

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 $x^2 + 10x + 7 = 0$

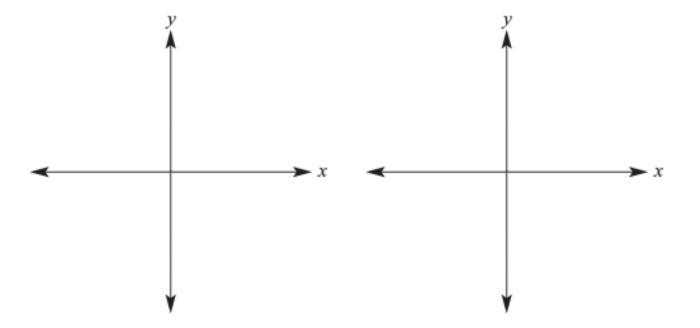
b) Use the quadratic formula to find the exact **solutions** to the equation: $2x^2 - 7x + 4 = 0$

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:

- $A = \{3, 6, 9, 10\} B = \{2, 4, 6, 8, 10\}$
- **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.

	Α	A'	
В		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*∩*B*)

b) Pr(*A*′∩*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: $\frac{1}{2}log_{10}16 + 2log_{10}5$

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