

Higher tier unit 9a-1 check in test

Calculator

Q1. Factorise $6x^2 + 5x - 6$.

Q2. Solve $3x^2 = 147$

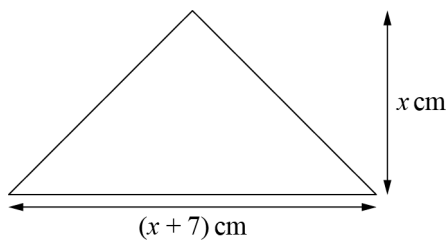
Q3. Solve, by factorising, the equation $8x^2 - 30x - 27 = 0$

Q4. Solve $3x^2 - 5x - 1 = 0$
Give your solutions correct to 3 significant figures.

Q5. Solve $2x^2 + 4x - 5 = 0$
Give your solutions correct to 2 decimal places.

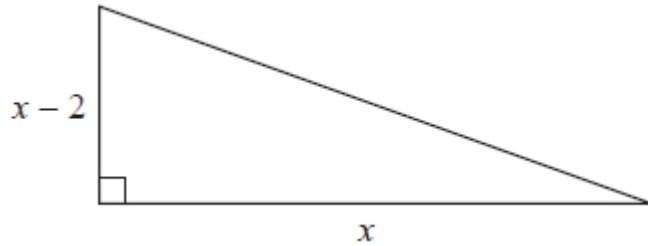
Q6. Solve $\frac{2}{y^2} + \frac{9}{y} - 7 = 0$
Give your solutions correct to 3 significant figures.

Q7. The area of the triangle is 22 cm^2 .



Set up and solve an equation to find the value of x .

Q8. Here is a right-angled triangle.



All measurements are in centimetres.

The area of the triangle is 2.5 cm^2 .

Find the perimeter of the triangle.

Give your answer correct to 3 significant figures.

You must show all of your working.

Q9. The expression $x^2 - 8x + 21$ can be written in the form $(x - a)^2 + b$ for all values of x .
Find the value of a and the value of b .

Q10. Write the expression $x^2 - 8x + 6$ in the form $(x - p)^2 + q$, and use it to solve $x^2 - 8x + 6 = 0$.
Give your answer in surd form.

Topics listed in objectives

- Factorise quadratic expressions in the form $ax^2 + bx + c$;
- Set up and solve quadratic equations;
- Solve quadratic equations by factorisation and completing the square;
- Solve quadratic equations that need rearranging;
- Solve quadratic equations by using the quadratic formula;
- Interpret the solution in the context of the problem;

Answers

Q1. $(3x - 2)(2x + 3)$

Q2. $x = \pm 7$

Q3. $x = 4.5, x = -0.75$

Q4. $x = 1.85, x = -0.180$

Q5. $x = 0.87, x = -2.87$

Q6. $x = 1.48, x = -0.193$

Q7. $x = 4$

Q8. perimeter = 8.64 cm

Q9. $a = 4, b = 5$

Q10. $x = 4 \pm \sqrt{10}$

Higher tier unit 9a-2 check in test

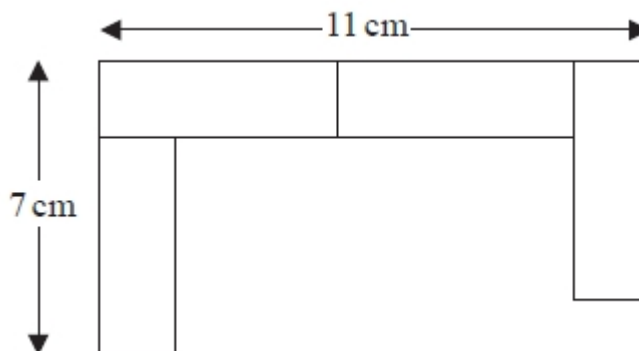
Non-calculator

Q1. Solve the simultaneous equations

$$4x + y = 25$$

$$x - 3y = 16$$

Q2. A pattern is made using identical rectangular tiles.



Find the total area of the pattern.

Q3. A cinema sells adult tickets and child tickets.

The total cost of 3 adult tickets and 1 child ticket is £30

The total cost of 1 adult ticket and 3 child tickets is £22

Work out the cost of an adult ticket and the cost of a child ticket.

Q4. Solve these simultaneous equations.

$$2x + 3y = 9$$

$$3x + 2y = 16$$

Q5. Solve the simultaneous equations

$$3x + 2y = 4$$

$$4x + 5y = 17$$

Q6. Solve the simultaneous equations

$$2x + 3y = \frac{2}{3}$$

$$3x - 4y = 18$$

Q7. Paper clips are sold in small boxes and in large boxes.

There is a total of 1115 paper clips in 4 small boxes and 5 large boxes.

There is a total of 530 paper clips in 3 small boxes and 2 large boxes.

Work out the number of paper clips in each small box and in each large box.

Q8. A curve with equation $y = x^2 + 2x + 3$ crosses a straight line with equation $y = x + 9$ in two places.

Find the coordinates of the two points where the lines intersect.

Q9. C is the curve with equation $y = x^2 - 4x + 4$

L is the straight line with equation $y = 2x - 4$

L intersects C at two points, A and B.

Calculate the exact length of AB.

Q10. Solve the simultaneous equations

$$x^2 + y^2 = 25$$

$$y = 2x + 5$$

Topics listed in objectives

- Find the exact solutions of two simultaneous equations in two unknowns;
- Use elimination or substitution to solve simultaneous equations;
- Solve exactly, by elimination of an unknown, two simultaneous equations in two unknowns:
 - linear / linear, including where both need multiplying;
 - linear / quadratic;
 - linear / $x^2 + y^2 = r^2$;
- Set up and solve a pair of linear simultaneous equations in two variables, including to represent a situation;
- Interpret the solution in the context of the problem;

Answers

Q1. $x = 7, y = -3$

Q2. 48 cm^2

Q3. adult ticket £8.50, child ticket £4.50

Q4. $x = 6, y = -1$

Q5. $x = -2, y = 5$

Q6. $x = 3\frac{1}{3}, y = -2$

Q7. small = 60, large = 175

Q8. $(2, 11), (-3, 6)$

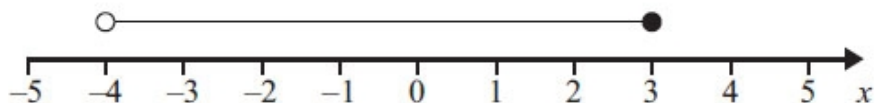
Q9. $AB = \sqrt{20}$ or $2\sqrt{5}$

Q10. $x = 0, y = 5$, or $x = -4, y = -3$

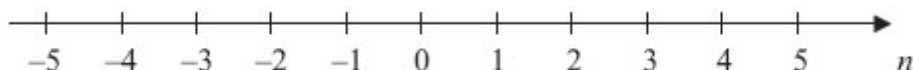
Higher tier unit 9b check in test

Non-calculator

Q1. Write down the inequality shown in the diagram.



Q2. $-2 < n \leq 3$
Represent this inequality on the number line.



Q3. $-3 < n < 4$
 n is an integer.

Write down all the possible values of n .

Q4. $3x + 5 > 16$
 x is an integer.

Find the smallest value of x .

Q5. Solve $6(x - 2) > 15$

Q6. Solve the inequality $8x - 3 \geq 6x + 4$.
Show the solution in a number line.

Q7. Solve the inequality $5e + 3 > e + 12$

Q8. Given that x and y are integers such that

$$3 < x < 7$$

$$4 < y < 9$$

$$\text{and } x + y = 13$$

find all the possible values of x .

Q9. Find the integer x that satisfies both the inequalities.

$$4x + 3 > 15$$

$$4x - 2 < 2x + 8$$

Q10. Solve the simultaneous inequalities.

$$3x - 2y < 7$$

$$7x + 2y \leq 13$$

Topics listed in objectives

- Show inequalities on number lines;
- Write down whole number values that satisfy an inequality;
- Solve simple linear inequalities in one variable, and represent the solution set on a number line;
- Solve two linear inequalities in x , find the solution sets and compare them to see which value of x satisfies both
- solve linear inequalities in two variables algebraically;
- Use the correct notation to show inclusive and exclusive inequalities.

Answers

Q1. $-4 < x \leq 3$

Q2. white circle at -2 , line to black circle at 3

Q3. $-2, -1, 0, 1, 2, 3$

Q4. $x = 4$

Q5. $x > 4\frac{1}{2}$

Q6. number line showing $x \geq 3.5$

Q7. $e > \frac{9}{4}$

Q8. $x = 5$ and 6

Q9. $x = 4$

Q10. $x < 2, y > -0.5$