make $n$ the subject of the formula.

166. Given $v = a(Z - b)^2$, make $b$ the subject of the formula.

167. Given $\frac{1}{2} m_a V^2 = ev$, make $V$ the subject of the formula.

168. Given $p = \sqrt{2eV m_e}$, make $m_e$ the subject of the formula.

169. Given $r = \frac{m_0 h^2 h^2}{\pi me^2}$, make $e$ the subject of the formula.

170. Given $I = \frac{E}{R + r}$, make $R$ the subject of the formula.

171. Given $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$, make $f$ the subject of the formula.

172. Given $\frac{1}{v} + \frac{1}{u} = \frac{2}{r}$, make $r$ the subject of the formula.

173. Given $\frac{1}{c} = \frac{1}{c_1} + \frac{1}{c_2}$, make $c_1$ the subject of the formula.

174. Given $\frac{1}{F} = \frac{1}{f_1} - \frac{1}{f_2}$, make $f_2$ the subject of the formula.

175. Given $IVt = m\ell + ft$, make $t$ the subject of the formula.

176. Given $\frac{1}{2} v^2 = gh \sin \theta$, make $v$ the subject of the formula.

177. Given $\beta = \frac{S_2 - S_1}{S_0}$, make $S_1$ the subject of the formula.

178. Given $n = \frac{R}{R + r}$, make $R$ the subject of the formula.

179. Given $F = \frac{1}{4\pi \varepsilon_0} \frac{Q_1 Q_2}{r^2}$, make $r$ the subject of the formula.

180. Given $d = n\left(1 - \frac{1}{n}\right)$, make $n$ the subject of the formula.

181. Given $\frac{1}{f} = (n - 1)\left(\frac{1}{n} + \frac{1}{r_2}\right)$, make $r_2$, the subject of the formula.

182. Make $m$ the subject of the formula.

\[ k = \sqrt{\frac{3 + 5m^2}{r}}. \]

183. Make $m$ the subject of the formula.

\[ p = \sqrt{\frac{5 - 3m^2}{n}}. \]

184. Make $p$ the subject of the formula.

\[ k = \sqrt{\frac{1 - 2p^2}{5p}}. \]

185. If $\frac{1}{R} = \frac{1}{V} - \frac{3}{T}$, express $V$ in terms of $R$ and $T$.

186. If $\frac{1}{R} = \frac{2}{V} - \frac{3}{T}$, express $T$ in terms of $R$ and $V$.

187. Given the formula $6\sigma \pi a = \frac{4}{3} \pi a^3 (p - q)g$.

Make $v$ the subject of the formula.

188. Write a formula for the statement, a number $m$ is equal to half the sum of two numbers $p$ and $q$. 
189. Write a formula for the statement, a number $p$ is equal to three-quarters the difference of two numbers $q$ and $r$, given that $q$ is greater than $r$.

190. (a) A bag of coins contains $p$ ten-cents coins and $q$ twenty-cents coins. The total value of the coins is $SR$. Determine a formula for $R$ in terms of $p$ and $q$.
(b) If $p = 5$ and $q = 10$, find $R$.

191. A rectangle is $3\ell$ metres long and $\ell$ metres wide. Write down a formula for:
(a) $P$, where $P$ metres is the perimeter of the rectangle.
(b) $A$, where $A$ metres squared is the area of the rectangle.

192. A rectangle is $5\ell$ metres long and $2\ell$ metres wide. Write down a formula for:
(a) $P$, where $P$ metres is the perimeter of the rectangle.
(b) $A$, where $A$ metres squared is the area of the rectangle.

193. A rectangle is $3y$ cm long and $2x$ cm wide.
(a) Write down a formula for the perimeter of the rectangle.
(b) Find the perimeter of the rectangle when $x = 4$ cm and $y = 5$ cm.

194. A rectangular box is $3\ell$ cm long, $h$ cm wide and $h$ cm high.
(a) Write down a formula for $V$, the volume of the box in cm$^3$.
(b) Determine the volume of a box measuring 30 cm by 14 cm by 5 cm.

195. A rectangle box is $\ell$ m long, $b$ m wide and $h$ m high.
(a) Write down a formula for $V$, the volume of the box in m$^3$.
(b) Calculate the volume of a box measuring 25 m by 16 m by 4 m.

196. If $I = \frac{PRT}{100}$, evaluate $I$ when $P = 200$, $R = 8$ and $T = 3$.

197. If $I = \frac{PRT}{100}$, evaluate $I$ when $P = 300$, $R = 7$ and $T = 5$.

198. If $P = 2(\ell + b)$, evaluate $P$ when $\ell = 8$ and $b = 3$.

199. If $P = 2(\ell + b)$, evaluate $P$ when $\ell = 9$ and $b = 4$.

200. Given $P = \frac{nRT}{V}$, evaluate $P$ when $n = 3$, $R = 15$, $T = 18$ and $V = 9$.

201. Given that $v = \frac{u - t}{5}$, evaluate $v$ when $u = 15$ and $t = 5$.

202. If $K = \frac{WV^2}{2g}$, evaluate $K$ when $W = 48$, $V = 15$ and $g = 32$.

203. If $S = \pi d n$, evaluate $d$ when $S = 55$, $\pi = \frac{22}{7}$ and $n = 0.7$.

204. If $K = \frac{WV^2}{2g}$, evaluate $W$ when $V = 10$, $g = 32$ and $K = 150$.

205. If $v = u + at$, evaluate $u$ when $v = 103$, $a = 5$ and $t = 9.5$.

206. If $v = u + at$, evaluate $a$ when $u = 3$, $v = 9$ and $t = 4$.

207. Evaluate $a$ from the formula $P = Wa + b$ when $P = 40$, $W = 4$ and $b = 15$.

208. If $v^2 = u^2 + 2as$, evaluate $a$ when $v = 5$, $u = 2$ and $s = 7$.

209. If $P = 100r - t$, determine the value of $t$ when $P = 50$ and $r = 0.25$.

210. (a) Make $R$ the subject of the formula $\frac{c}{100} + R$.
(b) Evaluate $R$ when $P = 30$ and $c = 450$.

211. (a) Make $t$ the subject of the formula $Z = \frac{v}{2} - 4t$.
(b) Evaluate $t$ when $x = 8$ and $z = 3$.

212. Evaluate $r$ from the formula:
$A = \pi r \ell$ when $\pi = \frac{22}{7}$, $A = 440$ and $\ell = 10$.

213. If $K = \frac{WV^2}{2g}$, evaluate $K$ when $W = 128$, $V = 20$ and $g = 32$.

214. (a) Make $a$ the subject of the formula $x = ut + \frac{1}{2}at^2$.
(b) Given that $u = 3$, $x = 8$ and $t = 2$, solve for $a$.

215. (a) Make $a$ the subject of the formula $v^2 = u^2 + 2ax$.
(b) Given that $u = 0$, $v = 10$ and $x = 25$, solve for $a$. 
216. If \( V = \pi r^2 h \), evaluate \( h \) when \( V = 308 \), \( \pi = \frac{22}{7} \) and \( r = 7 \).

217. Given that \( x = ut + \frac{1}{2}at^2 \), evaluate \( x \) when 
\[ u = 3, \ t = 5 \text{ and } a = 4. \]

218. Given that \( v^2 = u^2 + 2ax \), make \( a \) the subject of the formula. Hence evaluate \( a \) when 
\[ u = 2, \ v = 4 \text{ and } x = 9. \]

219. Given that \( V = 2\ell b + 2\ell h + 2bh \), evaluate \( V \) when 
\[ \ell = 9, \ b = 5 \text{ and } h = 3. \]

220. Given that \( v^2 = u^2 + 2ax \), make \( x \) the subject of the formula. Hence, evaluate \( x \) when 
\[ u = 2, \ v = 5 \text{ and } a = 7. \]

221. Given that \( v^2 = u^2 + 2ax \), evaluate \( v \) when 
\[ u = 5, \ a = 3 \text{ and } x = 4. \]

222. Given that \( V = \pi r^2 h \), make \( h \) the subject of the formula. Hence, evaluate \( h \) when 
\[ \pi = \frac{22}{7}, \ r = 7 \text{ and } V = 616. \]

223. Given the formula \( v = u + at \), calculate the value of \( v \), when \( u = 7, \ a = -3 \) and \( t = 2 \).

224. (a) Make \( r \) the subject of the formula \( V = \pi r^2 h \).

(b) Given that \( V = 225, \ \pi = \frac{22}{7} \text{ and } h = 14 \), solve for \( r \).

225. (a) Make \( r \) the subject of the formula \( V = \frac{1}{3} \pi r^2 h \).

(b) Calculate the value of \( r \) when \( V = 44, \ h = 7 \text{ and } \pi = \frac{22}{7} \).

226. (a) Make \( \ell \) the subject of the formula \( t = 2\pi \sqrt[3]{\frac{\ell}{g}} \).

(b) Calculate \( \ell \) when \( \pi = \frac{22}{7}, g = 10 \text{ and } t = 14 \).

227. Transpose \( T = 2\pi \sqrt[3]{\frac{\ell}{g}} \) for \( g \). Evaluate \( g \) when \( \ell = 40 \) and \( T = 12.6 \).

228. Transpose \( T = 2\pi \sqrt[3]{\frac{\ell}{g}} \) for \( \ell \). Evaluate \( \ell \) when \( g = 10, \ T = 22 \text{ and } \pi = \frac{22}{7} \).

229. (a) Given that \( t = 2\pi \sqrt[3]{\frac{\ell}{g}} \), make \( \ell \) the subject of the formula.

(b) Calculate \( t \) when \( \pi = \frac{22}{7}, \ \ell = 980 \text{ and } g = 9.8 \).

(c) Calculate \( \ell \) when \( \pi = \frac{22}{7}, \ t = 11 \text{ and } g = 10 \).