

Push Tasks — Answers



1. A rectangle has width x cm and length $(x + 4)$ cm. Its area is 60 cm^2 . Find x .



Solution

$$\begin{aligned}x(x + 4) &= 60 \\x^2 + 4x - 60 &= 0 \\(x + 10)(x - 6) &= 0 \\x &= 6 \text{ (reject } -10)\end{aligned}$$

2. A triangle has base x cm and height $(x + 3)$ cm. Its area is 44 cm^2 . Find x .



Solution

$$\begin{aligned}\frac{1}{2}x(x + 3) &= 44 \\x^2 + 3x - 88 &= 0 \\(x + 11)(x - 8) &= 0 \\x &= 8 \text{ (reject } -11)\end{aligned}$$

3. A rectangle has width x cm and length $(x - 2)$ cm. Its area is 63 cm^2 . Find x .



Solution

$$\begin{aligned}x(x - 2) &= 63 \\x^2 - 2x - 63 &= 0 \\(x - 9)(x + 7) &= 0 \\x &= 9 \text{ (reject } -7)\end{aligned}$$

4. A rectangle has width x cm and length $(2x + 1)$ cm. Its area is 55 cm^2 . Find x .



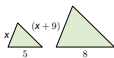
Solution

$$\begin{aligned}x(2x + 1) &= 55 \\2x^2 + x - 55 &= 0 \\(2x + 11)(x - 5) &= 0 \\x &= 5 \text{ (reject } -5.5)\end{aligned}$$

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5. Similar triangles have corresponding sides 5, 8 and x , $(x + 9)$. Find x .



Solution

$$\begin{aligned}\frac{5}{8} &= \frac{x}{x+9} \\ 5(x+9) &= 8x \\ 3x &= 45 \\ x &= 15\end{aligned}$$

7. A rectangle has width x cm and length $(x + 3)$ cm. Its area is 70 cm^2 . Find x , then find the perimeter.



Solution

$$\begin{aligned}x(x+3) &= 70 \\ (x+10)(x-7) &= 0 \\ x &= 7; \text{ perimeter} = 34 \text{ cm}\end{aligned}$$

6. The trapezium has area 54 cm^2 . Find x , rejecting any root that cannot be a length.



Solution

$$\begin{aligned}\frac{(x+1) + (x+5)}{2} \times x &= 54 \\ (x+3)x &= 54 \\ x^2 + 3x - 54 &= 0 \\ (x+9)(x-6) &= 0 \\ x &= 6 \text{ (reject } -9)\end{aligned}$$

8. A triangle has base x cm and height $(x + 5)$ cm. Its area is 52 cm^2 . Find x , then find the height.



Solution

$$\begin{aligned}\frac{1}{2}x(x+5) &= 52 \\ x^2 + 5x - 104 &= 0 \\ (x+13)(x-8) &= 0 \\ x &= 8; \text{ height} = 13 \text{ cm}\end{aligned}$$

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9. A square has side length $(x + 1)$ cm and area 100 cm^2 . Find x .



Solution

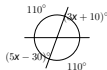
$$(x + 1)^2 = 100$$

$$x + 1 = 10$$

$$x = 9$$

(reject $x + 1 = -10$)

11. One angle is $(3x + 10)^\circ$, vertical opposite $(5x - 30)^\circ$. Find x and an adjacent angle.



Solution

Vertically opposite:

$$3x + 10 = 5x - 30$$

$$2x = 40, x = 20$$

adjacent angle $= 110^\circ$

10. A triangle has angles $(x + 5)^\circ$, $(2x - 15)^\circ$, $(3x + 10)^\circ$. Find x and the largest angle.



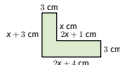
Solution

$$(x + 5) + (2x - 15) + (3x + 10) = 180$$

$$6x = 180, x = 30$$

largest angle $= 100^\circ$

12. The L-shape has area 75 cm^2 . Find x , then find the perimeter.



Solution

$$3(x + 3) + 3(2x + 1) = 75$$

$$9x + 12 = 75, x = 7$$

Perimeter = sum of 6 sides

$$= 10 + 3 + 7 + 15 + 3 + 18 = 56 \text{ cm}$$

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13. A rectangle has width x cm and length $(x + 7)$ cm. Its area is 120 cm^2 . Find x .



Solution

$$x(x + 7) = 120$$

$$x^2 + 7x - 120 = 0$$

$$(x + 15)(x - 8) = 0$$

$$x = 8 \text{ (reject } -15)$$

14. A triangle has base $(x + 6)$ cm and height x cm. Its area is 56 cm^2 . Find x .



Solution

$$\frac{1}{2}(x + 6)x = 56$$

$$x^2 + 6x - 112 = 0$$

$$(x + 14)(x - 8) = 0$$

$$x = 8 \text{ (reject } -14)$$

15. A regular polygon has interior angle $(8x + 24)^\circ$ and exterior angle $(2x + 6)^\circ$ at each vertex. Find x , then state how many sides the polygon has.

Solution

$$(8x + 24) + (2x + 6) = 180$$

$$10x + 30 = 180, x = 15$$

$$\text{exterior} = 36^\circ$$

$$n = 360 \div 36 = 10 \text{ sides}$$

16. An isosceles triangle has two equal sides of length x cm. Its base is $(x - 2)$ cm and its perimeter is 34 cm. Find x .

Solution

$$x + x + (x - 2) = 34$$

$$3x - 2 = 34$$

$$3x = 36$$

$$x = 12$$