

Final Exam Revision Sheet

Basic Algebra

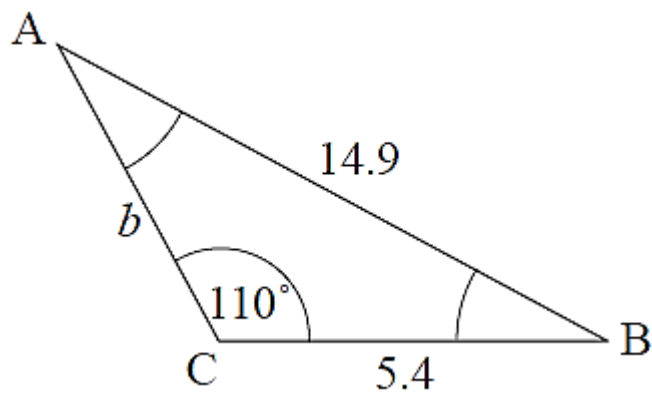
a) Let $f(x) = -x^2 + 3x + 4$. Find and simplify the following:

- (i) $f(-1)$
- (ii) $f(2x)$
- (iii) $f(x+2)$

b) Solve the following quadratic equation using the quadratic formula.

$$5x^2 - 3x + 3 = 0$$

Trigonometry



Find the unknown angles and side length of the triangle shown.

Probability

Amanda either catches the bus to school or she walks to school. On any day that she goes to school, the probability that she catches the bus is 0.4. The probability that Amanda is late for school when she catches the bus is 0.25. The probability that Amanda is late for school when she walks is 0.05.

- a) Draw a tree diagram to represent the data.
- b) Calculate the probability that Amanda catches the bus and is late for school.
- c) Find the probability that, on any day she goes to school, she is not late for school.

Statistics

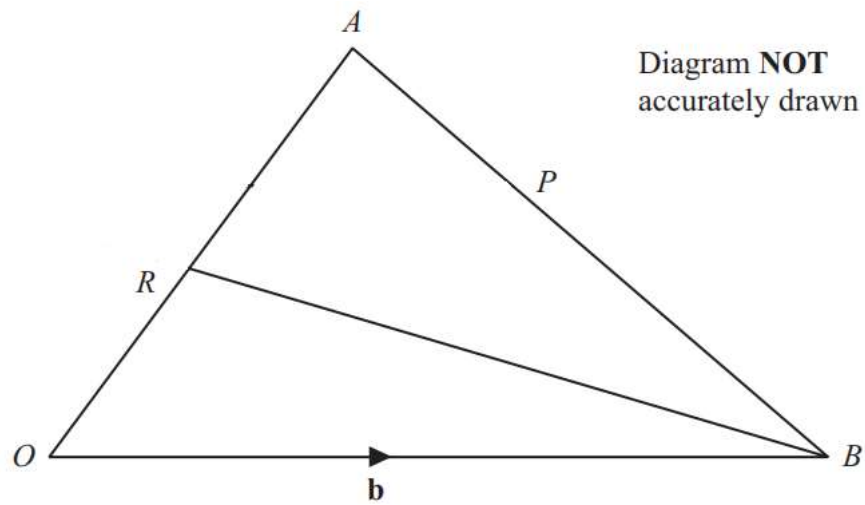
Mary measured the height of the plants in her backyard. Their heights, in cm, are given below.

38, 14, 22, 36, 35, 29, 19, 24,

32, 35, 41, 31, 47, 18, 28, 43

- a) Draw a stem and leaf diagram to represent Mary's data.
- b) What is the mode of the heights?
- c) What is the median of the heights?
- d) Calculate the interquartile range of the heights?
- e) Calculate the mean of the heights?

Vectors



In the Figure above, OAB is a triangle with $\overrightarrow{OA} = 4\mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.
The point R lies on OA such that $OR:RA = 1:3$

- a) Express, in terms of \mathbf{a} and \mathbf{b} ,
- \overrightarrow{OR}
 - \overrightarrow{RB}
 - \overrightarrow{AB}

The point P lies on AB such that $AP:PB = 1:2$

- b) Express in terms of \mathbf{a} and \mathbf{b} , simplifying your answer where possible,
- \overrightarrow{PB}
 - \overrightarrow{OP}

Matrices

The letters A to Z correspond to the numbers 1 to 26, as shown below, and a space is represented by the number 27.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

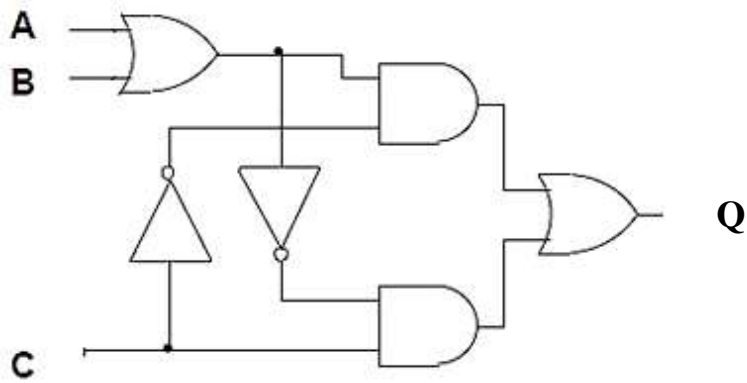
Use matrix $A = \begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$ to decode the following message below:

$$\begin{bmatrix} 35 \\ 57 \end{bmatrix} \begin{bmatrix} 57 \\ 95 \end{bmatrix} \begin{bmatrix} 14 \\ 23 \end{bmatrix}$$

Boolean Algebra

For the following circuit:

- construct a truth table
- simplify the Boolean expression at the output.



Number Systems

a) Convert the Decimal Number 5050 to Hexadecimal.

b) Convert the Hexadecimal Number 3DA2 to Binary.

Multiply the following Binary Numbers together: 101101 by 10110.

Formula Sheet

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

Trigonometric Ratios:

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

Mean: $\frac{\sum x_i}{n}$

Population variance, $\sigma^2 = \frac{\sum (x - \mu)^2}{N}$

Sample variance, $\sigma^2 = \frac{\sum (x - \bar{x})^2}{n-1}$

Population standard deviation, $SD = \sqrt{\frac{\sum (x - \mu)^2}{N}}$

Sample standard deviation, $SD = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$

Conditional Probability: $P(A|B) = \frac{P(A \cap B)}{P(B)}$