Examples 1 – Basic Algebra

These examples count towards the assessment of the module and should be handed in on Monday 13th October. Do not use a calculator.

Read Bostock & Chandler, pages 1 – 19, and pages 33–38.

Multiply out the following expressions:

1. \((x - 4z)(2x - 3z^2)\), \quad 2. \((y - x)^3\), \quad 3. \((x^2 - 2y)(x^2 + 2y)\).

Express the following as fractions with a single denominator:

4. \(\frac{2}{a - 1} + \frac{3}{a + 5}\), \quad 5. \(\frac{y}{x + 2} + \frac{x}{y - 4}\).

Factorise the following expressions:

6. \(x^2 + 7x + 6\), \quad 7. \(x^2 - 9x + 20\), \quad 8. \(z^2 - 36\),
9. \(y^2 + y - 42\), \quad 10. \(x^4 - 16x^2\), \quad 11. \(15 + 8x + x^2\),
12. \(2x^3 - 4x^2 - 16x\), \quad 13. \(5y^2 - 20\).

Solve the following equations.

14. \(x^2 - 10x + 21 = 0\), \quad 15. \(x^2 - 14x + 49 = 0\), \quad 16. \(a^2 + 4a = 5\),
17. \(z^2 + 10z + 16 = 0\), \quad 18. \(x^3 - 2x^2 + x = 0\), \quad 19. \(2z^2 - 12z + 18 = 0\).

See overleaf for practice examples . . .
PRACTICE EXERCISES, NOT TO BE HANDED IN

Multiply out the following expressions:

1. \((5x + y)(x - 2y)\),  
2. \((x + y^2)(x - y^2)\),  
3. \((x + y)(x - y)^2\).

Express the following as fractions with a single denominator:

4. \(\frac{1}{x + 3} + \frac{1}{x - 1}\),  
5. \(\frac{9a}{a - 2} - \frac{2(a - 9)}{a + 3}\).

Factorise the following expressions:

6. \(x^2 + 5x - 6\),  
7. \(y^2 - 10y + 21\),  
8. \(x^2 - 10x + 25\),  
9. \(z^2 - 81\),  
10. \(3x^2 + 18x - 48\),  
11. \(x^4 + 9x^3 + 14x^2\).

Solve the following equations.

12. \(y^2 - 9y = 0\),  
13. \(x^2 + 12x + 36 = 0\),  
14. \(z^2 + 7z - 8 = 0\),  
15. \(x^2 - 8x + 15 = 0\),  
16. \(4x^2 - 24x + 20 = 0\),  
17. \(3x^3 - 3x^2 - 90x = 0\).