Forming measurement expressions — Solutions

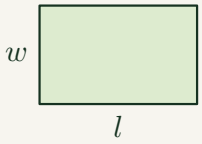
Write and simplify an algebraic expression for each measurement context.

Name _____ **Date** _____

How to answer

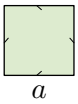
Choose the correct measurement rule (perimeter, area, volume, or a conversion), write the expression using the given letters, and simplify with brackets where useful. Keep units consistent.

Worked example Write a simplified expression for the perimeter of a rectangle with length l and width w.



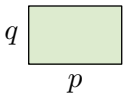
Add all four sides: $P = l + w + l + w$.
Group like terms: $P = 2l + 2w$.
Factorise: $P = 2(l + w)$.

1. Write an expression for the perimeter of a square with side a.



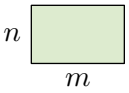
Solution
$P = 4a$

2. Write an expression for the area of a rectangle with length p and width q.



Solution
$A = pq$

3. Write a simplified expression for the perimeter of a rectangle with length m and width n.



Solution
$P = 2(m + n)$

4. Write an expression for the total length of k ribbons, each 12 cm long.

Solution
$L = 12k$ cm

5. Write an expression for the total mass of c boxes, each weighing 5 kg.

Solution
$M = 5c$ kg

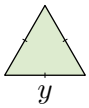
6. Write an expression for the total capacity of d bottles, each holding 3 L.

Solution
$V = 3d$ L

7. Write an expression for the cost of hiring a bike for h hours at $8 per hour.

Solution
$C = 8h$ dollars

8. Write an expression for the perimeter of an equilateral triangle with side y.

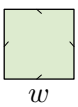


Solution
$P = 3y$

9. Write an expression for the distance travelled in t hours at 80 km/h.

Solution
$D = 80t$ km

10. Write an expression for the area of a square with side w.



Solution
$A = w^2$

11. Write an expression for the volume of a cube with edge e.

Solution
$V = e^3$

12. Two bags weigh 9 kg and g kg. Write an expression for their total mass.

Solution
$M = (9 + g)$ kg

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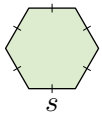
13. Write an expression for the perimeter of a regular hexagon with side s.



Solution

$P = 6s$

14. r pieces of pipe, each 15 cm, are joined end to end with a 20 cm offcut. Write an expression for the total length.

Solution

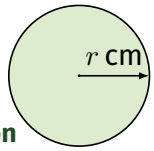
$L = (15r + 20)$ cm

15. Write an expression for the volume of a cuboid with sides l, w, and h.

Solution

$V = lwh$

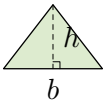
16. Write an expression for the circumference of a circle with radius r.



Solution

$C = 2\pi r$

17. Write an expression for the area of a triangle with base b and height h.



Solution

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

18. Write an expression for the distance travelled at speed v km/h for $2t$ hours.

Solution

$D = 2vt$ km

19. A tank holds x L and gains 12 L. Write an expression for the final volume.

Solution

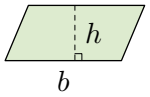
$(x + 12)$ L

20. A plank of length p m is cut into 3 equal pieces. Write an expression for the length of each piece.

Solution

$\frac{p}{3}$ m

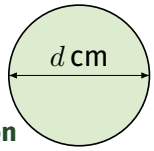
21. Write an expression for the area of a parallelogram with base b and height h. Then evaluate it when $b = 5$ and $h = 3$.



Solution

$A = bh = 15$

22. Write an expression for the circumference of a circle with diameter d. Then evaluate it to 1 d.p. when $d = 10$ (use $\pi \approx 3.14$).



Solution

$C = \pi d \approx 31.4$

23. Explain the difference between the expression $2\pi r$ and the formula $C = 2\pi r$.

Solution

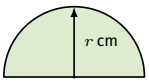
$2\pi r$ is a value with no equals sign; $C = 2\pi r$ states a relationship.

24. q packets each have a mass of 250 g. Write an expression for their total mass in kilograms.

Solution

$M = 0.25q$ kg

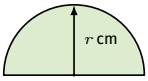
25. Write an expression for the area of a semicircle with radius r.



Solution

$A = \frac{1}{2}\pi r^2$

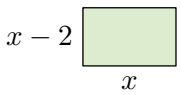
26. Write an expression for the perimeter of a semicircle with radius r (curved edge plus the straight diameter).



Solution

$P = \pi r + 2r$

27. A rectangle has length x and width $(x - 2)$. Write simplified, expanded expressions for its perimeter and its area.



Solution

$P = 4x - 4$; $A = x^2 - 2x$