

MATHEMATICS PRELIMINARY EXTENSION 1

ASSESSMENT TASK

TEST 1

COURSE/LEVEL

NSW Secondary High School Year 11 Preliminary Extension Mathematics.

TOPICS

- Basic Arithmetic (Syllabus Reference: 1.1, 1.2)
- Algebra and Surds (Syllabus Reference: 1.3)
- Equations (Syllabus Reference: 1.4, 1.4E)
- Geometry 1 (Syllabus Reference: 2.1, 2.2, 2.3, 2.4)

TOTAL TIME: 45 MINUTES

INSTRUCTIONS

Attempt all questions

Show all necessary working

Approved calculators may be used.

Marks may be deducted for careless or poorly arranged work

QUESTION 1

MARKS
5

(a) Solve for x :

(i) $3x^2 + 5x - 2 < 0$

(ii) $\frac{3}{x+4} \geq 1$

(b) Simplify: $x^{-1} \div (x + x^{-1})^{-1}$

2

(c) Solve for x :

3

(i) $8\sqrt{2} = 2^x$

(ii) $9^{2-x} = 3^{-x}$

QUESTION 2 (*Start a new sheet of paper*)

MARKS

(a) Factorise $x^3y - 25xy^3$

2

(b) Write down the solution to the equation:

1

$$(x + 1)(x - 2)(2x + 4) = 0$$

(c) Simplify:

2

(i) $|7 - 4| - |3 + 11|$

(ii) $|x - 4| - |4 - x|$

(d) Solve for y : $|3y - 7| - 4 > 0$

2

(e) Simplify $\frac{1}{x} + \frac{1}{2x}$

1

QUESTION 2 (continued)

MARKS

(e) Solve for x only:

2

$$\begin{aligned} x + y &= 3 \\ x^2 + y^2 &= 29 \end{aligned}$$

QUESTION 3 (Start a new sheet of paper)

MARKS

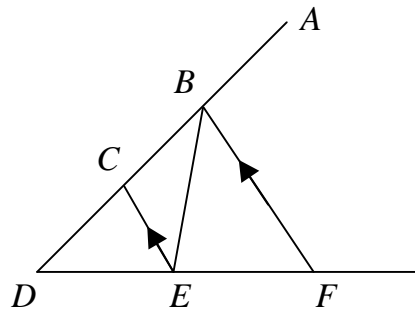
(a) In the diagram, CE and BF are parallel.

4

The line BF bisects angle ABE .

(i) Prove that $BE = BC$.

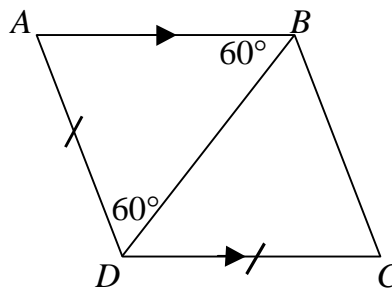
(ii) Prove that $\frac{DB}{BE} = \frac{DF}{EF}$



(b) In the figure,

4

$AB \parallel DC$,
 $AD = DC$,
 $\angle ADB = \angle ABD = 60^\circ$.



(i) Prove that $\triangle ADB$ is congruent to $\triangle CDB$.

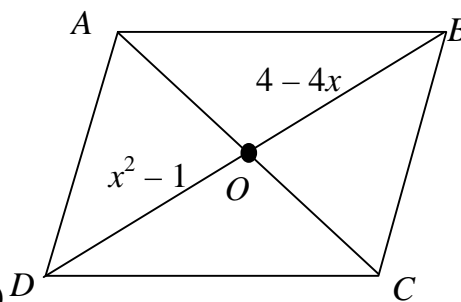
(ii) What is the size of $\angle BCD$? Give reasons for your answer.

(c) $ABCD$ is a parallelogram.

2

The length of OD is $x^2 - 1$
 and the length of OB is $4 - 4x$.

Find the value of x , giving reasons where appropriate.



(Note: there is just one solution for x .)