

A-Level

Pure Mathematics

~ Year 1 ~



Progress Test

Revision

PROGRESS TEST REVISION

Lesson 1

A-Level Pure Mathematics : Year 1

Progress Test Revision

1.1 Example #1

Given that, $(a + \sqrt{5})(4 + \sqrt{5}) = 29 + b\sqrt{5}$

find the value of a and the value of b both of which are integers.

[2 marks]

1.2 Example #2

Solve the equation, $3^{2x+1} - 28(3^x) + 3^2 = 0$

[3 marks]

1.3 Revision Exercise

*Any solution based entirely on graphical
or numerical methods is not acceptable*

Marks Available : 70

Question 1

Given that, $(a + \sqrt{7})(5 + \sqrt{7}) = 47 + b\sqrt{7}$

find the value of a and the value of b both of which are integers

[2 marks]

Question 2

Solve the equation, $2^{2x+2} - 33(2^x) + 2^3 = 0$

[3 marks]

Question 3

Solve the inequality, $21x + 19 > 6x - 26$

[2 marks]

Question 4

Consider the inequality, $x^2 - 4x - 21 \geq 0$

(i) State the critical values of x .

[2 marks]

(ii) Sketch the graph of, $y = x^2 - 4x - 21$

[2 marks]

(iii) Solve the inequality, $x^2 - 4x - 21 \geq 0$

[2 marks]

(iv) Solve the related inequality, $x^2 - 4x - 21 < 0$

[2 marks]

Question 5

Points A and B have coordinates $(3, 5)$ and $(9, 17)$ respectively.

(a) Find the midpoint of the line segment AB .

[2 marks]

(b) Find the gradient of the line segment AB .

[2 marks]

(c) Find the equation of the line through A and B in the form $ax + by + c = 0$, where a, b and c are integers.

[3 marks]

(d) Find the equation of the perpendicular bisector of the line segment AB .
Give your answer in the form $ax + by + c = 0$, $a, b, c \in \mathbb{Z}$

[3 marks]

Question 6

$$f(x) = x^3 + 4x^2 - 9x - 36$$

(i) Show that $f(-4) = 0$

[2 marks]

(ii) Hence, or otherwise, factorise the cubic polynomial completely.

[4 marks]

Question 7

Given that, $243\sqrt{3} = 3^a$, find the value of a

[3 marks]

Question 8

A-Level examination question from November 2002, (Edexcel)

(a) Solve the inequality, $3x - 8 > x + 13$

[2 marks]

(b) Solve the inequality, $x^2 - 5x - 14 > 0$

[2 marks]

Question 9

Rationalise the denominator of,

(i) $\frac{1}{2 + \sqrt{3}}$

[2 marks]

(ii) $\frac{1}{(3 - \sqrt{2})^2}$

[3 marks]

Question 10

Find the perpendicular bisector of the line segment between the points A and B where, A is $(4, 11)$ and B is $(16, 3)$

[4 marks]

Question 11

Examination Question, Edexcel June 2003

Find the set of values for x for which

(a) $6x - 7 < 2x + 3$

[2 marks]

(b) $2x^2 - 11x + 5 < 0$

[3 marks]

(c) Both $6x - 7 < 2x + 3$ and $2x^2 - 11x + 5 < 0$

[1 mark]

Question 12

$$g(x) = x^3 - 3x^2 - 10x + 24$$

(i) Show that $g(4) = 0$

[1 mark]

(ii) Hence, or otherwise, factorise the cubic polynomial completely.

[4 marks]

Question 13

Solve the equation, $8 + x\sqrt{12} = \frac{8x}{\sqrt{3}}$

Give your answer in the form $a\sqrt{b}$ where a and b are integers

[4 marks]

Question 14

(i) Expand the brackets; $(x + 1)^2$

[1 mark]

(ii) Hence, or otherwise, solve simultaneously;

$$x^2 + y^2 = 25$$

$$y = x + 1$$

[4 marks]

Question 15

Given that $x + 2$ is a factor of $x^3 - 2x^2 + ax + 6$ find a

[3 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from MHHShrewsbury@Gmail.com