# How Can You Visit the Sun Without Burning Up?

(KEY)

Solve each problem, then cross out the letter next to the correct answer. When you're finished, the answer to the title question will remain.

**1** $5(x - 9) = 2x + 15$

**2** $7n - 20 = 9(4n + 1)$

| Letter | Value |
|--------|-------|
| N | −1 |
| (T) | $6400 |
| (O) | 70° |
| (H) | 470 |
| F | 10 |
| (E) | 36 |
| (G) | 8 h |
| (I) | 44 |
| B | $510 |
| S | 7 |
| (N) | $8000 |
| I | 500 |
| (T) | −3 |
| (A) | 32 |
| (O) | $580 |
| (B) | $7500 |
| E | 20 |
| (G) | 65° |
| A | 5 h |
| L | 6 h |
| B | 28 |

Go at Night

**3** The square and the triangle have equal perimeters.
  A. Find the value of x.
  B. Find the perimeter.

$2x + 8 = 4(x-3)$

square with side $x - 3$; triangle with sides $x$, $x$, and base $8$
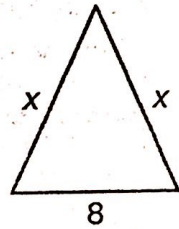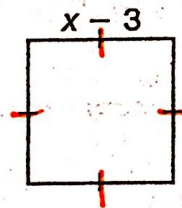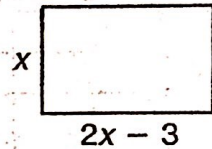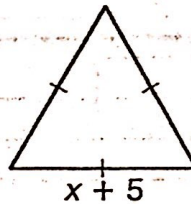
**4** The equilateral triangle and the rectangle have equal perimeters.
  A. Find the value of x.
  B. Find the perimeter.

$3(x+5) = 2(2x-3)+2x$

triangle with sides, base $x + 5$; rectangle with side $x$ and $2x - 3$

**5** The Red Bus Company charges $150 plus $72 per hour to rent a bus. The Blue Bus Company charges $240 plus $54 per hour.
  A. For what number of hours would the companies charge the same?
  B. What would the charge be for that number of hours?

$150 + 72x = 240 + 54x$

**6** Suppose it is 40° inside your refrigerator and 340° inside your oven when the power goes out. The refrigerator temperature starts rising at the rate of 5° per hour. The oven temperature starts dropping at the rate of 45° per hour.
  A. How long will it take for the temperatures to be the same?
  B. What will the temperature be then?

$40 + 5x = 340 + 45x$

**7** Suppose you write a book. The printer charges $4 per book to print it, and you spend $5500 on advertising. You sell the book for $15 a copy.
  A. How many copies must you sell to break even (total cost equals income from sales)?
  B. What is your income (or total cost) for that many copies?

$15x - 4x - 5500 = 0$

Equations, Problems, and Functions:
Using Equations with the Variable on Both Sides

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# How Can You Visit the Sun W/o Burning Up?

**①** $5(x-9) = 2x + 15$

$5x - 45 = 2x + 15$

$\phantom{5x} +45 \qquad\qquad +45$

$5x = 2x \cdot 60$

$\phantom{5x} -2x \qquad -2x$

$\dfrac{3x}{3} = \dfrac{60}{3}$

$\boxed{x = 20}$

**②** $7n - 20 = 9(4n+1)$

$7n - 20 = 36n + 9$

$\phantom{7n - 20} -9 \qquad\qquad -9$

$7n - 29 = 36n$

$\phantom{7n} -7n \qquad -7n$

$\dfrac{-29}{29} = \dfrac{29n}{29}$

$\boxed{-1 = n}$

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**③** P triangle = P square

$x + x + 8 = 4(x - 3)$

$2x + 8 = 4x - 12$

$\phantom{2x} +12 \qquad\qquad +12$

$2x + 20 = 4x$

$-2x \qquad\qquad -2x$

$\dfrac{20}{2} = \dfrac{2x}{2}$

$\boxed{10 \text{ units} = x}$

**④** P triangle = P rectangle

$3(x+5) = 2(2x-3) + 2x$

$3x + 15 = 4x - 6 + 2x$

$3x + 15 = 6x - 6$

$\phantom{3x + 15} +6 \qquad\qquad +6$

$3x + 21 = 6x$

$-3x \qquad\qquad -3x$

$\dfrac{21}{3} = \dfrac{3x}{3}$

$\boxed{7 \text{ units} = x}$

perimeter $\triangle = 3(7+5)$

$\boxed{= 36 \text{ units}}$

perimeter $\square = 2(2(7)-3) + 2(7)$

$= 2(11) + 14$

$= 22 + 14$

$\boxed{= 36 \text{ units}}$

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**⑤** Red = Blue

$150 + 72x = 240 + 54x$

$-150 \qquad\qquad -150$

$72x = 90 + 54x$

$\phantom{72x} -54x \qquad\qquad -54x$

$\dfrac{18x}{18} = \dfrac{90}{18}$

$\boxed{x = 5 \text{ hours}}$

$\boxed{\text{Red} = 150 + 72(5) = \$510}$

$\boxed{\text{Blue} = 240 + 54(5) = \$510}$

⑥ Refrigerator + oven

$$40 + 5x = 340 - 45x$$
$$\phantom{40+}{-40} \phantom{=340}{-40}$$

$$5x = 300 - 45x$$
$$+45x \phantom{= 300}+45x$$

$$\frac{50x}{50} = \frac{300}{50}$$

$$\boxed{x = 6 \text{ hours}}$$

Refrigerator = $40 + 5(6) = 70°$
oven = $340 - 45(6) = 70°$

⑦ $15x - 4x - 5500 = 0$
$$11x - 5500 = 0$$
$$\phantom{11x}+5500 \phantom{=}+5500$$

$$\frac{11x}{11} = \frac{5500}{11}$$

$$\boxed{x = 500}$$
books

total income
= $11 (500)$
= $5500