TRANSPOSITION OF FORMULAE
YEARS 9 AND 10

1 **If $a = bx + c$, then:**

   A $x = \dfrac{a+c}{b}$

   B $x = \dfrac{a}{b} - c$

   C $x = \dfrac{a-c}{b}$

   D $x = \dfrac{a}{b+c}$

2 **If $M = \dfrac{N-V}{P}$, then:**

   A $P = \dfrac{N-V}{M}$

   B $N = MP - V$

   C $V = \dfrac{N}{P} - M$

   D $V = \dfrac{N-M}{P}$

3 **If $\dfrac{1}{f} = \dfrac{1}{u} + \dfrac{1}{v}$, then**

   A $f = u + v$

   B $f = \dfrac{u+v}{uv}$

   C $f = \dfrac{uv}{u+v}$

   D $f = uv$

4 **If $m = \sqrt{n+p}$, then:**

   A $n = (m-p)^2$

   B $n = m^2 - p$

   C $n = m - p$

   D $n = \sqrt{m^2 - p}$

5 **If $a = b\sqrt{c}$, then:**

   A $c = a^2 - b^2$

   B $c = \dfrac{a^2}{b^2}$

   C $c = \dfrac{b}{a}$

   D $c = \sqrt{\dfrac{a}{b}}$

6 **If $ab - c = a + b$, then:**

   A $a = c + 1$

   B $a = \dfrac{b-1}{b+c}$

   C $a = \dfrac{b-c}{b+1}$

   D $a = \dfrac{b+c}{b-1}$

7 If $x = \dfrac{p - w}{m - w}$, then w is equal to:

A $\quad \dfrac{mx - p}{1 - x}$

B $\quad \dfrac{mx - p}{x - 1}$

C $\quad \dfrac{p - x}{m - x}$

D $\quad -\dfrac{mx}{p}$

8 If $a = \sqrt{\dfrac{b + c}{d}}$, then c is equal to:

A $\quad a^2 d - b$

B $\quad \left(\sqrt{a}\ d - b\right)^2$

C $\quad a^2 - bd$

D $\quad \dfrac{a^2 d}{b}$

9 If $a = \dfrac{bc^2}{3} + \dfrac{bd}{12}$, then b is equal to:

A $\quad \dfrac{12a - 4c^2}{d}$

B $\quad \dfrac{36a}{c^2 + d}$

C $\quad \dfrac{a - 12}{4c^2 + d}$

D $\quad \dfrac{12a}{4c^2 + d}$

10 The value of d, given $b = -4$, $c = 12$, $a = 4$ and $d = \dfrac{1}{4}\sqrt{a(c - b)}$, is:

A $\quad \sqrt{8}$

B $\quad 4$

C $\quad 2$

D $\quad \dfrac{\sqrt{8}}{2}$

11 Celsius temperature C and Fahrenheit temperature F are related by the formula $C = \dfrac{5}{9}(F - 32)$. If water boils at 100 degrees Celsius, its equivalent Fahrenheit temperature is:

A $\quad 100\ ^\circ F$

B $\quad 148\ ^\circ F$

C $\quad 212\ ^\circ F$

D $\quad 132\dfrac{5}{9}\ ^\circ F$

12 If $ab = c^2$, then c is equal to:

A $\quad \sqrt{ab}$

B $\quad \pm\sqrt{ab}$

C $\quad \dfrac{ab}{2}$

D $\quad a^2 b^2$

13 If $\dfrac{1}{a} = \dfrac{1}{b} + \dfrac{1}{c}$ then:

A $b = a - c$
                            B $b = \dfrac{ac}{a - c}$

C $b = \dfrac{ac}{c - a}$
                          D $b = \dfrac{ac}{a + c}$

14 The distance d (km) which a girl can see when she is at a height h (m) above the ground is given by the formula $d = 8\sqrt{\dfrac{h}{5}}$. If a girl is 125 m above the ground, she can see a distance of:

A   17.9 km
                            B   20 km
C   40 km
                            D   400 km

15 Now density d is related to mass m and volume v by the formula $d = \dfrac{m}{v}$. If a particular plastic object is to have a volume of 12 cm^3, and the plastic has density 1.5 g per cm^3, its mass must be:

A   18 g
                            B   8 g
C   0.125 g
                            D   13.5 g

16 If $ab = c + d$, and $b = 2 \times 10^{-3}$, $c = 4 \times 10^5$ and $d = 6 \times 10^5$, then a is equal to:

A 5×10^8
                            B 5×10^7
C 2×10^3
                            D 5×10^2

17 If $a = \sqrt{3}$, $b = 1 + \sqrt{3}$ and $c = (a - b)^2$, then c is equal to:

A   4
                            B   3
C   -1
                            D   1

18 The electrical resistance of a certain metal wire R (ohms) is given by $R = \dfrac{l}{10d^2}$ where l (mm) is the length of the wire and d (mm) is its diameter. An electronics engineer needs to cut a sufficient length to have a resistance of 100 ohms. If the diameter of the wire is 0.5 mm, the length of wire needed is:

A   0.025 mm
                            B   250 mm
C   400 mm
                            D   2500 mm

19 The volume of a cone V (cm^3) is given by $V = \frac{1}{3}\pi r^2 h$ where $\pi \approx 3$, r (cm) is the radius of the cone and h (cm) is its perpendicular height. The volume of a cone of radius 2 cm and height 10 cm approximately equals:

A $13\frac{1}{3} cm^3$

B $40 cm^3$

C $120 cm^3$

D $1600 cm^3$

20 If you are travelling at a steady pace, your speed S (km/hr) is related to the distance you travel d (km/hr) and the time taken t (hours) by:

$$S = \frac{d}{t}$$

The amount of time taken to fly over a distance of 1000 km if your aircraft is going at 400 km /h is:

A 0.4 hours

B $2\frac{1}{2}$ hours

C 4 hours

D 400,000 hours

21 A graph has the rule $y = 4x^3 - 6x^2 + 2x + 3$. If the x co-ordinate of a certain point is $-\frac{1}{2}$, its y co-ordinate will be:

A 0

B 1

C 3

D 5

22 The distance d (km) you can see from a height h (m) is given by $d = 8\sqrt{\frac{h}{5}}$. To see a distance of 16 km, the height you need to be at is:

A 10 m

B 20 m

C 100 m

D 320 m

23 For a vehicle accelerating along a straight road at a steady rate a (metres/sec^2), its final speed V (m/s) is related to its initial speed u (m/s) and the time over which it accelerates t (seconds) by $v = u + at$. If a motorcyclist accelerates at 10 m/s^2, how many seconds will she take to speed up from 20 m/s to 50 m/s?

A 3

B 7

C 30

D 40

24 The final volume of a gas V (cm³) enclosed in a balloon which is being exposed to heat is given by $V = u(kt + 1)$ where u (cm³) is its volume at 0°C, k is a constant number which is related to the lowest possible temperature on Earth, and t is its temperature (°C). If a balloon is filled at 0°C with 100 cm³ neon gas, it expands to 118 cm³ at 50°C. The value of k must be:

A   -0.0031   B   0.0036
C   0.0136   D   0.0234

25 The amount you will have in the bank if you invest $P for t years at an interest rate R% per annum, if interest is calculated once a year, is given by

$$A = P\left(1 + \frac{R}{100}\right)^t$$

The amount you will have if you invest $10 000 at 11% per annum for 5 years is:

A $16 850.58   B $50 055
C $55 500   D $60 000

ANSWERS TO WORKSHEET ON TRANSPOSITION OF FORMULAE

1	C	2	A	3	C	4	B	5	B	6	D
7	B	8	A	9	D	10	C	11	C	12	B
13	C	14	C	15	A	16	A	17	D	18	B
19	B	20	B	21	A	22	A	23	A	24	B
25	A										