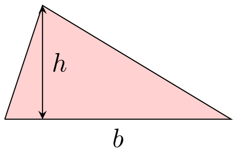
A DEFINITIONS

A.1 FINDING THE SUBJECTS

MCQ 1: For a triangle 

, we have the formula

$$A = \frac{b \times h}{2}.$$

Find the subject of the formula.

☒ A: the area

☐ b: the base

☐ h: the height

Answer: The subject of the formula is the area A.

MCQ 2: In an electrical circuit, we have the formula

$$U = RI$$

.Find the subject of the formula.

☒ U: the voltage

☐ R: the resistance

☐ I: the current

Answer: The subject of the formula is the voltage U.

MCQ 3: In physics, we have the formula

$$v = \frac{d}{t}$$

.Find the subject of the formula.

☒ v: the velocity

☐ d: the distance

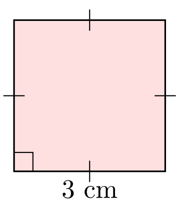
☐ t: the time

Answer: The subject of the formula is the velocity v.

B PROBLEM SOLVING

B.1 CALCULATING MEASURES IN GEOMETRY

Ex 4: Find the area of the figure:

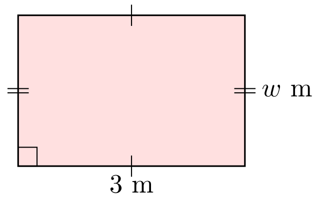


$A =$ 9 cm^2

Answer:

$$\begin{aligned} A &= s^2 && \text{(identifying the formula)} \\ &= 3^2 && \text{(substituting } s = 3\text{)} \\ &= 9\,\text{cm}^2 && \text{(solving)} \end{aligned}$$

Ex 5: The area of the rectangle is $6\,\text{m}^2$ and the length of one side is $3\,\text{m}$.



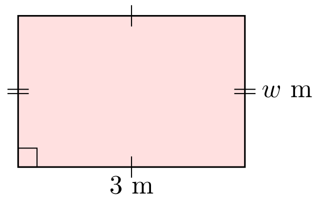
Find the width of the rectangle.

$w =$ 2 m

Answer:

$$\begin{aligned} A &= L \times w && \text{(identifying the formula)} \\ 6 &= 3 \times w && \text{(substituting } A = 6 \text{ and } L = 3\text{)} \\ w &= \frac{6}{3} && \text{(dividing by 3)} \\ w &= 2\,\text{m} \end{aligned}$$

Ex 6: The perimeter of the rectangle is $10\,\text{m}$.



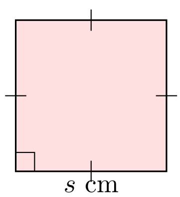
Find the width of the rectangle.

$w =$ 2 m

Answer:

$$\begin{aligned} P &= 2L + 2w && \text{(identifying the formula)} \\ 10 &= 2 \times 3 + 2w && \text{(substituting } P = 10 \text{ and } L = 3\text{)} \\ 10 &= 6 + 2w \\ 2w &= 10 - 6 && \text{(subtracting 6)} \\ 2w &= 4 \\ w &= \frac{4}{2} = 2\,\text{m} \end{aligned}$$

Ex 7: The area of a square is $10\,\text{cm}^2$.



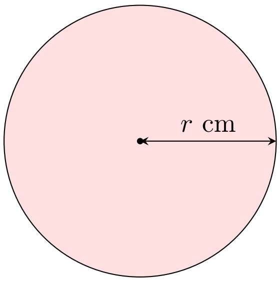
Find the length of the side of the square (round to 2 decimal places).

$$s = \boxed{3.16}\ \text{cm}$$

Answer:

$$\begin{aligned} A &= s^2 && \text{(identifying the formula)} \\ 10 &= s^2 && \text{(substituting } A = 10\text{)} \\ s &= \sqrt{10} && \text{(taking the square root)} \\ s &\approx 3.16\,\text{cm} && \text{(rounding to 2 decimal places)} \end{aligned}$$

Ex 8: The area of a circle is $10\,\text{cm}^2$. Recall the formula: $A = \pi r^2$.



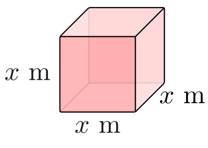
Find the radius of the circle (round your answer to 2 decimal places).

$$r = \boxed{1.78}\ \text{cm}$$

Answer:

$$\begin{aligned} A &= \pi r^2 && \text{(recall the formula)} \\ 10 &= \pi r^2 && \text{(substitute } A = 10\text{)} \\ r^2 &= \frac{10}{\pi} && \text{(divide both sides by } \pi\text{)} \\ r &= \sqrt{\frac{10}{\pi}} && \text{(take the square root)} \\ r &\approx 1.78\,\text{cm} && \text{(rounded to 2 decimal places)} \end{aligned}$$

Ex 9: The volume of the cube is $10\,\text{m}^3$.



Find the length of the side of the cube (round to 2 decimal places and $\sqrt[3]{10} = 2.1544\ldots$).

$$x = \boxed{2.15}\ \text{m}$$

Answer:

$$\begin{aligned} V &= x^3 && \text{(identifying the formula)} \\ 10 &= x^3 && \text{(substituting } V = 10\text{)} \\ x &= \sqrt[3]{10} && \text{(taking the cube root of both sides)} \\ x &\approx 2.15\,\text{m} && \text{(rounding to 2 decimal places)} \end{aligned}$$

B.2 CALCULATING MEASURES IN PHYSICS

Ex 10: A car travels at a constant speed of 120 km/h for 2 hours.
Find the distance traveled by the car. Recall the formula: $v = \frac{d}{t}$.

$$d = \boxed{240}\ \text{km}$$

Answer:

$$\begin{aligned} v &= \frac{d}{t} && \text{(identifying the formula)} \\ 120 &= \frac{d}{2} && \text{(substituting } v = 120 \text{ and } t = 2\text{)} \\ d &= 120 \times 2 && \text{(multiplying both sides by 2)} \\ d &= 240\ \text{km} \end{aligned}$$

Ex 11: A circuit has a resistance of 5 Ω and a voltage of 20 V.
Find the current flowing through the circuit. Recall the formula: $U = RI$.

$$I = \boxed{4}\ \text{A}$$

Answer:

$$\begin{aligned} U &= RI && \text{(identifying the formula)} \\ 20 &= 5I && \text{(substituting } U = 20 \text{ and } R = 5\text{)} \\ I &= \frac{20}{5} && \text{(dividing both sides by 5)} \\ I &= 4\ \text{A} \end{aligned}$$

Ex 12: The formula $F = \frac{9}{5}C + 32$ converts a temperature from Celsius (C) to Fahrenheit (F).
Given a temperature of 68°F, find the temperature in Celsius.

$$C = \boxed{20}\,^\circ\text{C}$$

Answer:

$$\begin{aligned} F &= \frac{9}{5}C + 32 && \text{(identifying the formula)} \\ 68 &= \frac{9}{5}C + 32 && \text{(substituting } F = 68\text{)} \\ 68 - 32 &= \frac{9}{5}C && \text{(subtracting 32 from both sides)} \\ 36 &= \frac{9}{5}C \\ C &= 36 \times \frac{5}{9} && \text{(multiplying both sides by } \frac{5}{9}\text{)} \\ C &= 20^\circ\text{C} \end{aligned}$$

Ex 13: The formula $E_p = mgh$ calculates the gravitational potential energy (E_p) of an object, where m is the mass in kilograms, g is the acceleration due to gravity (9.8 m/s^2), and h is the height in meters.
Given an object with a mass of 10 kg and a gravitational potential energy of 490 J, find the height at which the object is located.

$$h = \boxed{5} \text{ m}$$

Answer:

$$\begin{aligned} E_p &= mgh && \text{(identifying the formula)} \\ 490 &= 10 \times 9.8 \times h && \text{(substituting } E_p = 490,\ m = 10,\ g = 9.8\text{)} \\ 490 &= 98h && \text{(calculating } 10 \times 9.8\text{)} \\ h &= \frac{490}{98} && \text{(dividing both sides by 98)} \\ h &= 5 \text{ m} \end{aligned}$$

C REARRANGING FORMULAE

C.1 REARRANGING LINEAR EQUATIONS

Ex 14: Rearrange the equation $3x + 4y = 13$ to make y the subject.

$$y = \boxed{\frac{13 - 3x}{4}}$$

Answer:

$$\begin{aligned} 3x + 4y &= 13 \\ 4y &= 13 - 3x && \text{(subtracting } 3x \text{ from both sides)} \\ y &= \frac{13 - 3x}{4} && \text{(dividing both sides by 4)} \end{aligned}$$

Ex 15: Rearrange the equation $5x - 2y = 10$ to make y the subject.

$$y = \boxed{\frac{5x - 10}{2}}$$

Answer:

$$\begin{aligned} 5x - 2y &= 10 \\ -2y &= 10 - 5x && \text{(subtracting } 5x \text{ from both sides)} \\ -2y &= -5x + 10 && \text{(reordering)} \\ y &= \frac{-5x + 10}{-2} && \text{(dividing both sides by } -2\text{)} \\ y &= \frac{5x - 10}{2} && \text{(simplifying)} \end{aligned}$$

Ex 16: Rearrange the equation $3y + 2x = -x + 3$ to make y the subject.

$$y = \boxed{1 - x}$$

Answer:

$$\begin{aligned} 3y + 2x &= -x + 3 \\ 3y &= -x + 3 - 2x && \text{(subtracting } 2x \text{ from both sides)} \\ 3y &= 3 - 3x \\ y &= \frac{3 - 3x}{3} && \text{(dividing both sides by 3)} \\ y &= 1 - x && \text{(simplifying)} \end{aligned}$$

Ex 17: Rearrange the equation $7y - 5x = 2x + 14$ to make y the subject.

$$y = \boxed{2 + x}$$

Answer:

$$\begin{aligned} 7y - 5x &= 2x + 14 \\ 7y &= 2x + 14 + 5x && \text{(adding } 5x \text{ to both sides)} \\ 7y &= 7x + 14 \\ y &= \frac{7x + 14}{7} && \text{(dividing both sides by 7)} \\ y &= x + 2 && \text{(simplifying)} \end{aligned}$$

C.2 REARRANGING GEOMETRIC FORMULAE

MCQ 18: The formula for the circumference (perimeter) of a circle is $C = 2\pi r$.
Rearrange the formula to make r the subject.

Choose the correct answer:

- ☐ $r = 2\pi C$
- ☐ $2\pi r = C$
- ☒ $r = \dfrac{C}{2\pi}$

Answer:

$$\begin{aligned} C &= 2\pi r && \text{(given formula)} \\ r &= \frac{C}{2\pi} && \text{(dividing both sides by } 2\pi\text{)} \end{aligned}$$

MCQ 19: The formula for the volume of a cube is $V = s^3$.
Rearrange the formula to make s the subject.

Choose the correct answer:

- ☐ $s = V^3$
- ☐ $s = \dfrac{V}{3}$
- ☒ $s = \sqrt[3]{V}$

Answer:

$$\begin{aligned} V &= s^3 && \text{(given formula)} \\ s &= \sqrt[3]{V} && \text{(taking the cube root of both sides)} \end{aligned}$$

MCQ 20: The formula for the area of a triangle is $A = \dfrac{1}{2}bh$.
Rearrange the formula to make h the subject.

Choose the correct answer:

- ☐ $h = \dfrac{b}{2A}$
- ☐ $h = \dfrac{A}{2b}$
- ☒ $h = \dfrac{2A}{b}$

Answer:

$$\begin{aligned} A &= \frac{1}{2}bh && \text{(given formula)} \\ 2A &= bh && \text{(multiplying both sides by 2)} \\ h &= \frac{2A}{b} && \text{(dividing both sides by } b\text{)} \end{aligned}$$

C.3 REARRANGING PHYSICS FORMULAE

MCQ 21: The formula $F = \frac{9}{5}C + 32$ converts a temperature from Celsius (C) to Fahrenheit (F).
Rearrange the formula to make C the subject.

Choose the correct answer:

- ☒ $C = \frac{5}{9}(F - 32)$
- ☐ $C = \frac{9}{5}(F - 32)$
- ☐ $C = \frac{5}{9}F + 32$

Answer:

$$\begin{aligned} F &= \frac{9}{5}C + 32 && \text{(given formula)} \\ F - 32 &= \frac{9}{5}C && \text{(subtracting 32 from both sides)} \\ C &= \frac{5}{9}(F - 32) && \text{(multiplying both sides by } \tfrac{5}{9}\text{)} \end{aligned}$$

MCQ 22: The formula $v = \frac{d}{t}$ relates speed (v), distance (d), and time (t).
Rearrange the formula to make t the subject.

Choose the correct answer:

- ☒ $t = \frac{d}{v}$
- ☐ $t = \frac{v}{d}$
- ☐ $t = dv$

Answer:

$$\begin{aligned} v &= \frac{d}{t} && \text{(given formula)} \\ vt &= d && \text{(multiplying both sides by } t\text{)} \\ t &= \frac{d}{v} && \text{(dividing both sides by } v\text{)} \end{aligned}$$

MCQ 23: The formula $U = RI$ relates voltage (U), resistance (R), and current (I).
Rearrange the formula to make I the subject.

Choose the correct answer:

- ☒ $I = \frac{U}{R}$
- ☐ $I = UR$
- ☐ $I = \frac{R}{U}$

Answer:

$$\begin{aligned} U &= RI && \text{(given formula)} \\ I &= \frac{U}{R} && \text{(dividing both sides by } R\text{)} \end{aligned}$$

MCQ 24: The formula $E = \frac{1}{2}mv^2$ relates kinetic energy (E), mass (m), and speed (v).
Rearrange the formula to make v the subject.

Choose the correct answer:

- ☒ $v = \sqrt{\frac{2E}{m}}$
- ☐ $v = \frac{E}{m}$
- ☐ $v = \frac{2E}{m}$

Answer:

$$\begin{aligned} E &= \frac{1}{2}mv^2 && \text{(given formula)} \\ 2E &= mv^2 && \text{(multiplying both sides by 2)} \\ v^2 &= \frac{2E}{m} && \text{(dividing both sides by } m\text{)} \\ v &= \sqrt{\frac{2E}{m}} && \text{(taking the square root of both sides)} \end{aligned}$$

C.4 REARRANGING RATIO EQUATIONS

Ex 25: Rearrange the equation $\frac{2}{y} = \frac{x}{6}$ to make y the subject:

$$y = \boxed{\frac{12}{x}}$$

Answer:

$$\frac{2}{y} = \frac{x}{6}$$

$$\begin{aligned} y \times x &= 2 \times 6 && \text{(cross multiplication)} \\ y &= \frac{12}{x} && \text{(dividing both sides by } x\text{)} \end{aligned}$$

Ex 26: Rearrange the equation $\frac{1}{x} = \frac{2}{y}$ to make y the subject:

$$y = \boxed{2x}$$

Answer:

$$\frac{1}{x} = \frac{2}{y}$$

$$\begin{aligned} 1 \times y &= x \times 2 && \text{(cross multiplication)} \\ y &= 2x \end{aligned}$$

Ex 27: Rearrange the equation $\frac{x}{2} = \frac{4}{y}$ to make y the subject:

$$y = \boxed{\frac{8}{x}}$$

Answer:

$$\frac{x}{2} = \frac{4}{y}$$

$$\begin{aligned} x \times y &= 2 \times 4 && \text{(cross multiplication)} \\ y &= \frac{8}{x} && \text{(dividing by } x\text{)} \end{aligned}$$

Ex 28: Rearrange the equation $\frac{y}{x} = \frac{4}{3}$ to make y the subject:

$$y = \boxed{\frac{4x}{3}}$$

Answer:

$$\frac{y}{x} = \frac{4}{3}$$

$$\begin{aligned} y \times 3 &= x \times 4 && \text{(cross multiplication)} \\ y &= \frac{4x}{3} \end{aligned}$$

D CONSTRUCTING FORMULAE

D.1 MODELING LINEAR RELATIONSHIPS WITH ALGEBRA

Ex 29: A mechanic charges a \$40 call-out fee and \$30 per hour thereafter.
Find the mechanic's fee M for a job which takes x hours.

$$M = \boxed{40 + 30x}$$

Answer: The total fee is \$40 plus \$30 for each of x hours.

- For $x = 1$, $M = 40 + 30 \times 1$
- For $x = 2$, $M = 40 + 30 \times 2$
- $\vdots$
- For x , $M = 40 + 30 \times x$

Ex 30: A car rental company charges a fixed distance of 50 km included in the rental and 15 km for each extra hour of rental.
Find the total distance D the car can travel in terms of the rental time x (in hours).

$$D = \boxed{50 + 15x}$$

Answer: The total distance is 50 km plus 15 km for each extra hour.

- For $x = 1$, $D = 50 + 15 \times 1$
- For $x = 2$, $D = 50 + 15 \times 2$
- $\vdots$
- For x , $D = 50 + 15 \times x$

Ex 31: A gym membership includes a one-time joining fee of \$25 and a monthly fee of \$40.
Find the total cost C after x months.

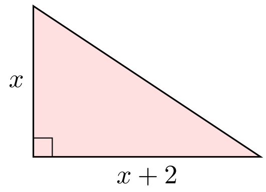
$$C = \boxed{25 + 40x}$$

Answer: The total cost is the joining fee of \$25 plus \$40 for each of x months.

- For $x = 1$, $C = 25 + 40 \times 1$
- For $x = 2$, $C = 25 + 40 \times 2$
- $\vdots$
- For x , $C = 25 + 40 \times x$

D.2 MODELING AREAS AND VOLUMES WITH ALGEBRA: LEVEL 1

Ex 32: A right-angled triangle has a base length of $x + 2$ units and a height of x units. Find the area A of the triangle.

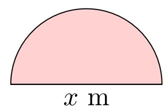


$$A = \boxed{\frac{x(x+2)}{2}}.$$

Answer: The area of a triangle is half the product of its base and height.

$$\begin{aligned} A &= \frac{\text{base} \times \text{height}}{2} \\ &= \frac{x(x+2)}{2} \end{aligned}$$

Ex 33: A garden is in the shape of a semi-circle with diameter x meters.



Find the area A of the garden in terms of the diameter x of the semi-circle.

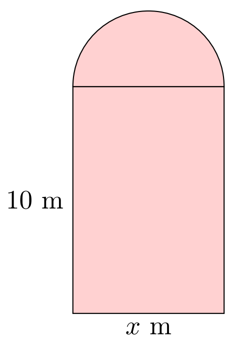
$$A = \boxed{\frac{\pi x^2}{8}}\ \text{m}^2.$$

Answer:

- The radius r is half of the diameter: $r = \frac{x}{2}$.
- The area of a circle is πr^2, where r is the radius.

$$\begin{aligned} \text{Area of semi-circle} &= \frac{1}{2}\text{Area of circle} \\ &= \frac{1}{2}\pi r^2 \\ &= \frac{1}{2}\pi \left(\frac{x}{2}\right)^2 \\ &= \frac{1}{2}\pi \frac{x^2}{4} \\ &= \frac{\pi x^2}{8} \end{aligned}$$

Ex 34: The door is composed of a rectangle with height 10 meters and width x meters, topped with a semi-circle of diameter x meters.



Find the area A of the door in terms of x.

$$A = \boxed{10x + \frac{\pi x^2}{8}} \text{ m}^2.$$

Answer:

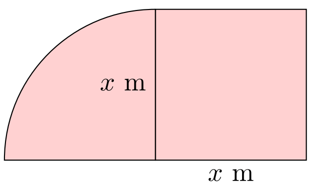
- The area of the rectangle is width times height: $x \times 10 = 10x$.
- The radius r of the semi-circle is half of the diameter: $r = \dfrac{x}{2}$.
- The area of a full circle is πr^2, so the area of the semi-circle is half of that.

$$\begin{aligned}\text{Area of semi-circle} &= \frac{1}{2}\pi r^2\\ &= \frac{1}{2}\pi\left(\frac{x}{2}\right)^2\\ &= \frac{1}{2}\pi\frac{x^2}{4}\\ &= \frac{\pi x^2}{8}\end{aligned}$$

- The total area of the door is the sum of the rectangle and semi-circle areas:

$$A = 10x + \frac{\pi x^2}{8}$$

Ex 35: The door consists of a square with side length x meters and a quarter-circle with radius x meters.



Find the area A of the door in terms of x.

$$A = \boxed{x^2 + \frac{\pi x^2}{4}} \text{ m}^2.$$

Answer:

- The area of the square is side times side: $x \times x = x^2$.
- The radius r of the quarter-circle is $r = x$.
- The area of a full circle is πr^2, so the area of the quarter-circle is one-fourth of that.

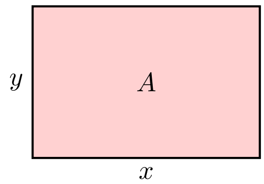
$$\begin{aligned}\text{Area of quarter-circle} &= \frac{1}{4}\pi r^2\\ &= \frac{1}{4}\pi x^2\end{aligned}$$

- The total area of the door is the sum of the square and quarter-circle areas:

$$A = x^2 + \frac{\pi x^2}{4}$$

D.3 MODELING AREAS AND VOLUMES WITH ALGEBRA: LEVEL 2

Ex 36: You have 28 meters of fencing to enclose a rectangular vegetable garden. Let x be the length of the rectangle and y be the width. Find the area A of the garden in terms of x.



$$A = \boxed{x(14 - x)}.$$

Answer:

- The perimeter of the rectangle is 28 m, so:

$$2x + 2y = 28$$

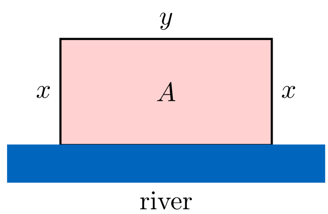
- Solve for y in terms of x:

$$\begin{aligned}2x + 2y &= 28\\ 2y &= 28 - 2x\\ y &= 14 - x\end{aligned}$$

- The area of the rectangle is $A = x \times y$. Substituting $y = 14 - x$:

$$A = x(14 - x)$$

Ex 37: A farmer has 4000 meters of fencing to enclose a rectangular field along a river.Because one side is along the river, fencing is required on only three sides.Let x be the length perpendicular to the river and y the length parallel to the river.Find the area A of the field in terms of x.



$$A = \boxed{x(4000 - 2x)}.$$

Answer:

- Since the fence is on three sides only, the total fencing is:

$$x + x + y = 4000 \quad \text{or} \quad 2x + y = 4000$$

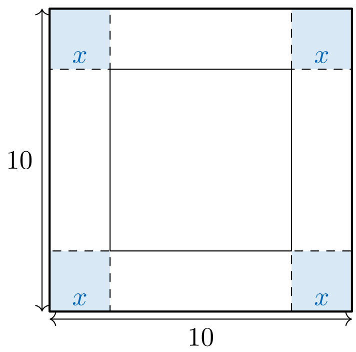
- Solve for y in terms of x:

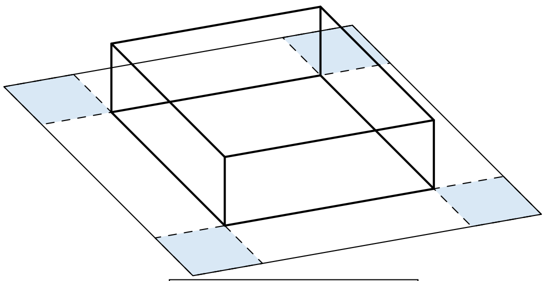
$$\begin{aligned}2x + y &= 4000\\ y &= 4000 - 2x\end{aligned}$$

- The area of the rectangle is $A = x \times y$. Substituting $y = 4000 - 2x$:

$$A = x(4000 - 2x)$$

Ex 38: A sheet of paper 10 cm × 10 cm is made into an open box by cutting x-cm squares out of each corner and folding up the sides.Find the volume V of the box in terms of x.

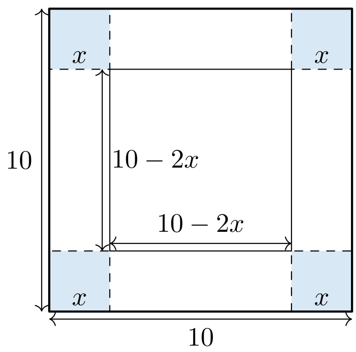


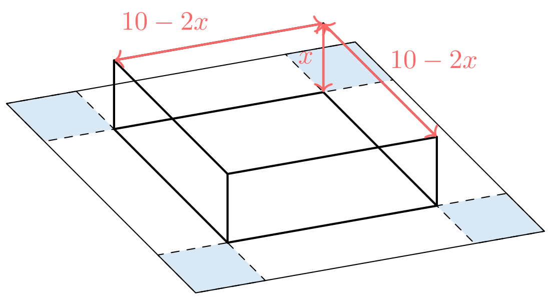


$V = \boxed{x(10-2x)(10-2x)}$.

Answer:

- After cutting out x-cm squares, the height of the box is x.The new length is $10-2x$ and the new width is $10-2x$.





- The volume of a box is

$$V = \text{height} \times \text{length} \times \text{width}.$$

- Substituting the dimensions:

$$V = x(10-2x)(10-2x).$$

D.4 FINDING PATTERNS AND WRITING FORMULAE

Ex 39: Look at the following matchstick pattern:

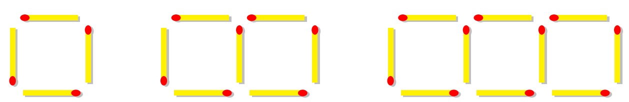


diagram 1 diagram 2 diagram 3

Find a formula for the number of matchsticks in the n-th diagram.

$$\text{Number of matchsticks} = \boxed{3n+1}.$$

Answer: Counting the matchsticks in each diagram:

- Diagram 1: $4 = 3\times 1+1$
- Diagram 2: $7 = 3\times 2+1$
- Diagram 3: $10 = 3\times 3+1$
- $\vdots$
- Diagram n: $3\times n+1$

Ex 40: Look at the following triangular matchstick pattern:

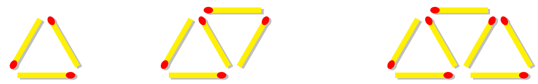


diagram 1 diagram 2 diagram 3

Find a formula for the number of matchsticks in the n-th diagram.

$$\text{Number of matchsticks} = \boxed{2n+1}.$$

Answer: Counting the matchsticks in each diagram:

- Diagram 1: $3 = 2\times 1+1$
- Diagram 2: $5 = 2\times 2+1$
- Diagram 3: $7 = 2\times 3+1$
- $\vdots$
- Diagram n: $2\times n+1$

Ex 41: Find the n-th term of the sequence $5, 10, 15, 20, 25, \ldots$.

$$n\text{-th term} = \boxed{5n}.$$

Answer:

- 1^{st} term: $5 = 5\times 1$
- 2^{nd} term: $10 = 5\times 2$
- 3^{rd} term: $15 = 5\times 3$
- $\vdots$
- n^{th} term: $5\times n$

Ex 42: Find the n-th term of the sequence $6, 12, 18, 24, 30, 36, \ldots$.

$$n\text{-th term} = \boxed{6n}.$$

Answer:

- 1^{st} term: $6 = 6\times 1$
- 2^{nd} term: $12 = 6\times 2$
- 3^{rd} term: $18 = 6\times 3$
- $\vdots$
- n^{th} term: $6\times n$

Ex 43: Find the n-th term of the sequence $1, 3, 5, 7, 9, 11, \ldots$.

$$n\text{-th term} = \boxed{2n-1}.$$

Answer:

- 1^{st} term: $1 = 2 \times 1 - 1$
- 2^{nd} term: $3 = 2 \times 2 - 1$
- 3^{rd} term: $5 = 2 \times 3 - 1$
- $\vdots$
- n^{th} term: $2 \times n - 1$

Ex 44: Find the n-th term of the sequence $2, 4, 8, 16, 32, 64, \ldots$.

$$n\text{-th term} = \boxed{2^n}.$$

Answer:

- 1^{st} term: $2 = 2^1$
- 2^{nd} term: $4 = 2^2$
- 3^{rd} term: $8 = 2^3$
- $\vdots$
- n^{th} term: 2^n

Ex 45: Find the n-th term of the sequence $1, 4, 9, 16, 25, 36, \ldots$.

$$n\text{-th term} = \boxed{n^2}.$$

Answer:

- 1^{st} term: $1 = 1^2$
- 2^{nd} term: $4 = 2^2$
- 3^{rd} term: $9 = 3^2$
- $\vdots$
- n^{th} term: n^2

Ex 46: Find the n-th term of the sequence $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \ldots$.

$$n\text{-th term} = \boxed{\frac{1}{2n}}.$$

Answer:

- 1^{st} term: $\frac{1}{2} = \frac{1}{2\times 1}$
- 2^{nd} term: $\frac{1}{4} = \frac{1}{2\times 2}$
- 3^{rd} term: $\frac{1}{6} = \frac{1}{2\times 3}$
- $\vdots$
- n^{th} term: $\frac{1}{2n}$