

Solving Solutions

Linear Equations

Solving Linear 1 Solutions

1. $x = 16/3$
2. $3 < x < 4$
3. $x > -2$
4. $x = 5$
5. $6/5 \geq x \text{ or } x \leq 6/5$
6. $-4 < x \text{ or } x > -4$
7. $x = 2$
8. $x = 10/3$

Solving Linear 2 Solutions

1. $x = 7$
2. $x = 4.5$
3. $x = 6$
4. $x > 7/4$
5. $-3/2 < x < -1$
6. $x = 4$
7. $x \leq -3$
8. $x = 25$

Piggy in the Middle

5	11	17	23	29
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Chicken Run

Width (m)	Length (m)	Area (m ²)
6	9	54
5	8	40
4	7	28

So, Victoria can make 3 different sized enclosures with an area greater than 20m²

Solving Solutions

Crack the Code

Solving the equations in the following order:

$$g = 15$$

$$c = 9$$

$$a = 6$$

$$y = 5$$

$$r = 2$$

$$m = 7$$

$$s = 3$$

$$k = 8$$

$$h = 1$$

$$d = 10$$

$$10 < t < 13$$

$$e < 4.16 \dots$$

Reveals: "The Mystery Message Cracked"

Simultaneous Equations

$$1 \quad x = 2, y = 3$$

$$3 \quad x = 2, y = 11$$

$$2 \quad x = 3, y = -1$$

$$4 \quad x = \frac{1}{2}, y = -2$$

Maths at the Movies

Number of rentals 1 575 000

Number of sales 370 000

Taxi

Distance travelled 12 miles

Value of x £2

Solving Graphically

$$1. \quad x = 2, y = 4$$

$$2. \quad x = 4, y = -2$$

$$3. \quad x = 8, y = 2$$

Puzzle to Ponder

If you rearrange the second equation you get $y = 2x + 8$

Both equations have the same gradient so they are parallel, they will never meet

Solving Solutions

Triple Simultaneous Equations

$$x = 3, y = 1, z = 6$$

Mean Problem

Adding you get $5x + 5y + 5z = 1155$

Dividing by 5 $x + y + z = 231$

Dividing by 3 (3 terms) you get the mean which is 77

Quadratic Equations

Solving Quadratics 1

1. $x = \pm 4$

5. $x = \frac{5}{2}$ or $x = -\frac{3}{4}$

2. $x = 0$ or $x = 16$

6. $x = \frac{1}{3}$ or $x = -5$

3. $x = -1$ or $x = \frac{3}{2}$

7. $x = 2$ or $x = -8$

4. $x = 2$ or $x = 1$

8. $x = \frac{3}{2}$ or $x = \frac{1}{5}$

Solving Quadratics 2

1 $x = 6$ or $x = -2$

5 $x = 3$ or $x = -1$

2 $x = 3$ or $x = -2$

6 $x = 2 \pm \sqrt{5}$

3 $x = \frac{3}{2}$ or $x = 4$

7 $x = -\frac{1}{3}$ or $x = \frac{2}{3}$

4 $x = -\frac{3}{2}$ or $x = \frac{4}{3}$

8 $x = 2$ (Note $x \neq -\frac{17}{6}$)

Quadrilaterals

The only solution in context is $x = 5$

Suitable lengths are width = 5, length = 12, diagonal = 13

Up In the Air

The object strikes the ground after 6 seconds (only consider positive answer as the time after the launch)

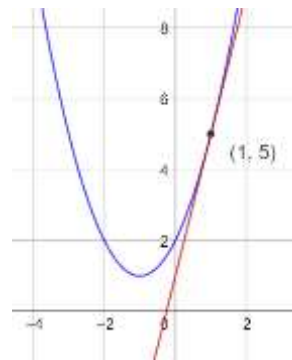
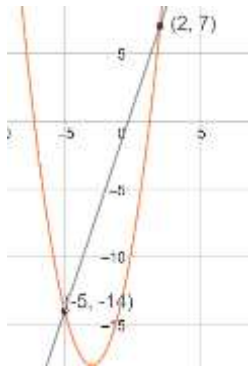
Solving Solutions

Using Graphs

1. $4 + 3x - x^2 = 0$ $x = -1$ or $x = 4$
2. $x^2 - 6x + 8 = 0$ $x = 2$ or $x = 4$
3. $3x^2 - 3x - 6 = 0$ $x = -1$ or $x = 2$
4. $4 + 3x - x^2 = 4$ $x = 0$ or $x = 3$

Simultaneously

- 1 $x = 2, y = 7$ or $x = -5, y = -14$ 2 $x = 1, y = 5$



Problem 1: When $a = \frac{10}{3}, b = \frac{8}{3}$ or when $a = 2, b = 8$

Problem 2: $(-\frac{17}{5}, -\frac{24}{5})$ and $(1, 4)$

Lines and Curves

$A(1, -1)$ $B(4, 2)$ $AB = \sqrt{18}$ or $3\sqrt{2}$ $BC = \sqrt{8}$ or $2\sqrt{2}$

Area of triangle ABC is 6 square units

Solving Other Equations

Solving equations with trigonometry

1. $x = 3.5\text{cm}$
2. $x = 68.2^\circ$ to 1 d.p
3. $x = 7.8\text{cm}$ to 1 d.p
4. $x = 83.6^\circ$ to 1 d.p
5. $x = 10.3\text{cm}$ to 1 d.p
6. $x = 4.1\text{cm}$ to 1 d.p
7. $x = 95.4^\circ$ to 1 d.p
8. $x = 5.0\text{cm}$ to 1 d.p

Solving Solutions

Solving Other Equations

1. $x = 5$
2. $x = 2$
3. $x = 46$
4. $x = 4 + 2\sqrt{3}$
5. $x = 9$
6. $x = 30^\circ$ or $x = 150^\circ$
7. $x = 30^\circ$ or $x = 330^\circ$
8. $x = -1$

Let's get Triggy

θ	30°	45°	60°
$\sin\theta$	$\frac{AD}{AB} = \frac{1}{2}$	$\frac{XW}{XZ} = \frac{WZ}{XZ} = \frac{1}{\sqrt{2}}$	$\frac{BD}{AB} = \frac{\sqrt{3}}{2}$
$\cos\theta$	$\frac{BD}{AB} = \frac{\sqrt{3}}{2}$	$\frac{WX}{WZ} = \frac{WZ}{WX} = \frac{1}{\sqrt{2}}$	$\frac{AD}{AB} = \frac{1}{2}$
$\tan\theta$	$\frac{AD}{BD} = \frac{1}{\sqrt{3}}$	$\frac{WX}{WZ} = \frac{WZ}{WX} = 1$	$\frac{BD}{AD} = \frac{\sqrt{3}}{1} = \sqrt{3}$

Trig Maze

$\frac{\tan 30^\circ}{3}$	$\frac{9}{3^{0.5}}$	$\frac{\sqrt{18}}{\sqrt{6}}$	$\frac{1.5}{0.05}$	$\frac{\sqrt{12}}{\sqrt{2}}$	$\frac{2\sqrt{6}}{\sqrt{4}}$	$\frac{\sqrt{9}}{3^0}$
$\frac{\sqrt{27}}{3}$	$\frac{3\sqrt{3}}{\sqrt{3}}$	$2 \cos 60^\circ$	$\frac{\tan 60^\circ}{2}$	$\frac{\sin 30^\circ}{\cos 30^\circ}$	$3 \tan 30^\circ$	$\frac{\sqrt{6}}{\sqrt{2}}$
$\frac{6}{\sqrt{2}}$	$\frac{\cos 60^\circ}{\sin 60^\circ}$	$\frac{9}{3\sqrt{3}}$	$\frac{3}{\sqrt{3}}$	$2 \cos 30^\circ$	$\frac{3+\sqrt{3}}{\sqrt{3}} - 1$	$3 \tan 60^\circ$
$\sqrt{3}$	$\frac{9}{\sqrt{3}}$	$2 \sin 60^\circ$	$\frac{\sqrt{9}}{3}$	$\frac{\sqrt{9}}{\sqrt{3}}$	$\frac{\sqrt{6}}{2}$	$\frac{\cos 30^\circ}{2}$
$\frac{1}{3^{\frac{1}{2}}}$	$\tan 60^\circ$	$\frac{\sqrt{12}}{2}$	$2 \sin 30^\circ$	$\frac{\sin 60^\circ}{\cos 60^\circ}$	$\frac{9^{0.5}}{3^{0.5}}$	$\frac{2\sqrt{6}}{\sqrt{8}}$
$\frac{\cos 60^\circ}{2}$	$\frac{\sqrt{12}}{4}$	$\frac{\sin 30^\circ}{2}$	$\frac{\sqrt{9}}{3}$	$\frac{\tan 60^\circ}{3}$	$\frac{9 \times 10^1}{3 \times 10^{-1}}$	$\frac{3 + \sqrt{3}}{\sqrt{3}}$

Solving Solutions

Triggy Problems

Problem 1

$$x = 4.806 \text{ to } 3 \text{ s.f.}$$

Problem 2

$$17.1m \text{ to } 3 \text{ s.f.}$$

Multiple Equations

$$a = \frac{1}{5}, \quad b = -1, \quad c = \frac{1}{3}$$

Powers

Case 1: Power is zero so $x = \pm 3$

Case 2 base is 1 so $x = 7$

Case 3 base is -1 so $x = 5$

Geometry Puzzle

Angle is 60°