

α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	\omicron	π	ρ	σ	τ	υ	ϕ	χ	ψ	ω
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"No human investigation can be called real science if it cannot be demonstrated mathematically"

Leonardo da Vinci

AS Maths Assignment β (beta)

Please read the attached guidance notes for information about how to complete this assignment.
Your first tracking test is week commencing 7th October for 1 hour in the main hall.

DRILL *Drill are the very basic techniques you need to solve maths problems.*

Section A: Convert these to the form αx^n :

(1) $\frac{1}{4x}$ (2) $\frac{3}{x^3}$ (3) $\sqrt[4]{16x^3}$ (4) $3\sqrt{x^3}$

Section B: Expand and simplify:

(1) $(x+1)(x+2)(x+3)$ (2) $(x+2)(x+1)^2$

Section C: Solve each of the following equations for x :

(1) $\frac{2x+3}{5} = \frac{4+3x}{3}$ (2) $\frac{3}{x+1} = \frac{4}{x}$

STATISTICS

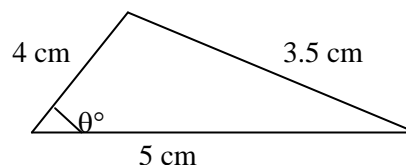
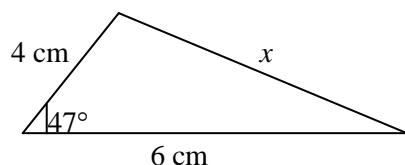
- 1 The following data shows the number of absences of 10 AS students over one term. The letter x is used to represent the number of absences of a particular student.

x	4	3	10	4	0	2	4	3	2	5
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- (a) First check that $\sum x = 37$ and $\sum x^2 = 199$ ($\sum x$ means 'add up the x values' and $\sum x^2$ means 'add up all the x^2 values'). Next use the formulae $\bar{x} = \frac{\sum x}{n}$ $\sigma^2 = \frac{\sum x^2}{n} - (\bar{x})^2$ to find the mean, \bar{x} , and the variance, σ^2 , of this data. n represents the size of the data set.
- (b) Use your S1 textbook or online research to describe briefly in words what the mean and variance tell you about a set of data.
- (c) **Skew** can be found by comparing the median and mean of the data. If median < mean then the data is positively skewed. If median > mean then the data is negatively skewed. Use this information to comment on the skew of the data.

PURE MATHS

- 2 Use the cosine rule to calculate the unknown length & the unknown angle, giving your answers to 3sf (*the cosine rule is written at the bottom of this assignment*)



- 3 For each of the following quadratics, solve the equation 'discriminant = 0'. By solving this equation you will find the values of k for which these quadratics have a repeated root.

(a) $2x^2 - kx + 1 = 0$

(b) $kx^2 + 8x + k = 0$

- 4 Solve these quadratic equations using the quadratic formula. Leave your answers in the form $A \pm B\sqrt{C}$:

(a) $3x^2 + 9x + \frac{1}{2} = 0$

(b) $4x^2 - 2x - 3 = 0$

- 5 Solve the following equations using the method of completing the square. Leave your answers in the form $A \pm B\sqrt{C}$.

(a) $3x^2 + 6x = 0$

(b) $x^2 - 2x - 8 = 0$

- 6 Write $4\sqrt{2}$ in the form 2^y showing every step of your working.

- 7 Rationalise the denominator of $\frac{6}{1-\sqrt{3}}$ leaving your answer in the form $a + b\sqrt{3}$

- 8 Where does the graph of $y = \frac{x-2}{2}$ cross the coordinate axes?

- 9 Construct the equation of the circle with centre $(-1, 2)$ and diameter $\sqrt{52}$ (*look back at the bullet points of assignment alpha if you need to*)

- 10 Showing all your steps, make x the subject of these formulae:

(a) $y = \frac{x}{3} + 4$

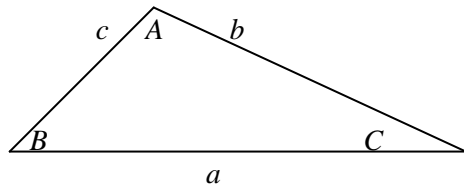
(b) $t = \frac{x+2}{3}$

- 11 Where does the line $y = x + 1$ cross the curve $x^2 - 2y + 3 = 0$? (*see assignment alpha question 11 for the method*)

12. a) What is the equation of the line through the point (2,-2) with gradient 3 ?
 b) What is the equation of the line through the points (1,4) and (-3,2)?

Note: It may help you to look back at the bullet points at the bottom of assignment alpha when completing this assignment.

The cosine rule. If you have a problem involving all 3 sides of a triangle and one angle you can use the cosine rule to find the missing value (either the angle or one of the sides)



The cosine rule

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

Answers

A: (1) $\frac{1}{4}x^{-1}$ (2) $3x^{-3}$ (3) $2x^{\frac{3}{4}}$ (4) $3x^{\frac{3}{2}}$

B: (1) $x^3 + 6x^2 + 11x + 6$ (2) $x^3 + 4x^2 + 5x + 2$ **C:** (1) $x = -\frac{11}{9}$ (2) $x = -4$

(1a) mean = 3.7, variance = 6.21 (1b)(1c) Marked by your teacher (2) $x = 4.39$ cm, $\theta = 44.0^\circ$

(3a) $k = \pm 2\sqrt{2}$ (3b) $k = \pm 4$ (4a) $-\frac{3}{2} \pm \frac{5}{6}\sqrt{3}$ (4b) $\frac{1}{4} \pm \frac{1}{4}\sqrt{13}$

(5a) 0, -2 (5b) 4, -2 (6) $2^{\frac{5}{2}}$ (7) $-3 - 3\sqrt{3}$

(8) (0, -1) (2, 0) (9) $(x+1)^2 + (y-2)^2 = 13$

(10a) $x = 3y - 12$ (10b) $x = 3t - 2$ (11) (1, 2) (12) (a) $3x - y - 8 = 0$ (b) $x - 2y + 7 = 0$



ASSIGNMENT

COVER SHEET

Name _____ Current Maths Teacher

Please tick honestly:

	Yes	No - explain why.
Have you ticked/crossed your answers using the answers given?		
Have you corrected all the questions which were wrong?		

How did you find this assignment?

Use this space to outline any problems you've had and how you overcame them as well as the things which went well or which you enjoyed/learned from.