

Lesson 2

A-Level Pure Mathematics : Year 1 Progress Test Revision

2.1 A Useful “Flip”

Power Inversion Rule

$$\left(\frac{p}{q}\right)^{-m} = \left(\frac{q}{p}\right)^m \quad p, q \neq 0$$

2.2 Examples

Simplify fully each of the following,

$$(i) \quad \left(\frac{3a^6}{5a^2\sqrt{b}}\right)^{-2} \qquad (ii) \quad \left(\frac{4x^2}{9\sqrt[3]{y}}\right)^{-\frac{3}{2}}$$

[3, 3 marks]

2.3 Revision Exercise

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

Marks Available : 40

Question 1

Simplify fully each of the following

$$(i) \quad \left(\frac{36x^6}{25}\right)^{-\frac{1}{2}} \qquad (ii) \quad \left(\frac{4xy^2}{3x^2y^3}\right)^{-1}$$

[3, 3 marks]

Question 2

Expand the brackets and simplify; $(x + 3)(x - 3)(x + 4)$

[3 marks]

Question 3

Factorise completely, $4x^2 - x^4$

[3 marks]

Question 4

Showing your method, rationalise the denominator of, $\frac{8}{3 - \sqrt{5}}$

[3 marks]

Question 5

- (i) Simplify $\sqrt{75} + \sqrt{12}$, giving your answer in the form $a\sqrt{3}$, where a is an integer to be found.

[2 marks]

- (ii) Simplify $\frac{\sqrt{75} + \sqrt{12}}{2 - \sqrt{3}}$ giving your answer in the form $b + c\sqrt{3}$ where b and c are integers to be found.

[4 marks]

Question 6

Here is a FALSE PROOF that, $\frac{a+b}{a-\sqrt{b}} = \frac{a+\sqrt{b}}{a-b}$ where $a \neq b$, $a \neq \sqrt{b}$

$$\begin{aligned}
 \text{LHS} &= \frac{a+b}{a-\sqrt{b}} \\
 &= \frac{a+b}{a-\sqrt{b}} \times \frac{a+\sqrt{b}}{a+\sqrt{b}} \\
 &= \frac{(a+b)(a+\sqrt{b})}{a^2 - b^2} \\
 &= \frac{(a+b)(a+\sqrt{b})}{(a+b)(a-b)} \quad (\text{Difference of two squares}) \\
 &= \frac{a+\sqrt{b}}{a-b} \\
 &= \text{RHS} \quad \square
 \end{aligned}$$

Where is the error ?

[3 marks]

Question 7

A-Level Examination Question from November 2021, Paper 1, Q1 (Edexcel)

Using algebra, solve the inequality

$$x^2 - x > 20$$

writing your answer in set notation.

[3 marks]

Question 8

Given that $y = 3^x$

(i) Express 9^x in terms of y

[1 mark]

(ii) Hence, or otherwise, solve $9(9^x) - 10(3^x) + 1 = 0$

[6 marks]

Question 9

AS-Level Examination Question from October 2020, Paper 1, Q3 (Edexcel)

- (i) Solve the equation,

$$x\sqrt{2} - \sqrt{18} = x$$

writing the answer as a surd in simplest form.

[3 marks]

- (ii) Solve the equation,

$$4^{3x-2} = \frac{1}{2\sqrt{2}}$$

[3 marks]

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