

4-7 Transforming Formulas

Objective: To transform a formula.

Example 1 Solve the formula $F = ma$ for m . State the restrictions, if any, for the formula obtained to be meaningful.

Solution $F = ma$ To get m alone on one side, divide both sides by a .

$\frac{F}{a} = m, a \neq 0$ The denominator cannot be 0.

Solve the given formula for the indicated variable. State the restrictions, if any, for the formula obtained to be meaningful.

1. $C = \pi d$ for d

2. $F = ma$ for a

3. $I = prt$ for t

4. $V = Bh$ for h

5. $d = rt$ for t

6. $s = gt^2$ for g

Example 2 The formula $A = \frac{1}{2}h(a + b)$ gives the area of a trapezoid with bases a units and b units and with height h units. Use this formula to solve for the variable b in terms of A , h , and a . State the restrictions, if any, for the formula obtained to be meaningful.

Solution $A = \frac{1}{2}h(a + b)$ To get clear of fractions, multiply both sides by 2.

$2A = h(a + b)$ Divide both sides by h .

$\frac{2A}{h} = a + b$ Subtract a from both sides.

$\frac{2A}{h} - a = b, h \neq 0$ The denominator cannot be 0.

Solve the given formula for the indicated variable. State the restrictions, if any, for the formula obtained to be meaningful.

7. $A = \frac{1}{2}bh$ for h

8. $b = 2b + y$ for y

9. $A = \frac{1}{2}h(b + c)$ for h

10. $A = P + Prt$ for r

11. $a = 2(l + w)$ for l

12. $C = \frac{5}{9}(F - 32)$ for F

4-7 Transforming Formulas (continued)

Example 3 Solve the formula $C = \frac{mv^2}{r}$ for r . State the restrictions, if any, for the formula obtained to be meaningful.

Solution

$C = \frac{mv^2}{r}$	To get r out of the denominator, multiply both sides by r .
$Cr = mv^2$	To get r alone on one side, divide both sides by C .
$r = \frac{mv^2}{C}, C \neq 0$	The denominator cannot be 0.

Solve the given formula for the indicated variable. State the restrictions, if any, for the formula obtained to be meaningful.

13. $s = \frac{v}{r}$ for v

14. $d = \frac{m}{v}$ for m

15. $C = \frac{mv^2}{r}$ for m

16. $2ax + 1 = ax + 5$ for x

17. $a = \frac{v - u}{t}$ for u

18. $v^2 = u^2 + 2as$ for a

19. $S = \frac{n}{2}(a + 1)$ for a

20. $m = \frac{x + y + z}{3}$ for x

21. $l = a + (n - 1)d$ for d

22. $A = \frac{a + b + c + d}{4}$ for b

23. $3by - 2 = 2by + 1$ for b

24. $3aw + 1 = aw - 7$ for a

25. $ax + b = c$ for b

26. $D = \frac{a}{2}(2t - 1)$ for a

27. $am - bm = c$ for a

28. $q = 1 + \frac{P}{100}$ for P

Mixed Review Exercises

Simplify.

1. $(y - 4)(y + 2)$

2. $(2n - 3)(3n - 4)$

3. $a[3a - 2(4 + a)]$

4. $xy(x - 2y)$

5. $3x(x^2 - 2x + 3)$

6. $(-4x^2)^3$

7. $n^2 \cdot n^3 \cdot n^4$

8. $(2a^2)^3 \cdot (3a^3b^2)$

9. $(x + 6)(x - 5)$

10. $(a + 2b)ab$

11. $(4m + 5)(8m + 7)$

12. $2y^2(y^3 + 2y - 1)$