Write your name here

Surname	Other names

Pearson Edexcel Level 3 GCE

Centre Number	Candidate Number

Mathematics

Year 11 to Year 12 Transition Paper

Algebraic Expressions

You must have:
Mathematical Formulae and Statistical Tables, calculator

Total Marks

Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for algebraic manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer cross it out and put your new answer and any working out underneath.

Turn over ▶

Pearson

Calculators may NOT be used to answer these questions.

1. Expand and simplify $(4x - 3)(3x + 1)$

(Total for Question 1 is 2 marks)

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2. (*a*) Expand and simplify $(2x + 1)(x - 4)$

(2)

(*b*) Expand and simplify $(3x - 5y)^2$

(2)

(Total for Question 2 is 4 marks)

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3. (*a*) Expand and simplify $(x - y)(x + 2y)$

(2)

(*b*) Factorise $12u^2t^2 + 18ut^3$

(2)

(Total for Question 3 is 4 marks)

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4. (*a*) Simplify

$$\sqrt{50} - \sqrt{18}$$

giving your answer in the form $a\sqrt{2}$, where a is an integer.

(2)

(*b*) Hence, or otherwise, simplify

$$\frac{12\sqrt{3}}{\sqrt{50} - \sqrt{18}}$$

giving your answer in the form $b\sqrt{c}$, where b and c are integers and $b \neq 1$.

(3)

(Total for Question 4 is 5 marks)

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5. Simplify

$$\frac{7+\sqrt{5}}{\sqrt{5}-1},$$

giving your answer in the form $a + b\sqrt{5}$, where a and b are integers.

(Total for Question 5 is 4 marks)

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6. Simplify

(a) $(2\sqrt{5})^2$,

(1)

(b) $\dfrac{\sqrt{2}}{2\sqrt{5}-3\sqrt{2}}$, giving your answer in the form $a + \sqrt{b}$, where a and b are integers.

(4)

(Total for Question 6 is 5 marks)

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7. (a) Factorise $24w^2y^3 - 8wy^2$

(2)

(b) Factorise $3ef - 3e + 2f - 2$

(2)

(c) Factorise $25 - 4x^2$

(1)

(Total for Question 7 is 5 marks)

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8. (*a*) Simplify $\left(3\sqrt{7}\right)^2$

(1)

(*b*) Simplify

$$\frac{\sqrt{3}}{5\sqrt{3}+6\sqrt{2}}$$

giving your answer in the form $a+b\sqrt{c}$, where *a*, *b* and *c* are integers and $b \neq -1$

(4)

(Total for Question 8 is 5 marks)

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9. (*a*) Find the value of $8^{\frac{5}{3}}$.

(2)

(*b*) Simplify fully $\frac{(2x^{\frac{1}{2}})^3}{4x^2}$.

(3)

(Total for Question 9 is 5 marks)

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10. (*a*) Simplify $\left(9x^4\right)^{\frac{1}{2}}$

(1)

(*b*) Simplify $a^7 \div a^{-3}$

(1)

(*c*) Simplify $(x^{-2})^{-3}$

(1)

$\frac{(2q)^2 - q^{\frac{7}{2}}}{q^2}$ can be written in the form $d - q^f$

(*d*) Work out the value of *d* and the value of *f*.

(3)

(Total for Question 10 is 6 marks)

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11. (*a*) Factorise $63x^2d + 9xd^2$

(2)

(*b*) Factorise $4ab - 8b + 2a - 4$

(3)

(*c*) Factorise $x^2 - 9t^2$

(1)

(Total for Question 11 is 6 marks)

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12. (*a*) Simplify

$$\sqrt{32} + \sqrt{18},$$

giving your answer in the form $a\sqrt{2}$, where a is an integer.

(2)

(*b*) Simplify

$$\frac{\sqrt{32} + \sqrt{18}}{3 + \sqrt{2}},$$

giving your answer in the form $b\sqrt{2} + c$, where b and c are integers.

(4)

(Total for Question 12 is 6 marks)

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13. (*a*) Simplify $(p^{-2})^{-4}$

(1)

(*b*) Simplify $\left(16t^2\right)^{\frac{3}{2}}$

(2)

(Total for Question 13 is 3 marks)

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14. (*a*) Write down the value of $32^{\frac{1}{5}}$.

(1)

(*b*) Simplify fully $(32x^5)^{-\frac{2}{5}}$.

(3)

(Total for Question 14 is 4 marks)

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15. (i) Express

$$(5 - \sqrt{8})(1 + \sqrt{2})$$

in the form $a + b\sqrt{2}$, where a and b are integers.

(3)

(ii) Express

$$\sqrt{80} + \frac{30}{\sqrt{5}}$$

in the form $c\sqrt{5}$, where c is an integer.

(3)

(Total for Question 15 is 6 marks)

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16. (a) Evaluate $(32)^{\frac{3}{5}}$, giving your answer as an integer.

(2)

(*b*) Simplify fully $\left(\frac{25x^4}{4}\right)^{-\frac{1}{2}}$.

(2)

(Total for Question 16 is 4 marks)

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17. Show that $\frac{2}{\sqrt{12}-\sqrt{8}}$ can be written in the form $\sqrt{a} + \sqrt{b}$, where a and b are integers.

(Total for Question 17 is 5 marks)

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18. Simplify $\sqrt[3]{(8x)^6}$

(Total for Question 18 is 2 marks)

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19. (*a*) Simplify $\left(\frac{x^5}{x^7}\right)^{-1}$

(1)

(*b*) Simplify $\left(4y^{\frac{2}{3}}\right)^3$

(2)

$6x^{-2}\left(\frac{1}{2}x^6 - \frac{1}{3}x^2\right)$ can be written in the form $ax^n + b$

(*c*) Find the value of *a*, the value of *b* and the value of *n*.

(2)

(*d*) Expand and simplify $(3y + 2)^2 - (3y - 2)^2$

(2)

(Total for Question 19 is 7 marks)

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20. (i) Simplify

$$\sqrt{48} - \frac{6}{\sqrt{3}}$$

Write your answer in the form $a\sqrt{3}$, where *a* is an integer to be found.

(2)

(ii) Solve the equation

$$3^{6x-3} = 81$$

Write your answer as a rational number.

(3)

(Total for Question 20 is 5 marks)
