

Pre-Assessment Task - Maths A-Level

Name:

To be able to add and subtract fractions

1. (a) $\frac{3}{4} + \frac{1}{7} =$

(b) $\frac{8}{9} - \frac{3}{4} =$

(c) $3\frac{1}{3} + 1\frac{3}{5} =$

To be able to solve linear inequalities.

2. (a) $7q + 5 \geq 12$

(b) $5(a - 3) > 3a - 5$

(c) $4x - 5 < -3$

(d) $2(q - 3) \leq 5 + 7q$

To be able to simplify expressions with indices

3. Evaluate:

(a) 8^0

(b) 3^{-2}

(c) 2^{-4}

(d) $25^{\frac{1}{2}}$

(e) $8^{\frac{2}{3}}$

(f) $64^{\frac{-3}{2}}$

To be able to solve equations involving indices

4. If $3^{(x-y)} = 27$ and $3^{(x+y)} = 243$, then x is equal to:

5. Solve:

(a) $3^x = 81$

(b) $2^x = 128$

(c) $6^x = \frac{1}{216}$

(d) $25^x = \frac{1}{5}$

To be able to simplify surds.

6. (a) Simplify $\sqrt{54}$

(b) Work out the value of $(5 - \sqrt{3})^2$. Give your answer in the form $a + b\sqrt{3}$ where a and b are integers.

To be able to rationalise the denominator.

7. (a) Rationalise the denominator in $\frac{8}{3\sqrt{6}}$

(b) Rationalise the denominator in $\frac{5}{3 + \sqrt{7}}$

(c) Express $\frac{12}{\sqrt{3}}$ in the form $a\sqrt{b}$ where a and b are integers.

To be able to find the gradient of a straight line

8. (i) Find the gradient of the straight line A with equation $5y = 3 - 2x$.

(ii) Give a possible equation for a line parallel to line A:

(iii) Give a possible equation for a line perpendicular to line A:

To be able to find the equation of a straight line.

9. The straight line L_1 has equation $y = 2x + 3$.
The straight line L_2 is parallel to the straight line L_1 .
The straight line L_2 passes through the point $(3, 2)$.
Find an equation of the straight line L_2 .
Find the equation of the line passing through the points $(1, 5)$ and $(5, -3)$.
Find the equation of the line perpendicular to $3y = 5 - 2x$ passing through the point $(4, 10)$.

To be able to expand brackets.

10. (a) $6(7d - 4)$
- (b) $5x(2x^2 + 3x - 2)$
- (c) $2xy(4x - y)$
- (d) $(3x - 9)(5x + 7)$

To be able to solve simultaneous equations

11. (a) Solve $2x + 5y = -1$
 $6x - y = 5$

(b) Solve $y = x^2 - 3x + 4$
 $y - x = 1$

(c) The line $x - y = 5$ intersects with the curve $x^2 + y^2 = 121$ at points A and B.
Find the coordinates of A and B.

To be able to calculate line segments using pythagoras.

12. The coordinates of the points A and B are (6, 8) and (1, 1).
Work out the length of AB.

To be able to solve quadratic equations by factorising

13. (a) Solve $x^2 - 14x - 147 = 0$

(b) Solve $3x^2 - 20x - 32 = 0$

To be able to solve quadratic equations by *completing the square*

14. Solve the following by completing the square, leave your answer in surd form.

(a) $x^2 + 14x + 13 = 0$

(b) $x^2 + 3x - 12 = 0$

To be able to solve quadratic equations using the quadratic formula.

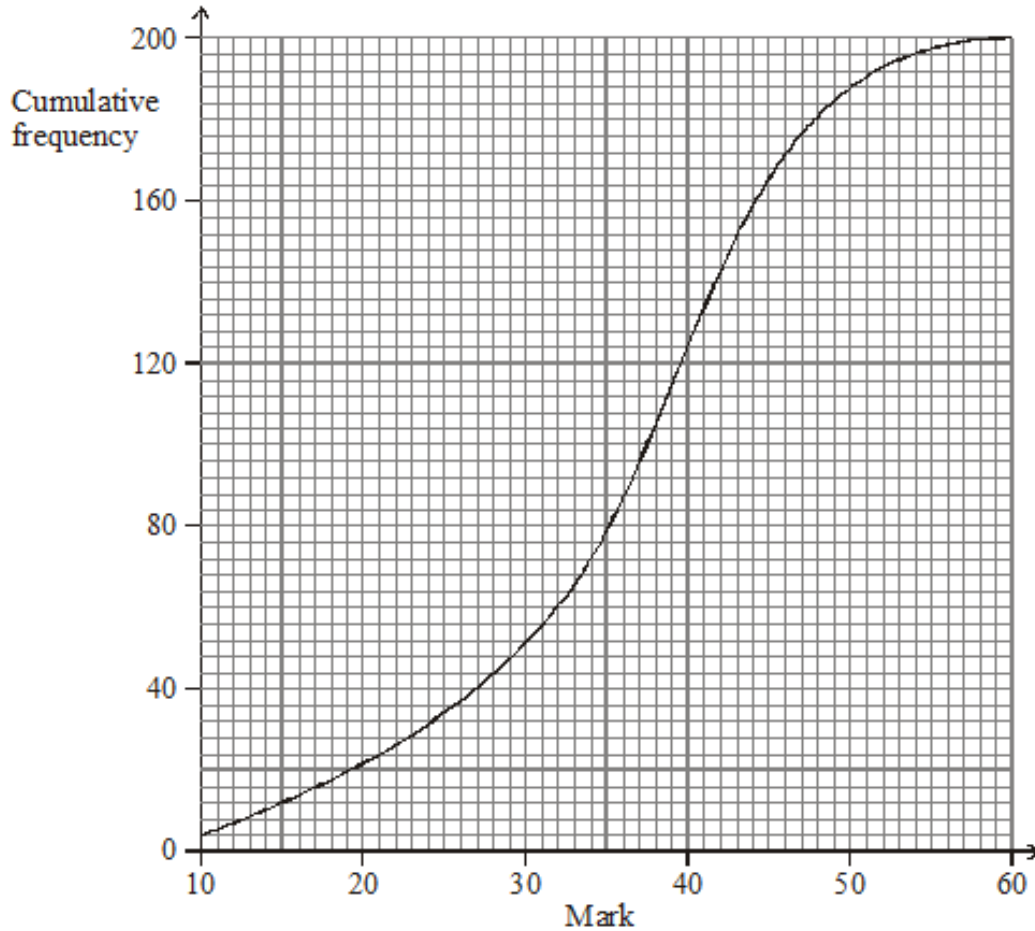
15. $3x^2 - 2x - 9 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

To be able to interpret cumulative frequency curves.

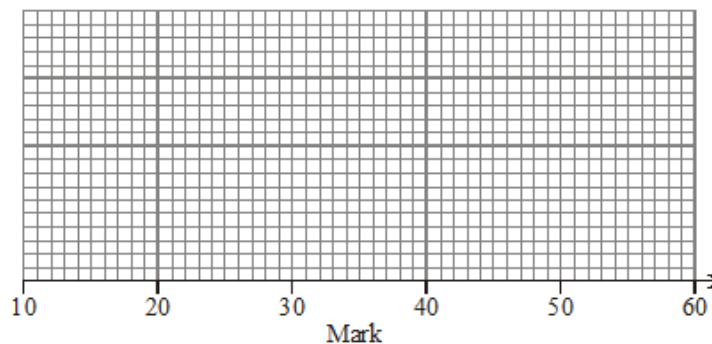
200 students took a test.

The cumulative frequency graph gives information about their marks.



The lowest mark scored in the test was 10.
The highest mark scored in the test was 60.

Use this information and the cumulative frequency graph to draw a box plot showing information about the students' marks.



What percentage of students had a mark greater than 45?

To be able to construct and interpret histograms

The incomplete histogram and table show information about the weights of some vehicles.

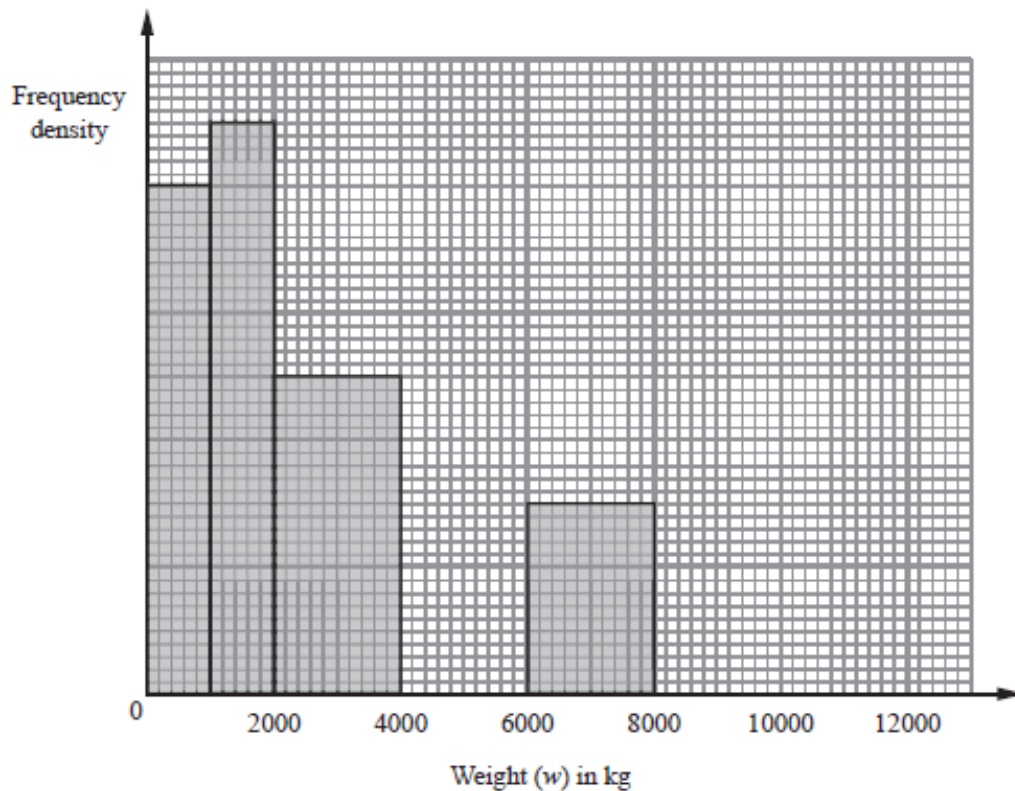
Weight (w) in kg	Frequency
$0 < w \leq 1000$	16
$1000 < w \leq 2000$	
$2000 < w \leq 4000$	
$4000 < w \leq 6000$	14
$6000 < w \leq 8000$	
$8000 < w \leq 12000$	4

(a) Use the information in the histogram to complete the table.

(2)

(b) Use the information in the table to complete the histogram.

(2)



To be able to solve probability questions

There are n sweets in a bag.

6 of the sweets are orange.

The rest of the sweets are yellow.

Hannah takes a random sweet from the bag. She eats the sweet.

Hannah then takes another random sweet from the bag. She eats the sweet.

The probability that Hannah eats two orange sweets is $\frac{1}{3}$

(a) Show that $n^2 - n - 90 = 0$

(b) Solve $n^2 - n - 90 = 0$ to find the value of n .

To be able to use SUVAT equations

$$\begin{aligned}v &= u + at \\s &= \left(\frac{u + v}{2}\right)t \\v^2 &= u^2 + 2as \\s &= ut + \frac{1}{2}at^2\end{aligned}$$

1. A car accelerates uniformly from 5m/s to 15m/s taking 7.5 seconds. How far did it travel during this period?
2. A train starts from rest and accelerates uniformly at 1.5m/s² until it attains a speed of 30m/s. Find the time taken and the distance travelled.
3. A train is uniformly slowed down from 35m/s to 21m/s over a distance of 350m. Calculate the acceleration and the time taken to come to rest from the 35m/s.