Clelland Maths National 5 Maths Flashcards

Your complete revision companion

Printing Instructions:

1. Set your printer to **Double-Sided (Duplex)** printing

2. Choose **"Flip on Short Edge"** for correct alignment

3. After printing, cut along the dashed lines

4. You'll have 76 flashcards with questions on one side and answers on the reverse

What is the formula for the roots of a quadratic equation $ax^2 + bx + c = 0$?

What is the Sine Rule for a triangle with sides a, b, c and opposite angles A, B, C?

State the Cosine Rule for finding a side 'a' in a triangle.

State the Cosine Rule for finding an angle 'A' in a triangle.

What is the formula for the area of a triangle given two sides and the included angle?

What is the formula for the volume of a sphere with radius r?

What is the formula for the volume of a cone with radius r and height h?

What is the formula for the volume of a pyramid with base area A and height h?

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}.$$

The roots are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}.$$

$$a^2 = b^2 + c^2 - 2bc \cos A.$$

$$V = \frac{4}{3}\pi r^3.$$

$$A = \frac{1}{2}ab \sin C.$$

$$V = \frac{1}{3}Ah.$$

$$V = \frac{1}{3}\pi r^2 h.$$

The standard deviation, s, can be calculated using the formula $s = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$ or _____.

How do you express a quadratic $x^2 + bx + c$ in the form $(x + a)^2 + b$?

In the equation of a parabola $y = (x - a)^2 + b$, what are the coordinates of the turning point?

What does the value of the discriminant, $b^2 - 4ac$, tell you about the roots of a quadratic equation?

If the discriminant $b^2 - 4ac > 0$, how many real roots does the quadratic equation have?

If the discriminant $b^2 - 4ac = 0$, how many real roots does the quadratic equation have?

If the discriminant $b^2 - 4ac < 0$, how many real roots does the quadratic equation have?

How do you calculate the resultant vector of $2\mathbf{u} - \mathbf{v}$?

This process is called completing the square.

$$s = \sqrt{\frac{\Sigma x^2 - (\Sigma x)^2/n}{n-1}}$$

It determines the nature of the roots (two real distinct, one real repeated, or no real roots).

The coordinates of the turning point are (a, b).

One real, repeated root (or two equal real roots).

Two real and distinct roots.

Multiply each component of vector $\mathbf{u}$ by 2, then subtract the corresponding components of vector $\mathbf{v}$.

No real roots.

$$s = \sqrt{\frac{\Sigma x^2 - (\Sigma x)^2/n}{n-1}}$$

What is the equation for the line of best fit given two points (x_1, y_1) and (x_2, y_2)?

How do you simplify a surd expression like $\sqrt{40}$?

To calculate the original amount before an 80% representation, what calculation should you perform on the given value?

In the graph of $y = a\sin(x + b)^\circ$, what does the value of 'a' represent?

In the graph of $y = a\sin(x + b)^\circ$, what does the value of 'b' represent?

How do you find the coordinates of the x-intercept of a straight line?

In a circle, a right-angled triangle is formed by a chord, its midpoint, and the centre of the circle. Which theorem is used to find the length of the chord?

What is the first step to calculate the expected value after a 15% annual decrease for 3 years?

Find the largest square number that is a factor (in this case, 4), and write it as $\sqrt{4 \times 10} = 2\sqrt{10}$.

First, find the gradient $m = \frac{y_2 - y_1}{x_2 - x_1}$, then use $y - b = m(x - a)$ with one of the points.

The amplitude.

Divide the given value by 0.80 (or 80) and then multiply by 100.

Substitute $y = 0$ into the equation of the line and solve for x.

The horizontal shift, or phase shift.

Calculate the multiplier, which is $1 - 0.15 = 0.85$.

Pythagoras' Theorem.

How are simultaneous equations typically solved?

When comparing two data sets, what does a lower mean indicate?

When comparing two data sets, what does a smaller standard deviation indicate?

If two shapes are mathematically similar and the linear scale factor is k, what is the volume scale factor?

How can you determine if a triangle is right-angled, given the lengths of its three sides?

How do you calculate the volume of a hemisphere with a given diameter?

How do you simplify an expression with indices like $(n^5)^2 \times n^{-10}$?

To express two algebraic fractions as a single fraction, what must you find first?

On average, the values in that data set are lower.

By using either the substitution method or the elimination method.

The volume scale factor is k^3.

The values in that data set are more consistent or less spread out.

Halve the diameter to find the radius (r), then calculate $\frac{1}{2} \times \frac{4}{3}\pi r^3$.

Use the converse of Pythagoras' Theorem: check if $a^2 + b^2 = c^2$, where c is the longest side.

A common denominator.

Multiply the powers in the bracket to get n^{10}, then add the powers to get $n^{10+(-10)} = n^0$, which equals 1.

How do you change the subject of the formula $s = ut + \frac{1}{2}at^2$ to 'a'?

To solve a trigonometric equation like $\cos x° = -\frac{2}{11}$ for $0 \le x \le 360$, what are the steps?

How do you calculate the area of a sector of a circle?

In an isosceles triangle, two angles are 70° each. What is the size of the third angle?

How do you rationalise the denominator of a fraction like $\frac{4}{\sqrt{8}}$?

What is the value of $\cos 90°$?

Calculate the gradient of the line passing through the points (2, 5) and (6, 13).

How do you simplify $\frac{x^2-4}{x^2+x-6}$?

Find the principal value using inverse cosine, then use a CAST diagram to find the angles in the correct quadrants (in this case, the 2nd and 3rd quadrants).

Rearrange to $s - ut = \frac{1}{2}at^2$, then $2(s - ut) = at^2$, and finally $a = \frac{2(s-ut)}{t^2}$.

The sum of angles in a triangle is 180°. So the third angle = 180° - 70° - 70° = 40°.

Use the formula Area = $\frac{\theta}{360} \times \pi r^2$, where θ is the angle at the centre.

0

Multiply the numerator and the denominator by $\sqrt{8}$, then simplify the resulting fraction.

Factorise the numerator and the denominator to get $\frac{(x-2)(x+2)}{(x+3)(x-2)}$, then cancel the common factor $(x - 2)$.

Using $m = \frac{y_2-y_1}{x_2-x_1}$, we get $m = \frac{13-5}{6-2} = \frac{8}{4} = 2$.

How do you evaluate $8^{\frac{2}{3}}$?

How do you calculate the magnitude of a 3D vector
$$\mathbf{u} = \begin{pmatrix} 6 \\ -13 \\ 18 \end{pmatrix}?$$

If two shapes are mathematically similar and the linear scale factor is k, what is the area scale factor?

How do you calculate the length of an arc of a circle?

A regular hexagon can be divided into six congruent _____ triangles.

How do you find the equation of the axis of symmetry of a parabola in the form
$$y = (x + a)^2 + b?$$

The formula for the area of a trapezium is $A = \frac{1}{2}h(a + b)$. How would you make 'a' the subject?

The trigonometric identity $\tan x^\circ$ can be expressed as the ratio _____.

Calculate $|\mathbf{u}| = \sqrt{6^2 + (-13)^2 + 18^2}$.

Find the cube root of 8 (which is 2), and then square the result (which gives 4).

Use the formula Arc Length = $\frac{\theta}{360} \times \pi D$ or $\frac{\theta}{360} \times 2\pi r$.

The area scale factor is k^2.

The equation of the axis of symmetry is $x = -a$.

equilateral

$\frac{\sin x^\circ}{\cos x^\circ}$

Rearrange to $2A = h(a + b)$, then $\frac{2A}{h} = a + b$, and finally $a = \frac{2A}{h} - b$.

How do you simplify the expression $\tan^2 x° \cos^2 x°$?

A tangent to a circle meets a radius at the point of contact. What is the angle between them?

What is the size of an angle in a semi-circle?

What is the first step in solving a fractional equation like $\frac{x-2}{3} = \frac{2x-5}{6}$?

How do you factorise the quadratic expression $x^2 + 7x + 12$?

What is the sum of the angles in a quadrilateral formed by two tangents from a point to a circle and the two radii to the points of contact?

How do you calculate the weight of one pollen grain if a sample of 1.5×10^9 grains weighs 12 grams?

How do you calculate the volume of a frustum (a cone with the top removed)?

90 degrees. A tangent is perpendicular to the radius at the point of contact.

Substitute $\tan^2 x^\circ = \frac{\sin^2 x^\circ}{\cos^2 x^\circ}$, which simplifies the expression to $\sin^2 x^\circ$.

Multiply both sides by the lowest common multiple of the denominators, which is 6.

90 degrees.

360 degrees. The two angles at the points of contact are 90 degrees each.

Find two numbers that multiply to give 12 and add to give 7. These are 3 and 4. So
$x^2 + 7x + 12 = (x+3)(x+4)$.

Calculate the volume of the large cone and subtract the volume of the small cone that was removed.

Divide the total weight by the number of grains:
$12 \div (1.5 \times 10^9)$.

What does a negative power in an index, such as n^{-3} mean?

How do you find the coordinates of the point where a line crosses the y-axis?

What is the Pythagorean identity in trigonometry?

To find the height of a perfume label shaped like a segment of a circle, what two lengths do you need to find?

Simplify $\sqrt{18} + \sqrt{2}$

If $\cos 30° = \frac{\sqrt{3}}{2}$, find the value of $\cos 210°$.

If $\sin 40° = 0.643$, find the value of $\sin 140°$ (to 3 decimal places).

How do you find the length of a space diagonal in a cuboid with dimensions l, b, and h?

Substitute $x = 0$ into the equation of the line and solve for y.

It means the reciprocal of the positive power, i.e., $\frac{1}{n^3}$.

The radius of the circle and the distance from the centre to the chord.

$\sin^2 x + \cos^2 x = 1$.

Using a CAST diagram, 210° is in the 3rd quadrant where cosine is negative. Therefore $\cos 210° = -\frac{\sqrt{3}}{2}$.

First simplify $\sqrt{18} = \sqrt{9 \times 2} = 3\sqrt{2}$. Then $3\sqrt{2} + \sqrt{2} = 4\sqrt{2}$.

Use 3D Pythagoras' Theorem: $d = \sqrt{l^2 + b^2 + h^2}$.

Using a CAST diagram, 140° is in the 2nd quadrant where sine is positive. Therefore $\sin 140° = 0.643$.

In a circle, what can be said about the perpendicular bisector of a chord?

When solving $y = (x - a)^2 + b$, the turning point is a minimum if the x^2 term is positive, and a _____ if the x^2 term is negative.

For a trigonometric function $y = a\cos(bx) + c$, what does the value of 'c' represent?

Expand the brackets: $(x + 5)(x - 3)$

What is the condition for a line to be a tangent to a parabola?

What is the formula for calculating the area of a sector with angle θ (in degrees) and radius r?

How is the area of a segment of a circle calculated?

How do you calculate the gradient of a straight line passing through the points (x_1, y_1) and (x_2, y_2)?

maximum

It passes through the centre of the circle.

$x^2 - 3x + 5x - 15 = x^2 + 2x - 15$

The vertical shift, which is the midline of the graph.

$Area = \frac{\theta}{360} \times \pi r^2.$

The quadratic equation formed by their intersection has exactly one solution (i.e., the discriminant is zero).

Use the formula $m = \frac{y_2 - y_1}{x_2 - x_1}.$

By subtracting the area of the triangle from the area of the sector.

How do you simplify $(m^{-4})^2 \times m^5$?

How do you find the median of a data set with an odd number of values?

How do you calculate the interquartile range (IQR) of a data set?

In the graph of $y = a\cos(bx)^\circ$, what does the value of 'b' represent?

Arrange the values in order and select the middle value.

It simplifies to $m^{-8} \times m^5 = m^{-3}$, which is $\frac{1}{m^3}$.

The number of complete cycles in $360°$.

Calculate the difference between the upper quartile (Q_3) and the lower quartile (Q_1).

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🎉 Well Done! 🎉

Good luck with your studies!

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