

Math Review -- KEY

Algebra:

1) $K = C + 273.15$ (solve for **C**)

(subtract **273.15** from both sides) $K - 273.15 = C + 273.15 - 273.15 \rightarrow K - 273.15 = C$

2) $P \times V = n \times R \times T$ (solve for **R**)

(divide both sides by **T**) $\frac{P \times V}{T} = \frac{n \times R \times \cancel{T}}{\cancel{T}} \rightarrow \frac{P \times V}{T} = n \times R$

(divide both sides by **n**) $\frac{P \times V}{T \times n} = \frac{\cancel{n} \times R}{\cancel{n}} \rightarrow \frac{P \times V}{T \times n} = R$

3) $P \times V = n \times R \times T$ (solve for **V**)

(divide both sides by **P**) $\frac{\cancel{P} \times V}{\cancel{P}} = \frac{n \times R \times T}{P} \rightarrow V = \frac{n \times R \times T}{P}$

4) $\frac{67w - y + 3}{6} = 2z$ (solve for **w**)

(multiply both sides by **6**) $\cancel{6} \times \frac{67w - y + 3}{\cancel{6}} = 2z \times 6 \rightarrow 67w - y + 3 = 12z$

(subtract **3** from both sides) $67w - y + 3 - 3 = 12z - 3 \rightarrow 67w - y = 12z - 3$

(add **y** to both sides) $67w - y + y = 12z - 3 + y \rightarrow 67w = 12z - 3 + y$

(divide both sides by **67**) $\frac{\cancel{67}w}{\cancel{67}} = \frac{12z - 3 + y}{67} \rightarrow w = \frac{12z - 3 + y}{67}$

5) $C = \frac{(F - 32)}{1.8}$ (solve for **F**)

(multiply both sides by **1.8**) $1.8 \times C = \frac{(F - 32)}{1.8} \times \cancel{1.8} \rightarrow 1.8 \times C = F - 32$

(add **32** to both sides) $32 + 1.8 \times C = F - 32 + 32 \rightarrow 32 + 1.8 \times C = F$

$$6) \frac{R \times S}{T} = \frac{Y \times Z}{W} \text{ (solve for } Y \text{)}$$

(multiply both sides by W)
$$\frac{W \times R \times S}{T} = \frac{Y \times Z \times \cancel{W}}{\cancel{W}} \rightarrow \frac{W \times R \times S}{T} = Y \times Z$$

(divide both sides by Z)
$$\frac{W \times R \times S}{T \times Z} = \frac{Y \times \cancel{Z}}{\cancel{Z}} \rightarrow \frac{W \times R \times S}{T \times Z} = Y$$

$$7) \frac{R \times S}{T} = \frac{Y \times Z}{W} \text{ (solve for } T \text{)}$$

(multiply both sides by T)
$$\cancel{T} \times R \times S = \frac{Y \times Z \times T}{W} \rightarrow R \times S = \frac{Y \times Z \times T}{W}$$

(multiply both sides by W)
$$W \times R \times S = \frac{Y \times Z \times T \times \cancel{W}}{\cancel{W}} \rightarrow W \times R \times S = Y \times Z \times T$$

(divide both sides by Z)
$$\frac{W \times R \times S}{Z} = \frac{Y \times \cancel{Z} \times T}{\cancel{Z}} \rightarrow \frac{W \times R \times S}{Z} = Y \times T$$

(divide both sides by Y)
$$\frac{W \times R \times S}{Z \times Y} = \frac{\cancel{Y} \times T}{\cancel{Y}} \rightarrow \frac{W \times R \times S}{Z \times Y} = T$$

$$8) 50.0 \times 4.18 \times (T - 23) = -62.7 \times 0.312 \times (T - 142)$$

$$50.0 \times 4.18 \times (T - 23) = -62.7 \times 0.312 \times (T - 142) \rightarrow 209 \times (T - 23) = -19.5624 \times (T - 142)$$

(divide by 209)
$$\frac{\cancel{209} \times (T - 23)}{\cancel{209}} = \frac{-19.5624 \times (T - 142)}{209} \rightarrow T - 23 = -0.0936 \times (T - 142)$$

(distribute -0.0936)
$$T - 23 = -0.0936 \times T - 0.0936 \times -142 \rightarrow T - 23 = -0.0936T + 13.2912$$

(add 23 to both sides)
$$T - 23 + 23 = -0.0936T + 13.2912 + 23 \rightarrow T = -0.0936T + 36.2912$$

(add $0.0936T$ to both sides)
$$0.0936T + T = -0.0936T + 36.2912 + 0.0936T \rightarrow 1.0936T = 36.2912$$

(divide by 1.0936)
$$\frac{\cancel{1.0936}T}{\cancel{1.0936}} = \frac{36.2912}{1.0936} \rightarrow T = 33.19$$

$$9) \frac{n}{781.2} \times 100 = 23.71$$

(multiply both sides by **781.2**) $\frac{\cancel{781.2} \times n}{\cancel{781.2}} \times 100 = 23.71 \times 781.2 \rightarrow n \times 100 = 18522.252$

(divide both sides by **100**) $\frac{n \times \cancel{100}}{\cancel{100}} = \frac{18522.252}{100} \rightarrow n = 185.2$

$$10) \frac{0.113}{d} \times 100 = 76.2$$

(multiply both sides by **d**) $\frac{\cancel{d} \times 0.113}{\cancel{d}} \times 100 = 76.2 \times d \rightarrow 0.113 \times 100 = 76.2 \times d$

(divide both sides by **76.2**) $\frac{0.113 \times 100}{76.2} = \frac{\cancel{76.2} \times d}{\cancel{76.2}} \rightarrow 0.148 = d$

$$11) \frac{11.16}{16.11} \times 100 = p \rightarrow 69.27 = p$$

$$12) \frac{25.0}{25.0 + s} \times 100 = 28.1$$

(multiply both sides by **25.0 + d**)

$$\frac{(\cancel{25.0 + s}) \times 25.0}{\cancel{25.0 + s}} \times 100 = 28.1 \times (25.0 + s) \rightarrow 25.0 \times 100 = 28.1 \times (25.0 + s)$$

(divide both sides by **28.1**) $\frac{25.0 \times 100}{28.1} = \frac{\cancel{28.1} \times (25.0 + s)}{\cancel{28.1}} \rightarrow \frac{25.0 \times 100}{28.1} = 25.0 + s$

(subtract **25.0** from both sides) $88.968 - 25.0 = 25.0 + s - 25.0 \rightarrow 64.0 = s$

Simplify the following:

$$1) x^2 \cdot x^4 \rightarrow x^{2+4} \rightarrow x^6$$

$$2) \frac{k^8}{k^3} \rightarrow k^{8-3} \rightarrow k^5$$

$$3) a^{11} \cdot a^{-7} \rightarrow a^{11+(-7)} \rightarrow a^4$$

$$4) \frac{w^{-4}}{w^{-7}} \rightarrow w^{-4-(-7)} \rightarrow w^3$$

$$5) r^3 \cdot \frac{t^5}{r} \rightarrow r^3 \cdot r^{-1} \cdot t^5 \rightarrow r^{3-1} \cdot t^5 \rightarrow r^2 \cdot t^5$$

$$6) (4m)^3 \rightarrow 4^3 m^3 \rightarrow 64m^3$$

$$7) \left(\frac{1n}{2.14m} \right)^2 \rightarrow \frac{1^2 n^2}{2.14^2 m^2} \rightarrow \frac{n^2}{4.58m^2}$$

$$8) a^2 \times \frac{p^{-2}}{f^2} \times \frac{d}{a^2} \times \frac{f^3}{p^{-2}} \times \frac{1}{d} \times \frac{w}{u^{-1}} \times \frac{n^2}{w} \rightarrow a^2 \times \frac{p^{-2}}{f^2} \times \frac{d}{a^2} \times \frac{f^3}{p^{-2}} \times \frac{1}{d} \times \frac{w}{u^{-1}} \times \frac{n^2}{w} \rightarrow$$

$$\cancel{a^2} \times \frac{\cancel{p^{-2}}}{f^2} \times \frac{\cancel{d}}{\cancel{a^2}} \times \frac{f^3}{\cancel{p^{-2}}} \times \frac{1}{\cancel{d}} \times \frac{1}{u^{-1}} \times \frac{\cancel{w}}{\cancel{w}} \times \frac{n^2}{\cancel{w}} \rightarrow \frac{f^{3-2} n^2}{u^{-1}} \rightarrow f \cdot u \cdot n^2$$