ILLAWARRA TUTORING

In this worksheet you will develop your ability to manipulate and solve equations derived from various formulas. Work through each question carefully and show all of your working.

Easy Questions

1. Instruction: Given the formula $A = l\,w$, solve for w when $A = 48$ and $l = 8$.
2. Instruction: The area of a triangle is given by $A = \frac{1}{2}\,b\,h$. Solve for h when $A = 20$ and $b = 5$.
3. Instruction: The formula for the volume of a rectangular prism is $V = l\,w\,h$. Solve for h when $V = 120$, $l = 4$, and $w = 5$.
4. Instruction: Given the formula for speed $s = \frac{d}{t}$, rearrange to solve for t when $d = 100$ and $s = 20$.
5. Instruction: The formula for force is $F = m\,a$. Solve for m when $F = 50$ and $a = 10$.

Intermediate Questions

6. Instruction: A rectangle has a perimeter given by $P = 2(l + w)$, where $l = x + 2$ and $w = 3x - 1$.
   (a) Express P in terms of x.
   (b) Then, solve for x when $P = 40$.
7. Instruction: The area of a rectangle is given by $A = l\,w$. If $l = 2x$ and $w = 5$, express x in terms of A and then find x when $A = 50$.
8. Instruction: The volume of a cylinder is given by $V = \pi\,r^2\,h$. Solve for h in terms of V and r, and then find h when $V = 150$ and $r = 5$.
9. Instruction: Density is defined as $d = \frac{m}{v}$. Solve for v in terms of m and d. Then calculate v if $m = 80$ and $d = 4$.
10. Instruction: Given the formula $T = m + 3n$, solve for m in terms of T and n. Then, find m when $T = 20$ and $n = 4$.

11. Instruction: The formula $F = m\,a$ can be rearranged to express a in terms of F and m. Write the expression and then calculate a when $F = 36$ and $m = 9$.

12. Instruction: The simple interest formula is $I = P\,r\,t$. Solve for r in terms of I, P, and t. Then, if $I = 30$, $P = 150$, and $t = 2$, determine r.

13. Instruction: Given $s = \dfrac{d}{t}$, rearrange to solve for t in terms of d and s. Then find t for $d = 75$ and $s = 15$.

14. Instruction: The area of a triangle is $A = \dfrac{1}{2}\,b\,h$. Express b in terms of A and h. Then, if $A = 18$ and $h = 6$, find b.

15. Instruction: The cost C of n items is given by $C = n\,p$. Solve for n in terms of C and p. Then, if $C = 60$ and $p = 5$, determine n.

16. Instruction: The formula for the average of two numbers is $D = \dfrac{v+u}{2}$. Solve for u in terms of D and v. Then find u if $D = 8$ and $v = 10$.

17. Instruction: Given $P = 2a+3b$ and the relation $b = 2a-4$, substitute the expression for b into the first equation and solve for a when $P = 20$.

18. Instruction: For the formula $M = \dfrac{x+y}{2}$, solve for y in terms of M and x. Then calculate y if $M = 7$ and $x = 5$.

19. Instruction: The formula $Q = 3(a-2)+5b$ is given. Solve for a in terms of Q and b when $Q = 23$ and $b = 2$.

20. Instruction: Given $R = 2(x+4)-3y$, rearrange to solve for x in terms of R and y. Then determine x when $R = 10$ and $y = 2$.

Hard Questions

21. Instruction: Solve for x in the equation $\dfrac{3x+2}{2x-1} = 2$.

22. Instruction: Solve for x given that $\dfrac{x+2}{3} = \dfrac{2x-1}{5}$.

23. Instruction: Solve for x in the equation $\dfrac{2x-3}{4} + \dfrac{x+1}{2} = 3$.

24. Instruction: The wave speed is given by $f = \dfrac{v}{\lambda}$. Solve for λ in terms of v and f, and then find λ when $v = 340$ and $f = 170$.

25. Instruction: The total cost of a service is given by $C = 2\pi r + 2l$. Solve for l when C and r are known. Then compute l if $C = 50$ and $r = 3$.

26. Instruction: Given $P = 2a+3b$ and $b = 2a-4$, substitute the expression for b into the equation for P and solve for a when $P = 20$.

27. Instruction: Given the formula $A = \dfrac{2x}{3y+4}$, rearrange to solve for y in terms of A and x.

28. Instruction: Solve for z in the equation $B = \dfrac{5-2z}{4}$. Then, compute z when $B = 1$.

29. Instruction: The formula $M = \dfrac{2p+3}{p-1}$ is given. Solve for p when $M = 5$.

30. Instruction: The final price F after a discount d (in percent) on the marked price M is given by $F = M\left(1 - \dfrac{d}{100}\right)$. Solve for M in terms of F and d, and then find M when $F = 80$ and $d = 20$.