

Multiplication and Division of Fractions (Without Calculator)

1. Calculate the following, showing all you working clearly. Leave your answers in their lowest form.

(a) $\frac{3}{5} \times \frac{1}{2}$

(b) $\frac{3}{4} \times \frac{1}{6}$

(c) $\frac{7}{8} \times \frac{3}{4}$

(d) $\frac{4}{9} \times \frac{3}{8}$

(e) $\frac{7}{16} \times \frac{8}{21}$

(f) $\frac{3}{25} \times \frac{15}{17}$

(g) $\frac{2}{3} \times \frac{6}{7} \times \frac{1}{8}$

(h) $\frac{5}{7} \times \frac{3}{10} \times \frac{8}{9}$

2. Calculate the following, showing all you working clearly (leave your answers as 'improper fractions' where necessary and write them in their lowest form).

(a) $\frac{1}{4} \times \frac{2}{5}$

(b) $\frac{5}{8} \times \frac{2}{15}$

(c) $\frac{2}{3} \times \frac{9}{16}$

(d) $\frac{6}{7} \times \frac{5}{12}$

(e) $\frac{7}{15} \times \frac{3}{14}$

(f) $\frac{5}{9} \times \frac{3}{10}$

3. Calculate the following, showing all you working clearly. Leave your answers as 'improper fractions' in their lowest form.

(a) $\frac{3}{4} \div \frac{1}{2}$

(b) $\frac{3}{5} \div \frac{1}{10}$

(c) $\frac{3}{5} \div \frac{2}{15}$

(d) $\frac{2}{7} \div \frac{5}{14}$

(e) $\frac{4}{5} \div \frac{2}{15}$

(f) $\frac{12}{35} \div \frac{9}{14}$

(g) $\frac{2}{21} \div \frac{4}{7}$

(h) $\frac{5}{24} \div \frac{2}{9}$

4. Calculate the following, showing all you working clearly. Leave your answers in their lowest form.

(a) $\frac{3}{4} \times \frac{2}{7}$

(b) $\frac{15}{16} \times \frac{4}{5}$

(c) $\frac{3}{5} \times \frac{25}{27}$

(d) $2\frac{1}{2} \times 4\frac{2}{3}$

(e) $5\frac{5}{7} \times 1\frac{1}{5}$

(f) $4\frac{4}{5} \times 3\frac{1}{8}$

(g) $\frac{1}{7} \times 1\frac{1}{5} \times 2\frac{2}{3}$

(h) $\frac{4}{7} \times 1\frac{2}{5} \times 2\frac{3}{11}$

Solving Linear Equations

1. Solve the following equations:

- | | | |
|----------------|----------------|----------------|
| (a) $7x+1=15$ | (b) $3x+5=29$ | (c) $4x+1=37$ |
| (d) $11x-3=19$ | (e) $4x-7=13$ | (f) $5x-11=-1$ |
| (g) $6x-13=-7$ | (h) $3-4x=-17$ | (i) $11-8x=-5$ |
| (j) $9-4x=-19$ | (k) $14-3x=-1$ | (l) $17-5x=32$ |

2. Solve the following equations:

- | | |
|-------------------|--------------------|
| (a) $7x+3=5x+7$ | (b) $11x-7=8x+2$ |
| (c) $12x+11=5x-3$ | (d) $9x-1=7x+7$ |
| (e) $7+4x=6x-3$ | (f) $11-x=3x+19$ |
| (g) $13-x=x+11$ | (h) $13-5x=28-2x$ |
| (i) $17x-2=18-3x$ | (j) $17-8x=29-14x$ |

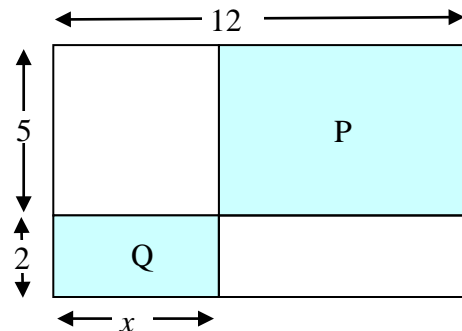
3. The sum of four consecutive numbers is 98. Let the first number be x and write down the other three numbers in terms of x . Find the four numbers.

4. The sum of four consecutive *odd* numbers is 216. Find the numbers.

5. You have three consecutive even numbers so that the sum of twice the smallest number plus three times the middle number is four times the largest number. Find the three numbers.

6.

- (a) The area of rectangle P is five times the area of rectangle Q. Find x .
- (b) The value of x is changed and the areas of the unshaded rectangles become equal. Find the new value of x .



Graphs of Quadratics

1. The table of values below is for the graph $y = x^2 - 6x + 1$

x	0	1	2	3	4	5	6
y			-7				

- Copy and complete the above table.
- Draw a scale from 0 to 6 on the x -axis (2cm per unit) and from -10 to 5 on the y -axis (1cm per unit).
- Draw a sketch of the curve $y = x^2 - 6x + 1$.
- Use your graph to find the values of x (to 1dp) when $y = 0$ and $y = -5$.

2. The table of values below is for the graph $y = x^2 - 2x - 4$

x	-3	-2	-1	0	1	2	3	4	5
y								4	

- Copy and complete the above table.
- Draw a scale from -3 to 5 on the x -axis (2cm per unit) and from -8 to 12 on the y -axis (1cm per unit).
- Draw a sketch of the curve $y = x^2 - 2x - 4$.
- Use your graph to solve (to 1dp) the equation $x^2 - 2x - 4 = 0$
- Use your graph again to solve (to 1dp) the equation $x^2 - 2x - 4 = 5$
- What is the smallest value of $x^2 - 2x - 4$ and which value of x achieves this smallest value?

3. The table of values below is for the graph $y = 1 - 4x - x^2$

x	-6	-5	-4	-3	-2	-1	0	1	2
y								-4	

- Copy and complete the above table.
- Draw a scale from -6 to 2 on the x -axis (2cm per unit) and from -12 to 6 on the y -axis (1cm per unit).
- Draw a sketch of the curve $y = 1 - 4x - x^2$.
- Use your graph to solve (to 1dp) the equation $1 - 4x - x^2 = 2$
- What is the largest value of $1 - 4x - x^2$ and which value of x achieves this largest value?

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4. (a) Solve the equation $x^2 + 5x + 6 = 0$ by factorising.
- (b) Explain why the equation $x^2 + 5x + 5 = 0$ cannot be solved in this way.
- (c) Copy and complete the table of values below is for the graph $y = x^2 + 5x + 5$

x	-6	-5	-4	-3	-2	-1	0	1
y						1		

- (d) Draw a scale from -6 to 1 on the x -axis (2cm per unit) and from -3 to 11 on the y -axis (1cm per unit).
- (e) Draw a sketch of the curve $y = x^2 + 5x + 5$
- (f) Use your graph to solve (to 1dp) the equation $x^2 + 5x + 5 = 0$.
5. A javelin thrower reckons that if y is the height (in m) above the ground of the javelin and x is the horizontal distance (in m) of the javelin from his feet when he throws it then x and y are connected by the equation $y = 1.8 + x - 0.014x^2$ when the throw it as 45° to the horizontal.
- (a) Copy and complete the following table (to 1dp):

x	0	10	20	30	40	50	60	70
y	1.8							

- (b) Draw a scale from 0 to 80 on the x -axis (1cm per 5m) and from 0 to 20 on the y -axis (1cm per 2m).
- (c) Draw a sketch of the curve $y = 1.8 + x - 0.014x^2$
- (d) How far does he throw the javelin (to the nearest m)?
- (e) What is height (to the nearest m) above the ground of the javelin at its highest point?
- (f) When an object is thrown at 45° to the horizontal at a speed of u m/s from a height of h m above the ground its path has equation $y = h + x - \frac{9.8}{u^2}x^2$.
- (i) From what height was the javelin thrown?
- (ii) At what speed was it thrown?

Constructions using a Straight Edge and a Compass

1.
 - (a) Draw any line AB.
 - (b) Construct the perpendicular bisector of AB. Mark the midpoint of AB as the point C.
 - (c) Draw a semicircle with C as the centre and AB as the diameter.
 - (d) Draw any line, starting at A so that it crosses the semicircle and continues on. Label the point where it crosses the semicircle as the point D.
 - (e) Construct the line which is perpendicular to AD and which passes through D.
 - (f) Where does the line you drew in (e) meet the line AB?
 - (g) If E is any point on the semicircle, what is the angle AEB?

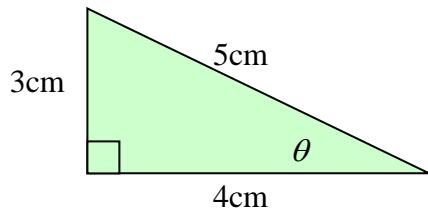
2.
 - (a) Draw a circle with a radius of about 6cm.
 - (b) Mark points A, B and C on the circle so that they are roughly equally spaced around the circle.
 - (c) Draw the lines AB, AC and BC.
 - (d) Construct the line through A and perpendicular to BC.
 - (e) Construct the line through B and perpendicular to AC.
 - (f) Construct the line through C and perpendicular to AB.
 - (g) Label the point of intersection X.
 - (h) Construct the point Y that is the mirror image of X about the line AC.
 - (i) What do you notice about the point Y?

3.
 - (a) Draw the line AB with length 10cm in the middle of the page.
 - (b) Construct the point C such that AC is 8cm and BC is 5cm.
 - (c) Construct the midpoint of AB and label it P.
 - (d) Construct the midpoint of BC and label it Q.
 - (e) Construct the midpoint of AC and label it R.
 - (f) Draw the lines RP, RQ and PQ.
 - (g) What is the length of RQ and to which line is it parallel?

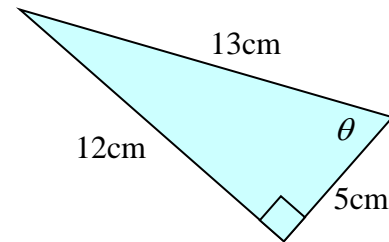
Trigonometry (Without calculators)

1. Find $\sin \theta$, $\cos \theta$ and $\tan \theta$ as fractions in the following triangles:

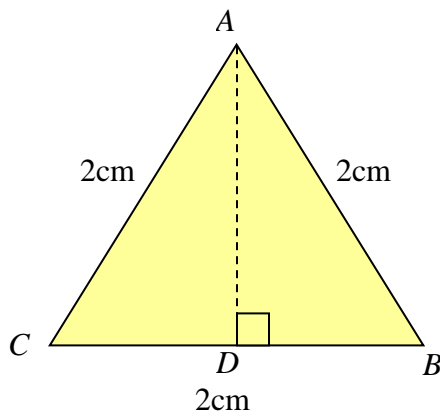
(a)



(b)



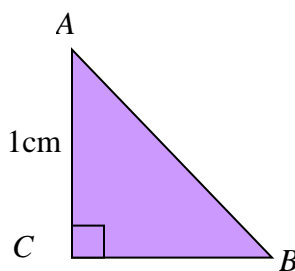
- 2.



ABC is an equilateral triangle. D is the midpoint of CB .

- Find the angle DAB .
- Write down the length of DB .
- Calculate the length DA using Pythagoras' theorem (express your answer in the form \sqrt{n}).
- Use the triangle ADB to evaluate $\sin 30^\circ$, $\cos 30^\circ$ and $\tan 30^\circ$ (leave \sqrt{n} in your answers where necessary).
- Use the triangle ADB to evaluate $\sin 60^\circ$, $\cos 60^\circ$ and $\tan 60^\circ$ (leave \sqrt{n} in your answers where necessary).

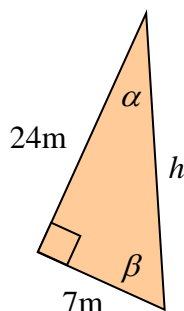
- 3.



ABC is an isosceles triangle.

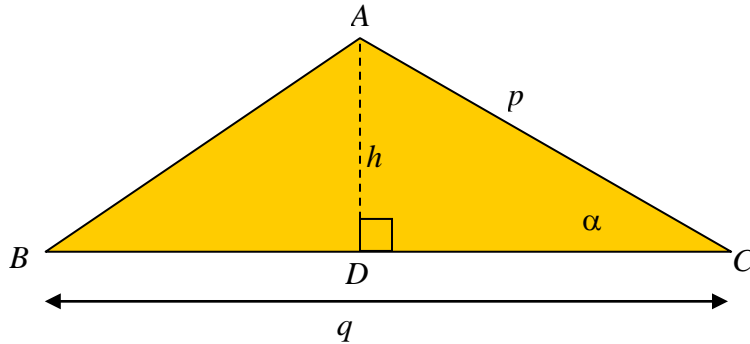
- Show that the angle CAB is 45° .
- Write down the length of CB .
- Calculate the length AB using Pythagoras' theorem (express your answer in the form \sqrt{n}).
- Find expressions for $\sin 45^\circ$, $\cos 45^\circ$ and $\tan 45^\circ$.

- 4.



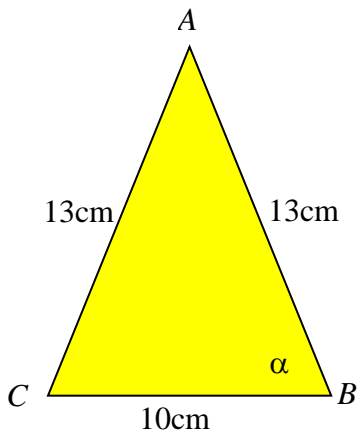
- Show that $h = 25m$.
- Express $\sin \alpha$, $\cos \alpha$ and $\tan \alpha$ as fractions.
- Express $\sin \beta$, $\cos \beta$ and $\tan \beta$ as fractions.
- Of the values calculated in (b) and (c) what is equal to
 - $\sin \alpha$
 - $\cos \alpha$
 - $\frac{1}{\tan \alpha}$
 - $\frac{\sin \alpha}{\cos \alpha}$

5.



- Express $\sin \alpha$ as a fraction in terms of h and p .
- Write down an expression for the area of the triangle ABC in terms of h and q .
- Hence show that the area of the triangle ABC is $\frac{1}{2} pq \sin \alpha$.

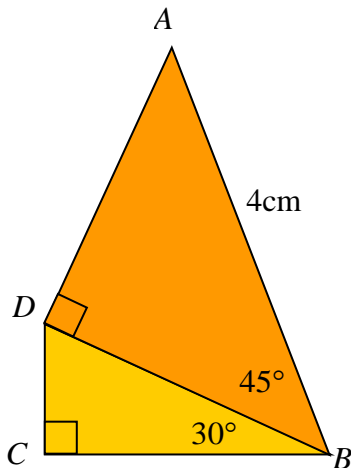
6.



The triangle ABC is isosceles and has side lengths as shown.

- Find the height of the triangle.
- Express $\sin \alpha$, $\cos \alpha$ and $\tan \alpha$ as fractions.


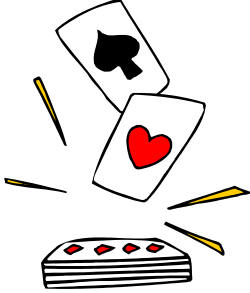

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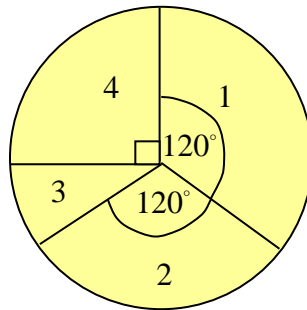
In the diagram shown opposite find the following in terms of square roots:

- AD (use question 3(d))
- BD (use question 3(d))
- CD (use question 2(d))
- CB (use question 2(d))

Probability

1.  A fair die is tossed. Find, as fractions, the probability of getting :
- A six
 - An even number
 - A number greater than 4
 - A prime number (1 is not prime)
 - 4 or an odd number.
2. A bag contains 7 red balls, 3 yellow balls and 2 blue balls. A ball is selected at random. Find, as fractions, the probability of the ball being:
- a red ball
 - a yellow ball
 - a yellow or a blue ball
 - a red or a blue ball.
3. A die is biased so that the numbers 1 to 5 appear with the same probability but the number 6 appears less often. The probability of getting a 6 is only 0.1.
- Find the probability of getting a number other than 6.
 - Show that the probability of getting the number 5 is 0.18.
 - Find the probability of getting a number greater than 3.
4.  A normal pack of 52 cards contains 13 cards of each suit (Spades, Clubs, Diamonds and Hearts). In each suit there is an ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen and King. I choose a card at random from the pack. What is the probability that:
- The card is a Heart.
 - The card is a King.
 - The card is the Ace of Spades
 - The number on the card is 7 or 8.
5. The first day of 2003 was a Wednesday and, as a non leap-year, the year 2003 had 365 days. A pupil was chosen at random from a class. What is the probability that, in 2003, her birthday fell on a Thursday? 
6. In a rugby team of 15 players, five players were 17 years old, seven players were 18 and the rest were 16. A player is chosen at random. Find the probability that he was:
- 16
 - 16 or 17
7. The lottery basket contains 49 balls numbered from 1 to 49. What is the probability of getting:
- A single digit number.
 - An even number.
 - A multiple of 7.
 - A multiple of 5 or a multiple of 17.

8. A circular spinner has an arrow in the middle. The circle is split into four sections as shown below.



Find the probability that when the arrow is spun, the number of the section on which it lands is:

- (a) 4.
 (b) 3.
 (c) at least 2.
 (d) an even number.
9. A spinner similar to that in question 8 has 4 sections, numbered 1, 2, 3 and 4. The area for 2 is twice the area for 1, the area for 3 is three times the area for 1 and the area for 4 is four times the area for 1.
 If p is the probability of getting a 1 then:
- (a) write down, in terms of p , the probabilities of getting 2, 3 and 4.
 (b) Find p .
 (c) Find the probability of getting an even number.
10. The probabilities associated with the scores on a biased die are shown below:

Score	1	2	3	4	5	6
Probability	0.1	0.3	0.05		0.25	0.15

- (a) Find the probability of getting a 4 when the die is rolled.
 (b) Find the probability of getting an odd number when the die is rolled.
 (c) Find the probability of getting at least 4 when the die is rolled.

Quadratic Factorisation

1. Multiply out the following:

(a) $(x+2)(x+3)$

(b) $(x+4)(x+7)$

(c) $(x-2)(x-2)$

(d) $(x-4)(x-5)$

(e) $(x-8)(x+3)$

(f) $(x-1)(x+1)$

(g) $(x-11)(x+12)$

(h) $(x+7)(x-9)$

2. Factorise the following quadratics:

(a) $x^2 + 5x + 6$

(b) $x^2 + 7x + 12$

(c) $x^2 + 3x + 2$

(d) $x^2 + 8x + 12$

(e) $x^2 + 12x + 35$

(f) $x^2 + 13x + 42$

(g) $y^2 + 6y + 9$

(h) $z^2 + 10z + 24$

(i) $h^2 + 12h + 32$

(j) $t^2 + 2t + 1$

3. Factorise the following quadratics:

(a) $x^2 - 7x + 6$

(b) $x^2 + 3x - 28$

(c) $x^2 - 14x + 24$

(d) $x^2 - 17x + 70$

(e) $a^2 - 15a + 56$

(f) $b^2 + b - 6$

(g) $y^2 - 13y - 48$

(h) $z^2 - 18z - 40$

(i) $h^2 + 15h + 26$

(j) $t^2 + 3t + 2$

(k) $m^2 - 3m - 130$

(l) $q^2 + 7q - 60$

4. Factorise the following quadratics:

(a) $s^2 + 2s + 1$

(b) $h^2 - h - 110$

(c) $z^2 + 19z + 48$

(d) $u^2 + 2u - 8$

(e) $w^2 - 54w$

(f) $v^2 - 3v - 40$

(g) $t^2 + t - 42$

(h) $x^2 - x - 20$

(i) $x^2 + x - 30$

(j) $p^2 + 27p$

(k) $y^2 - 1$

(l) $r^2 - r - 42$

(m) $k^2 - 100$

(n) $r^2 - 36$

5. Factorise the following:

(a) $x^2 + 11x + 30$

(b) $x^2 - 9x - 10$

(c) $t^2 - 2t - 8$

(d) $x^2 - 7x - 8$

(e) $y^2 - y - 42$

(f) $z^2 + 3z$

(g) $u^2 - 4$

(h) $w^2 - 9$

Completing the Square

- Write the following in the form $(x+p)^2 + r$ where p and r are numbers to be determined:
 - $x^2 + 8x + 7$
 - $x^2 + 12x + 25$
 - $x^2 + 18x + 75$
 - $x^2 + 6x + 5$
 - $x^2 + 10x + 7$
 - $x^2 + 12x + 3$
 - $x^2 + 2x - 1$
 - $x^2 + 8x - 3$
 - $x^2 + 4x + 1$
 - $x^2 + 14x + 40$
- Write the following in the form $(x+p)^2 + r$ where p and r are numbers to be determined:
 - $x^2 - 8x + 11$
 - $x^2 - 12x + 13$
 - $x^2 - 18x + 60$
 - $x^2 + 6x + 6$
 - $x^2 - 10x - 15$
 - $x^2 + 12x + 29$
 - $x^2 - 2x + 3$
 - $x^2 + 8x + 13$
 - $x^2 - 4x - 10$
 - $x^2 + 14x - 3$
- Solve the following equations by completing the square (leaving square roots in your answers):
 - $x^2 + 2x - 1 = 0$
 - $x^2 - 4x - 3 = 0$
 - $x^2 + 12x + 36 = 0$
 - $x^2 + 20x + 5 = 0$
 - $x^2 + 8x - 9 = 0$
 - $x^2 - 2x - 7 = 0$
- Solve the following equations by completing the square. First write them in the form $x^2 + px + q = 0$. Leave square roots in your answers.
 - $2x^2 + 4x - 6 = 0$
 - $3x^2 + 15x - 12 = 0$
 - $2x^2 + 10x + 1 = 0$
 - $2x^2 + 8x - 12 = 0$
- If $f(x) = x^2 + 4x + 5$ then show that it can be written as $f(x) = (x+2)^2 + 1$.
 - What is the minimum value of $f(x)$?
 - What value of x generates this minimum value of $f(x)$?
- By completing the square, find the minimum value of the following functions:
 - $f(x) = x^2 + 2x - 3$
 - $g(x) = x^2 - 10x + 3$
 - $h(x) = x^2 - 4x + 1$

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7. By completing the square, find the co-ordinates of the turning points of following curves
- (a) $y = x^2 + 6x - 1$
 - (b) $y = x^2 - 2x + 5$
 - (c) $y = x^2 + 6x + 9$
 - (d) $y = x^2 + x - 1$
8. (a) Find the minimum value of the function $f(x) = x^2 + 4x + 5$.
- (b) How many solutions are there to the equation $x^2 + 4x + 5 = 0$?
- (c) Explain what happens when you try to solve the equation $x^2 + 4x + 5 = 0$ by completing the square.
- (d) What is the largest value of p for there to be at least one solution to the equation $x^2 + 4x + p = 0$?
9. By completing the square on the denominator find the maximum value of the function $f(x) = \frac{6}{x^2 + 6x + 11}$. What value of x achieves this maximum?

Solving Quadratic Equations

1. Solve the following equations:
- | | |
|--------------------------|--------------------------|
| (a) $a^2 + 7a + 10 = 0$ | (b) $w^2 + 10w + 16 = 0$ |
| (c) $x^2 - 8x + 15 = 0$ | (d) $y^2 - 2y + 1 = 0$ |
| (e) $h^2 + 5h - 14 = 0$ | (f) $r^2 + 3r - 10 = 0$ |
| (g) $t^2 - 10t - 24 = 0$ | (h) $k^2 + 7k - 18 = 0$ |
| (i) $y^2 - 16 = 0$ | (j) $m^2 + 2m = 0$ |
| (k) $u^2 - 5u = 0$ | (l) $k^2 - 36 = 0$ |
2. Solve the following equations:
- | | |
|---------------------|---------------------|
| (a) $a(a + 2) = 35$ | (b) $c(c + 3) = 28$ |
|---------------------|---------------------|
3. A photograph of area 40 cm^2 is 3cm longer than it is wide.

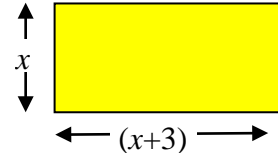
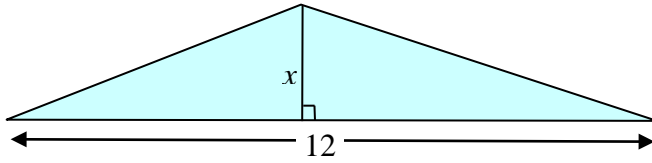


If its width is x cm then:

- | | |
|--|--|
| (a) Write down an expression for the length in terms of x . | |
| (b) Write down an equation which x satisfies and hence show that $x^2 + 3x - 40 = 0$. | |
| (c) Find the two solutions to this equation. | |
| (d) Hence write down the width of the photograph. | |
4. A rectangle has area 24 cm^2 its length is 5cm shorter than its width. If its width is w cm then:
- | | |
|---|--|
| (a) Write down an expression for the length in terms of w . | |
| (b) Write down an equation which w must satisfy. | |
| (c) Find the two solutions to this equation. | |
| (d) Hence write down the width of the rectangle. | |
5. A triangle is such that the length of its base is 4cm longer than its height. The area of the triangle is 30 cm^2 .
- | | |
|---|--|
| (a) Write down an expression for the length of its base in terms of h where h cm is the height of the triangle. | |
| (b) Write down an equation which h must satisfy. | |
| (c) Find the two solutions to this equation. | |
| (d) Hence find the height of the triangle. | |

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6. The triangle and the rectangle have the same area.



- (a) Write down an equation involving x .
- (b) Find the two solutions to this equation.
- (c) Hence write down the one possible value of x in the above diagrams.
7. (a) Solve the equation $x^2 + 3x + 2 = 0$.
- (b) Solve the equation $x^2 - 7x + 12 = 0$.

Arithmetic Sequences (without calculators)

$$\text{You may use } u_n = a + (n-1)d \text{ and } S_n = s_n = \frac{n}{2}(a+l) = \frac{n}{2}(2a + (n-1)d)$$

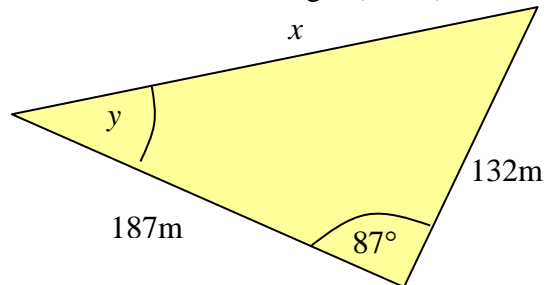
- A man has to put up 50 fence pegs in a straight line – each of them is 3m from the next one. They are initially all lying in a pile. He puts the first peg in at the foot of the pile. He then carries the second peg 3m and puts that one in. He goes back to the pile, collects another peg and walks 6m to put in the next one. This continues until he has put in each peg, after which he walks back to where he started.
 - How far did he walk to put in the second peg (there and back)?
 - Show that the distance (there and back) he walks for each peg is an arithmetic sequence.
 - Find the total distance that the man walked.
- The 7th term of an arithmetic sequence is 336. If the sum of the first 7 terms of this arithmetic sequence is five times the 7th term then:
 - write down two equations involving the first term a and the common difference d .
 - solve these to find a and d .
- Find the sum of the integers between 1 and 100 which are divisible by 3.
- Show that the sum of the first n terms of the arithmetic sequence $2 + 3\frac{1}{4} + 4\frac{1}{2} + \dots$ is $\frac{5n^2 + 11n}{8}$.
 - How many terms are needed to make a sum of 204?
- An arithmetic sequence has thirteen terms whose sum is 143. The third term is 5.
 - write down two equations involving the first term a and the common difference d .
 - solve these to find the first term.
- Find the sum of the integers from 1 to 100, inclusive.
 - Find the sum of the integers from 1 to 100, inclusive, which are divisible by six.
 - Hence find the sum of the integers from 1 to 100, inclusive, which are not divisible by six.
- The 3rd term of an arithmetic series is 11 and the common difference is -3.
 - Find the first term.
 - Find the smallest value of n such that the n th term is negative.
 - Find the sum of the first 15 negative terms.
- The 5th term of an arithmetic series is 3 and the common difference is 7.
 - Find the first term.
 - Find the sum of the first ten positive terms.

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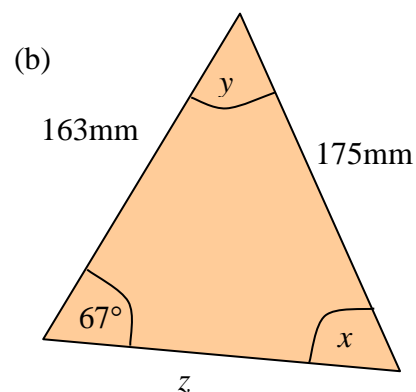
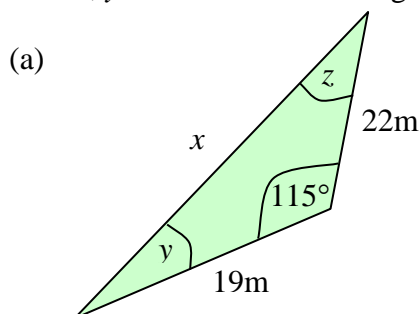
9. The sum of the first n terms of a certain sequence is $3n^2 + 10n$ for all values of n .
- Find the n th term by calculating $S_n - S_{n-1}$.
 - Hence describe the sequence.
10. Find the first term and the common difference of an arithmetic sequence which is such that the sum of its first n terms is given by $S_n = 7n^2 - 4n$.
11. A child wishes to build up a triangular pile of toy bricks so as to have 1 brick in the top row, 2 in the second, 3 in the third and so on.
- Find the numbers of bricks needed to make n rows.
 - If he has 100 bricks, how many rows can he complete and how many bricks will he have left over?
12. Show that the sum of the odd numbers from 1 to 55 inclusive is equal to the sum of the odd numbers from 91 to 105 inclusive.
13. The eighth term of an arithmetic sequence is twice the third term, and the sum of the first eight terms is 39.
- Write down two equations involving the first term a and the common difference d .
 - Solve these to find a and d .
 - Show that its sum to n terms is $\frac{3n(n+5)}{8}$.

Sine and Cosine Rule

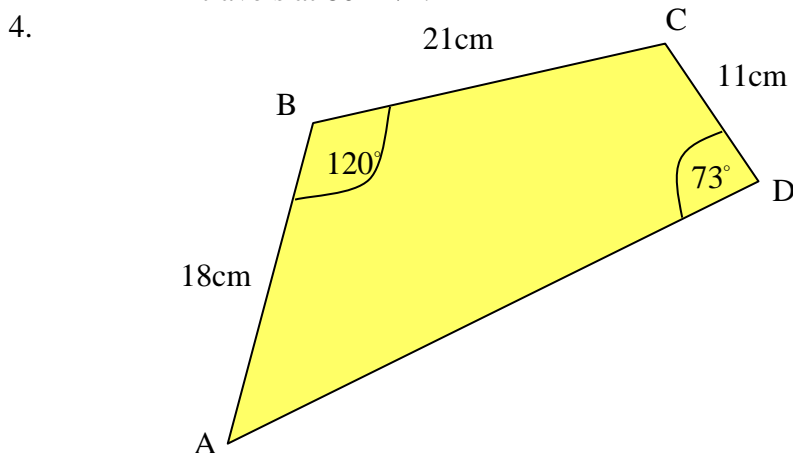
1. (a) Find x (to 3sf) and y (to 1dp) in the triangle shown below:
 (b) Find also the area of the triangle (to 3sf).



2. Find x , y and z in the following triangles:



3. A car travels 15km from A on a bearing of 100° to a point B. It then travels 12 km from B on a bearing of 175° to a point C. It then returns to A.
 (a) Calculate the area enclosed by this journey (to 3sf).
 (b) Calculate the time (to the nearest minute) it takes to travel from C to A if the car travels at 80km/h.



- (a) Find the length of AC (to 3sf) in the quadrilateral shown above.
 (b) Find the area (to 3sf) of the triangle ABC.
 (c) Find the angle CAD (to 1dp) and so find the angle ACD (to 1dp).
 (d) Hence find the area of the quadrilateral ABCD (to 2sf).

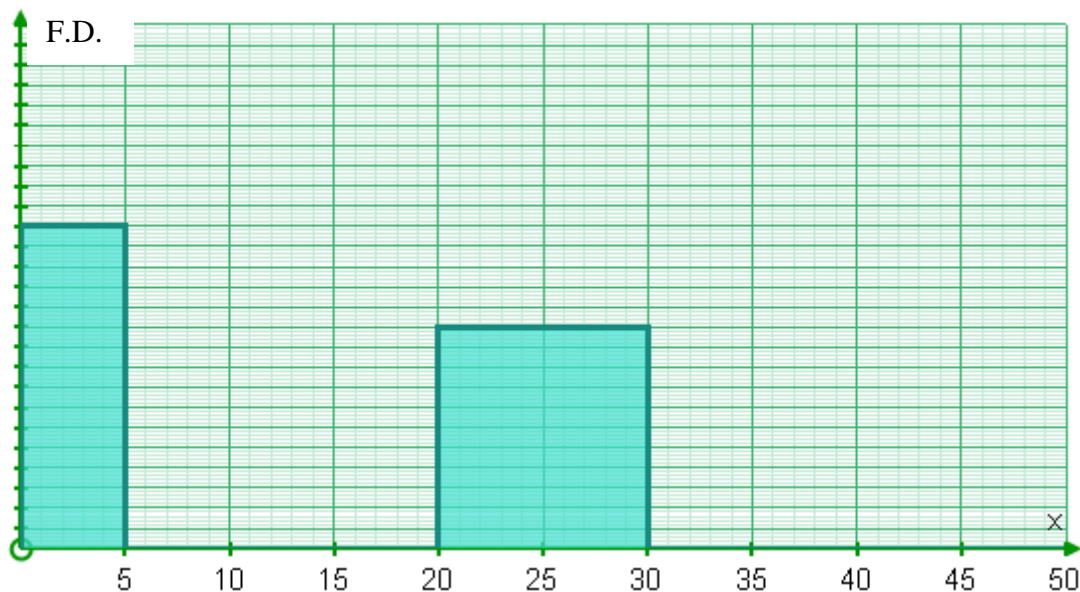
Histograms

1. In an experiment, 64 flowers were grown and their heights were measured. The results are summarised in the table:

Height (cm)	$0 \leq h < 5$	$5 \leq h < 10$	$10 \leq h < 20$	$20 \leq h < 30$	$30 \leq h < 50$
No. of flowers	8	12	25	11	8

- (a) Copy and complete the above table with a third row showing frequency density.

Some of the data has been used to start the histogram:



- (b) Use the histogram and the values of frequency density to work out what each mark on the vertical axis represents.
- (c) Hence copy and complete the histogram, using 1cm between each bold vertical line and 0.5cm between each bold horizontal line.
2. A histogram was drawn for the data shown below. The table summarises the height and the width of each bar of this histogram.

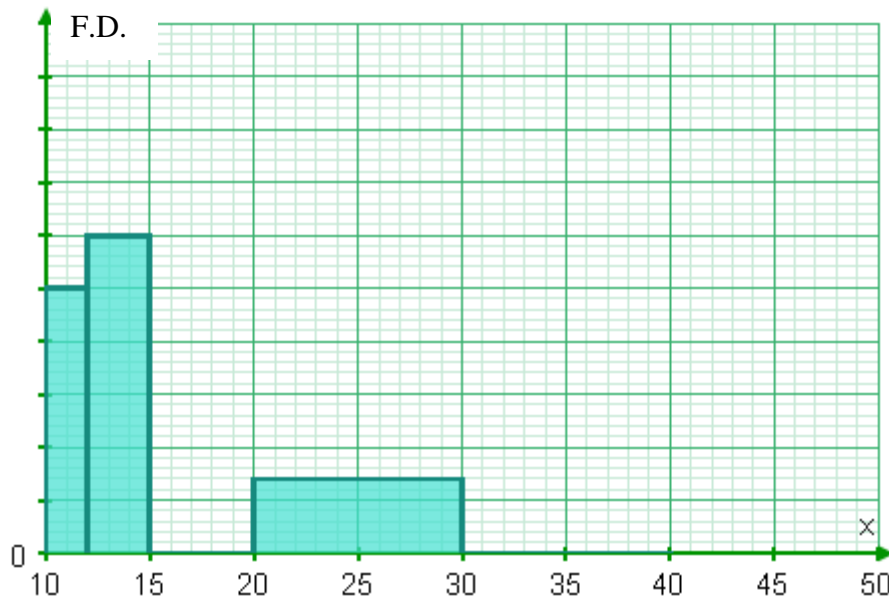
Height (cm)	Frequency	Frequency Density	Height on Histogram (cm)	Width on Histogram (cm)
20-	12		12	2
25-	16			
30-		2.5		
40-			2.5	
60-80	16			

Copy and complete the above table.

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3. The times that competitors took to complete a race were recorded. The results are summarised in the table and histogram shown below, neither of which is completed:

Time (min)	$10 \leq t < 12$	$12 \leq h < 15$	$15 \leq h < 20$	$20 \leq t < 30$	$30 \leq t < 40$
No. of flowers	10		35		12



- (a) Copy and complete the above table with a third row showing frequency density, in the cases where frequency density is given.
- (b) Use the histogram and the values of frequency density to work out what each mark on the vertical axis represents.
- (c) Hence copy and complete the histogram, using 2cm between each bold vertical line and 0.5cm between each bold horizontal line.
- (d) Use the histogram to fill in the gaps in the table.
4. A histogram was drawn the data shown below. The table summarises the height and the width of each bar of this histogram.

Weight (kg)	Frequency	Frequency Density	Width on Histogram (cm)	Height on Histogram (cm)
100-	23		2cm	
110-		3.1		
130-	40			4cm
150-	15			
175-200		0.4		

Copy and complete the above table.