



Billanook College

NAME:

Home Group:

TEACHER'S NAME:

YEAR 10 MATHEMATICAL METHODS

SEMESTER 2 EXAMINATION 1 TECHNOLOGY FREE

November, 2017

Reading Time: 15 minutes

Writing time: 45 minutes

Instructions to students

This exam consists of **14** questions.

All questions should be answered in the spaces provided.

There is a total of **35** marks available.

A decimal approximation will not be accepted if an exact answer is required.

Where more than one mark is allocated to a question working must be shown.

Students **may not** bring any notes or any calculators into this exam.

Diagrams in this exam are not to scale except where otherwise stated.

Question 1 (1+1 marks)

Solve each of the following

a) $x^2 - 4(x+15) = 0$

b) $x^2 + 16x + 64 = 0$

Question 2 (2+2 marks)

a) For the quadratic equation: $x^2 + 10x + 7 = 0$

i) Complete the square

ii) Hence solve the equation $x^2 + 10x + 7 = 0$

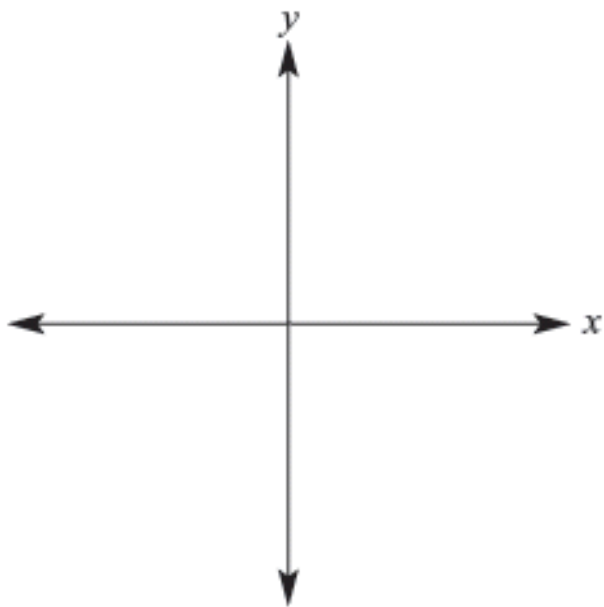
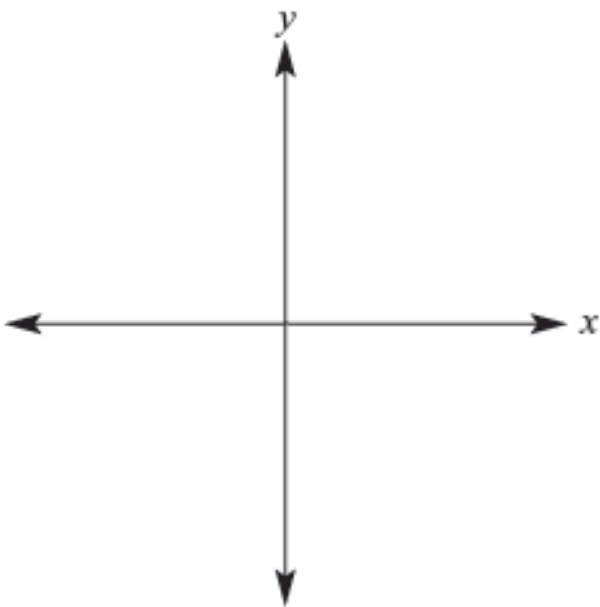
b) Use the quadratic formula to find the exact **solutions** to the equation: $2x^2 - 7x + 4 = 0$

Question 3 (2+2 = 4 marks)

Sketch graphs of the following quadratic relations, carefully labelling the coordinates of all intercepts and the turning point:

a) $y = -x^2 + 4$

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



Question 4 (2 marks)

For the equation: $y = 2x^2 - 8x + 6$

i) Find the discriminant.

ii) Hence state the number and **type** of x-intercepts.

Question 5 (2 marks)

Consider the following sets:

$$A = \{3, 6, 9, 10\} \quad B = \{2, 4, 6, 8, 10\}$$

a List the set of $A \cap B$.

b List the set of $A \cup B$.

Question 6 (4 marks)

Consider the following two-way table.

	A	A'	
B		12	20
B'	7		
			45

a) Complete the table.

b) $\Pr(A' \cap B')$

c) $\Pr(A | B)$

d) $\Pr(B | A)$

Question 7 (1+1 marks)

Two events, A and B , are such that $\Pr(A)=0.3$, $\Pr(B)=0.6$ and $\Pr(A \cup B)=0.8$. Find:

a) $\Pr(A \cap B)$

b) $\Pr(A' \cap B')$

Question 8 (2 marks)

If $\begin{bmatrix} -9 & 4 \\ 8 & -6 \end{bmatrix} + \begin{bmatrix} 3 & 4b \\ -10 & 2 \end{bmatrix} = \begin{bmatrix} -6 & -4 \\ -2 & 2c \end{bmatrix}$, find the values of b and c .

Question 9 (2 marks)

Given $A = \begin{bmatrix} -3 & 1 \\ 2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 4 \\ -7 & 3 \end{bmatrix}$, calculate the product $B \times A$

Question 10 (1+1 marks)

For the matrix $P = \begin{bmatrix} -3 & 1 \\ 10 & -4 \end{bmatrix}$ find:

(a) $\det P$

(b) P^{-1} , the inverse of P .

Question 11 (1+1 marks)

Find the value of x in the following

a) $\log_x 32 = 5$

b) $x = \log_3 \frac{1}{9}$

Question 12 (2 marks)

Simplify: $\frac{1}{2} \log_{10} 16 + 2 \log_{10} 5$

Question 13 (3 marks)

Divide $P(x) = 2x^3 + 3x^2 - 5x + 7$ by $(x + 3)$ and write your answer in the form $P(x) = (x + 3)Q(x) + R$ where R is the remainder.

Question 14 (2 marks)

A cubic polynomial has the rule $P(x) = x^3 - 2x^2 - 13x - 10$.

a) Is $(x+1)$ a factor?

b) Explain your reasoning for part a)

End of Examination