ALGEBRA

Chapter 3: Algebra

Part 11: Solving Linear Equations

(with the unknown on both sides)

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Starter

Video

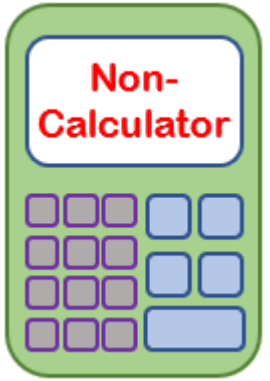
Worksheet – I'm giving it a try!

Worksheet – I'm building my confidence!

Worksheet – I'm ready for anything!

Extension

Homework



Answer 4 questions to make a straight line vertically, horizontally or diagonally.

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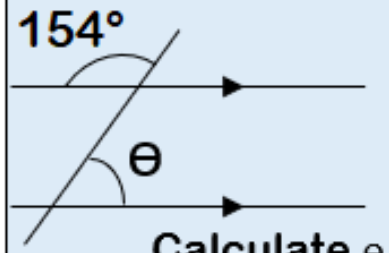
Write 42 as a product of prime factors	If a =1, b =2 and c =-5, calculate 4a+bc	A table that used to cost £180 has decreased in price by 61%. How much does it cost now?	The ratio of red to blue sweets is 1 : 3 and blue to green sweets is 1 : 5. What is the ratio of red to green sweets?
 Calculate θ	Factorise $4a^2 - 10ab$	Find the nth term of the sequence 6,10,14,18,22	Calculate 2/4 x 1/7
Calculate 1/8 + 3/5	Estimate 14.96 x 3.76	Share 36 in the ratio 9 : 3	Expand and simplify (x - 9)(x + 4)
Solve 7(7y + 1) = -91	The mean of these 4 numbers is 7.5. Calculate the missing value. 3,3,13,?	Does the co-ordinate (2 , 8) lie on the graph y = 3x - 1?	Calculate the size of one interior angle in a regular heptagon.

Answers

Answers

$2 \times 3 \times 7$	-6	£70.20	1 : 15
26°	$2a(2a-5b)$	$4n + 2$	1/14
29/40	40	27 : 9	$x^2 - 5x - 36$
$y = -2$	11	$8 = 3(2) - 1$ No	128.6°

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Back to the start!

Solving Linear Equations

(with the unknown on both sides)

Solve the following equations:

$(a)\ 5x + 8 = 4x + 11$

$(b)\ 6x + 2 = 3x + 14$

$(c)\ x + 4 = 3x + 1$

$(d)\ 7x - 2 = 2x + 8$

$(e)\ 5x - 2 = 9x - 2$

$(f)\ 4x + 6 = -3x + 20$

$(g)\ 10 - x = 2x - 5$

$(h)\ 4(2x - 7) = 3(x - 6)$

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Watch this video to see how to do the examples.
Remember to pause the video when promoted to copy the notes.

Notes

Solving Linear Equations

(with the unknown on both sides)

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Solve the following equations:

(a) $5x + 8 = 4x + 11$

$-4x$: $5x+8-4x = 4x+11-4x$

$x + 8 = 11$

-8: $x = 3$

$-4x$, -8

Check $5(3)+8 = 4(3)+11$ ✓

(b) $6x + 2 = 3x + 14$

$-3x$: $3x+2 = 14$

-2: $3x = 12$

$\div 3$: $x = 4$

$-3x$, -2, $\div 3$

Check $6(4)+2 = 3(4)+14$ ✓

(c) $x + 4 = 3x + 1$

$-x$: $4 = 2x+1$

-1: $3 = 2x$

$\div 2$: $\frac{3}{2} = x$

$-x$, -1, $\div 2$

Check $(1.5)+4 = 3(1.5)+1$ ✓

(d) $7x - 2 = 2x + 8$

$-2x$: $5x - 2 = 8$

$+2$: $5x = 10$

$\div 5$: $x = 2$

$-2x$, $+2$, $\div 5$

Check $7(2)-2 = 2(2)+8$ ✓

(e) $5x - 2 = 9x - 2$

$-5x$: $-2 = 4x-2$

$+2$: $0 = 4x$

$\div 4$: $0 = x$

$-5x$, $+2$, $\div 4$

Check $5(0)-2 = 9(0)-2$ ✓

(f) $4x + 6 = -3x + 20$

$+3x$: $7x+6 = 20$

-6: $7x = 14$

$\div 7$: $x = 2$

$+3x$, -6, $\div 7$

Check $4(2)+6 = -3(2)+20$ ✓

(g) $10 - x = 2x - 5$

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

$+5$: $15 = 3x$

$\div 3$: $5 = x$

$+x$, $+5$, $\div 3$

Check $10-(5) = 2(5)-5$ ✓

(h) $4(2x - 7) = 3(x - 6)$

$8x - 28 = 3x - 18$

$-3x$: $5x - 28 = -18$

$+28$: $5x = 10$

$\div 5$: $x = 2$

$-3x$, $+28$, $\div 5$

Check $4(2(2)-7) = 3((2)-6)$ ✓

- 'Solve' means find the value of the letter
- Start by subtracting the least amount of x's from both sides of the equation then solve as usual.
- Remember to check your solution using substitution.

Non-Calculator

Back to the start!

I'm giving it a try!

Solve the following equations:

(1) $2x = x + 4$

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

(3) $3x + 1 = 2x + 5$

(4) $3x + 2 = 2x + 6$

(5) $4x + 2 = 3x + 6$

(6) $3x + 6 = 4x + 2$

(7) $6x + 4 = 5x + 9$

(8) $9a + 8 = 10a + 5$

(9) $3x = x + 4$

(10) $4x = 2x + 4$

(11) $4x + 1 = 2x + 5$

(12) $4x + 2 = 2x + 6$

(13) $5x + 2 = 3x + 6$

(14) $3x + 6 = 5x + 2$

(15) $8x + 3 = 6x + 11$

(16) $5w + 18 = 7w + 4$

(17) $5x + 1 = 2x + 7$

(18) $4x + 5 = 7x + 2$

(19) $5x + 3 = x + 11$

(20) $3x + 38 = 8x + 8$

(21) $6x + 3 = 3x + 3$

(22) $12t + 1 = 8t + 3$

(23) $9x + 5 = 6x + 2$

(24) $9x + 4 = 11x + 10$

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Answers

Answers

I'm giving it a try!

(1) $x = 4$	(2) $x = 4$	(3) $x = 4$	(4) $x = 4$
(5) $x = 4$	(6) $x = 4$	(7) $x = 5$	(8) $a = 3$
(9) $x = 2$	(10) $x = 2$	(11) $x = 2$	(12) $x = 2$
(13) $x = 2$	(14) $x = 2$	(15) $x = 4$	(16) $w = 7$
(17) $x = 2$	(18) $x = 1$	(19) $x = 2$	(20) $x = 6$
(21) $x = 0$	(22) $t = 0.5$ *or* $\frac{1}{2}$	(23) $x = -1$	(24) $x = -3$

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Now that you have marked your work, take time to reflect on how confident you are feeling…

My Reflections…

Back to the start!

I'm building my confidence!

Solve the following equations:

(1) $5x - 3 = 4x + 2$

(2) $8x - 1 = 6x + 5$

(3) $2x + 7 = 5x - 5$

(4) $x + 1 = 3x - 1$

(5) $4x - 6 = 3x$

(6) $7x - 6 = 4x - 3$

(7) $9x - 10 = 5x - 2$

(8) $6x - 5 = 4x - 9$

(9) $2x - 1 = 3x - 4$

(10) $4x - 20 = 10x - 2$

(11) $4x + 1 = 2x - 9$

(12) $3x - 6 = 7x - 4$

(13) $2x + 2 = -x + 11$

(14) $2x + 2 = 11 - x$

(15) $-2x + 1 = 3x + 6$

(16) $5 - 3x = 7x + 20$

(17) $3x - 1 = -x + 7$

(18) $5 - x = 5x - 1$

(19) $-2x + 6 = x - 9$

(20) $3x - 2 = 1 - 3x$

(21) $-x + 1 = -2x + 3$

(22) $7 - 7x = 12 - 2x$

(23) $-2x - 10 = 5x - 10$

(24) $-1 - 2x = 5 - 10x$

Answers

Answers

I'm building my confidence!

(1) $x = 5$

(2) $x = 3$

(3) $x = 4$

(4) $x = 1$

(5) $x = 6$

(6) $x = 1$

(7) $x = 2$

(8) $x = -2$

(9) $x = 3$

(10) $x = -3$

(11) $x = -5$

(12) $x = -0.5$ *or* $-\frac{1}{2}$

(13) $x = 3$

(14) $x = 3$

(15) $x = -1$

(16) $x = -1.5$ *or* $-1\frac{1}{2}$

(17) $x = 2$

(18) $x = 1$

(19) $x = 5$

(20) $x = 0.5$ *or* $\frac{1}{2}$

(21) $x = 2$

(22) $x = -1$

(23) $x = 0$

(24) $x = 0.75$ *or* $\frac{3}{4}$

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Now that you have marked your work, take time to reflect on how confident you are feeling…

My Reflections…

Back to the start!

I'm ready for anything!

Solve the following equations:

(1) $4x = 3(x + 1)$

(2) $3(x + 4) = 2(x + 9)$

(3) $5(x + 2) = 3(x + 4)$

(4) $2(x + 5) = 6(x - 1)$

(5) $4(x - 5) = 7(x - 2)$

(6) $8(2x - 5) = 3(5x - 10)$

(7) $5(2x + 5) = 3(6x + 7)$

(8) $9(2x - 5) = 3(4x + 7)$

(9) $2(2x + 4) = 4(2 - x)$

(10) $10(3x - 4) = 20(5 - 2x)$

(11) $6(3 - 4x) + 14 = 8(3x + 1)$

(12) $5(2 - 7x) + 25x = 2(6 - 4x)$

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Answers

Answers

I'm ready for anything!

(1) $x = 3$

(2) $x = 6$

(3) $x = 1$

(4) $x = 4$

(5) $x = -2$

(6) $x = 10$

(7) $x = 0.5$ *or* $\frac{1}{2}$

(8) $x = 11$

(9) $x = 0$

(10) $x = 2$

(11) $x = 0.5$ *or* $\frac{1}{2}$

(12) $x = -1$

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Now that you have marked your work, take time to reflect on how confident you are feeling…

My Reflections…

Back to the start!

Extension

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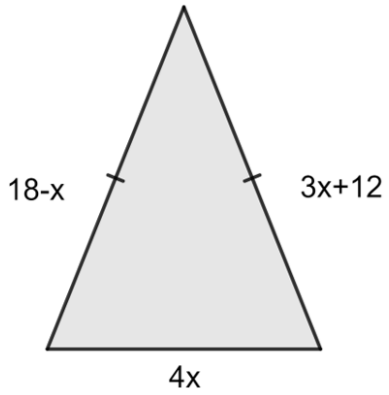
By using your knowledge about isosceles triangles, find:
(a) the value for x
(b) the perimeter of the triangle



By finding the value for x first, find the value for y:

$$6x - 3 = 2x + 29$$

$$5x + 17 = 4x + 2y - 3$$

Explain why the following equation has no solutions:

$$4(3x + 2) = 12x + 5$$

Answers

Answers

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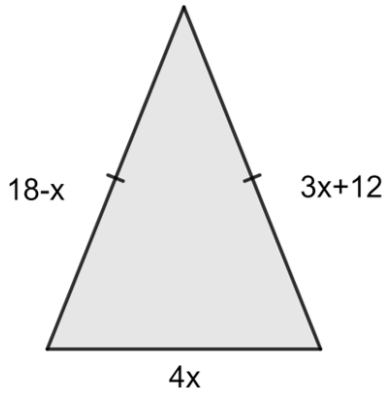
By using your knowledge about isosceles triangles, find:
(a) the value for x
(b) the perimeter of the triangle



$(a)\ 18 - x = 3x + 12$
$x = 1.5$

$(b)\ 18 - x + 3x + 12 + 4x$
$= 30 + 6x$
$= 30 + 6(1.5) = 39$

By finding the value for x first, find the value for y:

$6x - 3 = 2x + 29$

$5x + 17 = 4x + 2y - 3$

$4x - 3 = 29$
$4x = 32$
$x = 8$

$5(8) + 17 = 4(8) + 2y - 3$
$57 = 29 + 2y$
$2y = 28$
$y = 14$

Explain why the following equation has no solutions:

$4(3x + 2) = 12x + 5$

$12x + 8 = 12x + 5$
now subtract $12x$
from both sides
$8 = 5$
this does not make sense

Back to the start!

Homework

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Retrieval Homework	Topic Homework
1) Calculate $\frac{3}{8} + \frac{3}{7}$	*Solve the following equations*:
2) Share 162 in the ratio 3 : 6	$(a)\ 6x + 3 = 5x + 5$
3) Expand $(x - 8)(x + 4)$	$(b)\ 7x + 1 = 4x + 10$
4) Increase £180 by 83%	$(c)\ 2x + 3 = 4x + 5$
5) Solve $9(4y + 1) = 81$	$(d)\ 9x - 11 = 4x + 9$
	$(e)\ 2x + 4 = 8x + 4$
	$(f)\ -x + 2 = 5x - 1$
	$(g)\ 2x - 4 = 8 - 2x$
	$(h)\ 2(x - 3) = 3(5x + 11)$

My Reflections…

[Answers](#)

Answers

Homework

Retrieval Homework

(1) $\frac{45}{56}$ (2) 54:108 (3) $x^2 - 4x - 32$ (4) £329.40 (5) y=2

Topic Homework

$(a)\ x = 2$ $(b)\ x = 3$ $(c)\ x = -1$ $(d)\ x = 4$

$(e)\ x = 0$ $(f)\ x = 0.5\ or\ \frac{1}{2}$ $(g)\ x = 3$ $(h)\ x = -3$

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Back to the start!