ALGEBRA (Q 2 & 3, PAPER 1)

2009

2   (a) Find the value of $\dfrac{3x - 2y - 1}{5}$ when $x = 13$ and $y = 14$.

   (b) (i)   Find the value of 3^6.

      (ii) Write 27 in the form 3^k, where $k \in \mathbf{N}$.

      (iii) Find the value of x for which $27 \times 3^x = \dfrac{1}{729}$.

   (c) Let $f(x) = x^3 + x^2 - 4x - 4$.
      (i)   Verify that $f(-2) = 0$.

      (ii) Solve the equation
$$x^3 + x^2 - 4x - 4 = 0.$$

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3   (a) Simplify $x(2x + 7) - 3(x - 4)$.

   (b) (i) Solve for x and y
$$x + y = 7$$
$$x^2 + y^2 = 29.$$

      (ii) Which one of the values of y in **(i)** above satisfies the inequality
$$6 - 2y < 0\,?$$
      Justify your answer.

   (c) A rectangle has length $2\sqrt{x}$ cm and width $\sqrt{x}$ cm.

      The length of a diagonal of the rectangle is $\sqrt{45}$ cm.
      (i) Find the area of the rectangle.

      (ii) The area of a square is twice the area of the rectangle.
      Find the length of a side of the square.

ANSWERS

2 (a) 2
   (b) (i) 729   (ii) 3^3 (iii) $x = -9$
   (c) (ii) $x = -2, -1, 2$

3 (a) $2x^2 + 4x + 12$
   (b) (i) $x = 5, y = 2; x = 2, y = 5$ (ii) $y = 5$
   (c) (i) 18 cm²   (ii) 6 cm