

- 1 a** $v = u + at$
 $= 15 + 2 \times 5$
 $= 25$
- b** $I = \frac{PrT}{100}$
 $= \frac{600 \times 5.5 \times 10}{100}$
 $= 330$
- c** $V = \pi r^2 h$
 $= \pi \times 4.25^2 \times 6$
 ≈ 340.47
- d** $S = 2\pi r(r + h)$
 $= 2\pi \times 10.2 \times (10.2 + 15.6)$
 ≈ 1653.48
- e** $V = \frac{4}{3}\pi r^2 h$
 $= \frac{4\pi \times 3.58^2 \times 11.4}{3}$
 ≈ 612.01
- f** $s = ut + \frac{1}{2}at^2$
 $= 25.6 \times 3.3 + \frac{1}{2} \times -1.2 \times 3.3^2$
 ≈ 77.95
- g** $T = 2\pi\sqrt{\frac{l}{g}}$
 $= 2\pi \times \sqrt{\frac{1.45}{9.8}}$
 $= 2\pi \times 0.3846\dots$
 ≈ 2.42
- h** $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$
 $= \frac{1}{3} + \frac{1}{7} = \frac{10}{21}$
 $f = \frac{21}{10}$
 $= 2.1$
- i** $c^2 = a^2 + b^2$
 $= 8.8^2 + 3.4^2$
 $= 89$
 $c = \sqrt{89}$
 ≈ 9.43
- j** $v^2 = u^2 + 2as$
 $= 4.8^2 + 2 \times 2.25 \times 13.6$
 $= 91.04$
 $v = \sqrt{91.04}$
 ≈ 9.54

2 a $v = u + at$

$$v - u = at$$

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

b $S = \frac{n}{2}(a + l)$

$$2S = n(a + l)$$

$$a + l = \frac{2S}{n}$$

$$\therefore l = \frac{2S}{n} - a$$

c $A = \frac{1}{2}bh$

$$2A = bh$$

$$\therefore b = \frac{2A}{h}$$

d $P = I^2R$

$$\frac{P}{R} = I^2$$

$$\therefore I = \pm\sqrt{\frac{P}{R}}$$

e $s = ut + \frac{1}{2}at^2$

$$s - ut = \frac{1}{2}at^2$$

$$2(s - ut) = at^2$$

$$\therefore a = \frac{2(s - ut)}{t^2}$$

f $E = \frac{1}{2}mv^2$

$$2E = mv^2$$

$$v^2 = \frac{2E}{m}$$

$$\therefore v = \pm\sqrt{\frac{2E}{m}}$$

g $Q = \sqrt{2gh}$

$$Q^2 = 2gh$$

$$\therefore h = \frac{Q^2}{2g}$$

h $-xy - z = xy + z$

$$-xy - xy = z + z$$

$$-2xy = 2z$$

$$\therefore x = \frac{2z}{-2y} \\ = -\frac{z}{y}$$

$$\begin{aligned}
 \text{i} \quad & \frac{ax + by}{c} = x - b \\
 & ax + by = c(x - b) \\
 & ax + by = cx - bc \\
 & ax - cx = -bc - by \\
 & x(a - c) = -b(c + y) \\
 \therefore & x = \frac{-b(c + y)}{a - c} \\
 & = \frac{b(c + y)}{c - a}
 \end{aligned}$$

$$\begin{aligned}
 \text{j} \quad & \frac{mx + b}{x - b} = c \\
 & mx + b = c(x - b) \\
 & mx + b = cx - bc \\
 & mx - cx = -bc - b \\
 & x(m - c) = -b(c + 1) \\
 \therefore & x = \frac{-b(c + 1)}{m - c}
 \end{aligned}$$

$$\begin{aligned}
 \text{3 a} \quad F &= \frac{9C}{5} + 32 \\
 &= \frac{9 \times 28}{5} + 32 \\
 &= 82.4^\circ
 \end{aligned}$$

$$\begin{aligned}
 \text{b} \quad F &= \frac{9C}{5} + 32 \\
 F - 32 &= \frac{9C}{5} \\
 9C &= 5(F - 32) \\
 \therefore C &= \frac{5(F - 32)}{9}
 \end{aligned}$$

Substitute $F = 135$.

$$\begin{aligned}
 C &= \frac{5(135 - 32)}{9} \\
 &= \frac{515}{9} \\
 &\approx 57.22^\circ
 \end{aligned}$$

$$\begin{aligned}
 \text{4 a} \quad S &= 180(n - 2) \\
 &= 180(8 - 2) \\
 &= 1080^\circ
 \end{aligned}$$

$$\begin{aligned}
 \text{b} \quad S &= 180(n - 2) \\
 \frac{S}{180} &= n - 2 \\
 \therefore n &= \frac{S}{180} + 2 \\
 &= \frac{1260}{180} + 2 \\
 &= 7 + 2 = 9
 \end{aligned}$$

Polygon has 9 sides (a nonagon).

$$\begin{aligned}
 \text{5 a } V &= \frac{1}{3}\pi r^2 h \\
 &= \frac{1}{3} \times \pi \times 3.5^2 \times 9 \\
 &\approx 115.45 \text{ cm}^3
 \end{aligned}$$

$$\begin{aligned}
 \text{b } V &= \frac{1}{3}\pi^2 h \\
 3V &= \pi r^2 h \\
 \therefore h &= \frac{3V}{\pi r^2} \\
 &= \frac{3 \times 210}{\pi 4^2} \\
 &\approx 12.53 \text{ cm}
 \end{aligned}$$

$$\begin{aligned}
 \text{c } V &= \frac{1}{3}\pi r^2 h \\
 3V &= \pi r^2 h \\
 r^2 &= \frac{3V}{\pi h} \\
 \therefore r &= \sqrt{\frac{3V}{\pi h}} \\
 &= \sqrt{\frac{3 \times 262}{\pi \times 10}} \\
 &\approx 5.00 \text{ cm}
 \end{aligned}$$

$$\begin{aligned}
 \text{6 1 } S &= \frac{n}{2}(a + l) \\
 &= \frac{7}{2}(-3 + 22) \\
 &= 66.5
 \end{aligned}$$

$$\begin{aligned}
 \text{2 } S &= \frac{n}{2}(a + l) \\
 2S &= n(a + l) \\
 \frac{2S}{n} &= a + l \\
 \therefore a &= \frac{2S}{n} - l \\
 &= \frac{2 \times 1040}{13} - 156 \\
 &= 4
 \end{aligned}$$

$$\begin{aligned}
 \text{3 } S &= \frac{n}{2}(a + l) \\
 2S &= n(a + l) \\
 \therefore n &= \frac{2S}{a + l} \\
 &= \frac{2 \times 110}{25 + -5} \\
 &= 11
 \end{aligned}$$

There are 11 terms.