



Proof Exam Practice

Q1. Prove, using algebra, that the sum of any three consecutive integers is always divisible by three.

Answer: _____
(2 marks)

Q2. Prove, using algebra, that the sum of any two consecutive integers is always odd.

Answer: _____
(2 marks)



Q3. Prove that the difference between the squares of any 2 consecutive integers is always odd.

Answer: _____
(2 marks)

Q4. Prove, using algebra, that the sum of any three consecutive integers is always divisible by three.

Answer: _____
(2 marks)



Q5. Let n be an even number. Prove that n^2 is even.

Answer: _____
(2 marks)

Q6. Prove that $(2n - 5)^2 + n^2 + 25n + 1$ is never divisible by 5 for all whole values of n .

Answer: _____
(3 marks)



Q7. Prove that $m^2 + m$ is an even number for all values of m .

Answer: _____
(3 marks)

Q8. Prove that the points $D = (-5, 2)$, $E = (-3, -4)$ and $C = (3, -2)$ are the vertices of a isosceles triangle.

Answer: _____
(3 marks)



Q9. Prove that $3n^2 - 4n + 10$ is positive for all values of n .

Answer: _____
(4 marks)

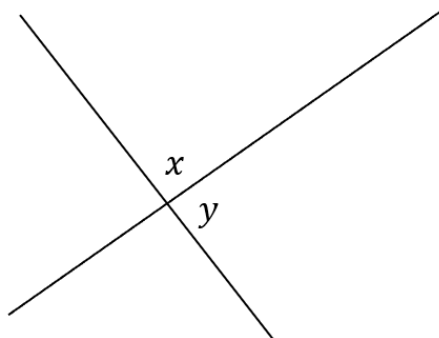
Q10. Prove that $(4n + 3)^2 - (4n - 3)^2$ is always divisible by 6 for all whole values of n .

Answer: _____
(3 marks)



Mixed Practice Problems

Q11.



(i) Find an expression for y in terms of x .

Answer: _____
(1 mark)

(ii) Hence prove that “opposite angles at a point are equal”.

Answer: _____
(2 marks)

Q12. Prove that the product of two surds is not always a surd.

Answer: _____
(2 marks)



Q13. Using algebra, prove that $2^{48} - 1$ is not a prime number.

Answer: _____
(3 marks)

Q14. Prove that $\sqrt{x} < x^2$ is not always true.

Answer: _____
(2 marks)



Q15. A quadratic sequence has the formula, $an^2 + bn + c$ where n is a whole positive number, and a, b and c are whole numbers.

(i) Work out the first 3 terms of the quadratic sequence.

Answer: _____
(1 mark)

(ii) Hence prove that a is equal to half the *second difference* of the sequence

Answer: _____
(2 marks)

Q16. Prove that all square numbers are either a multiple of 4 or 1 more than a multiple of 4.

Answer: _____
(4 marks)