

# Algebra Exam Questions

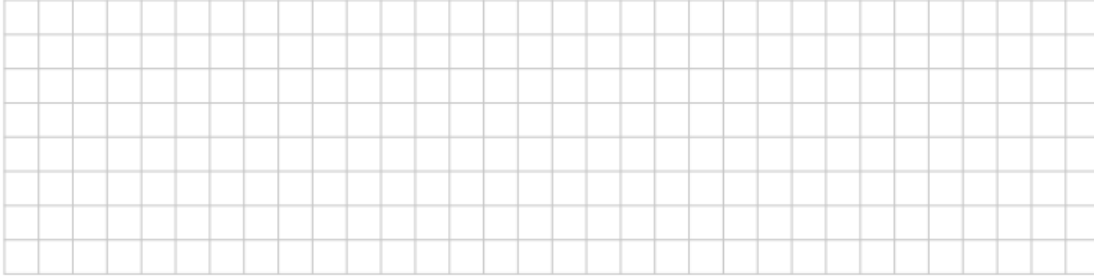
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2014

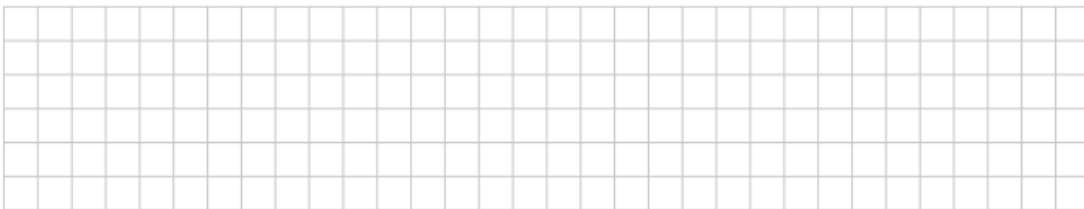
Question 4

(Suggested maximum time: 10 minutes)

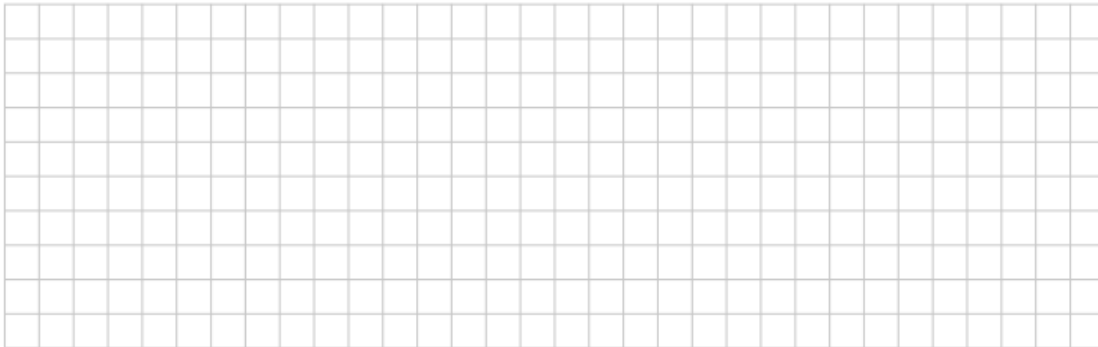
(a) Factorise fully  $9a^2 - 6ab + 12ac - 8bc$ .



(b) Factorise  $9x^2 - 16y^2$ .



(c) Use factors to simplify the following:  $\frac{2x^2 + 4x}{2x^2 + x - 6}$ .

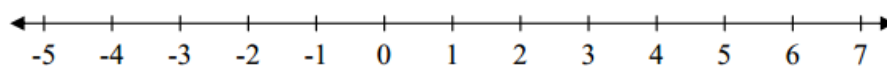
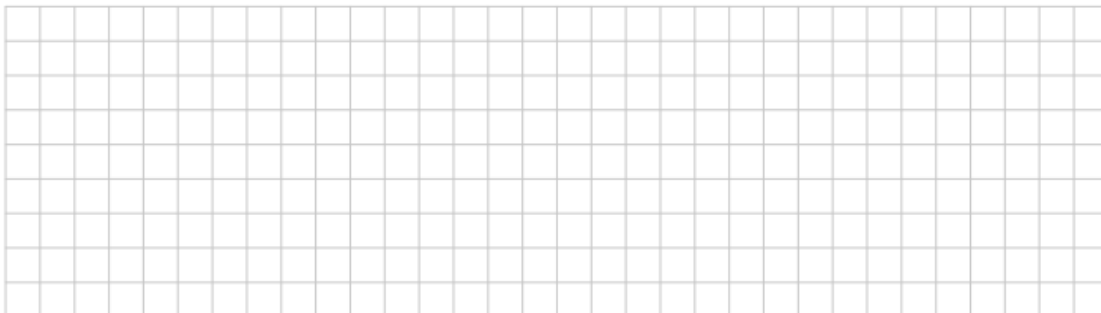


Question 5

(Suggested maximum time: 5 minutes)

Solve the following inequality and show the solution on the number line.

$$-17 \leq 1 - 3x < 13, \quad x \in \mathbb{Z}$$





**(b)** Simplify  $(3x^3 - 2x^2 - 3x + 2) \div (x - 1)$ .



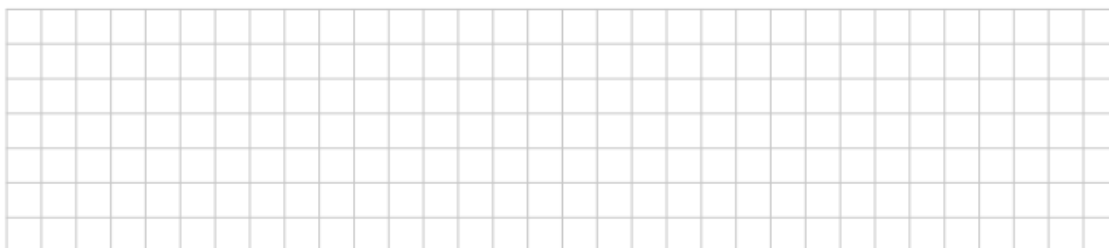
**(c) (i)** Solve the simultaneous equations:

$$2x - 3y = 18$$

$$5x + 9y = -10.$$

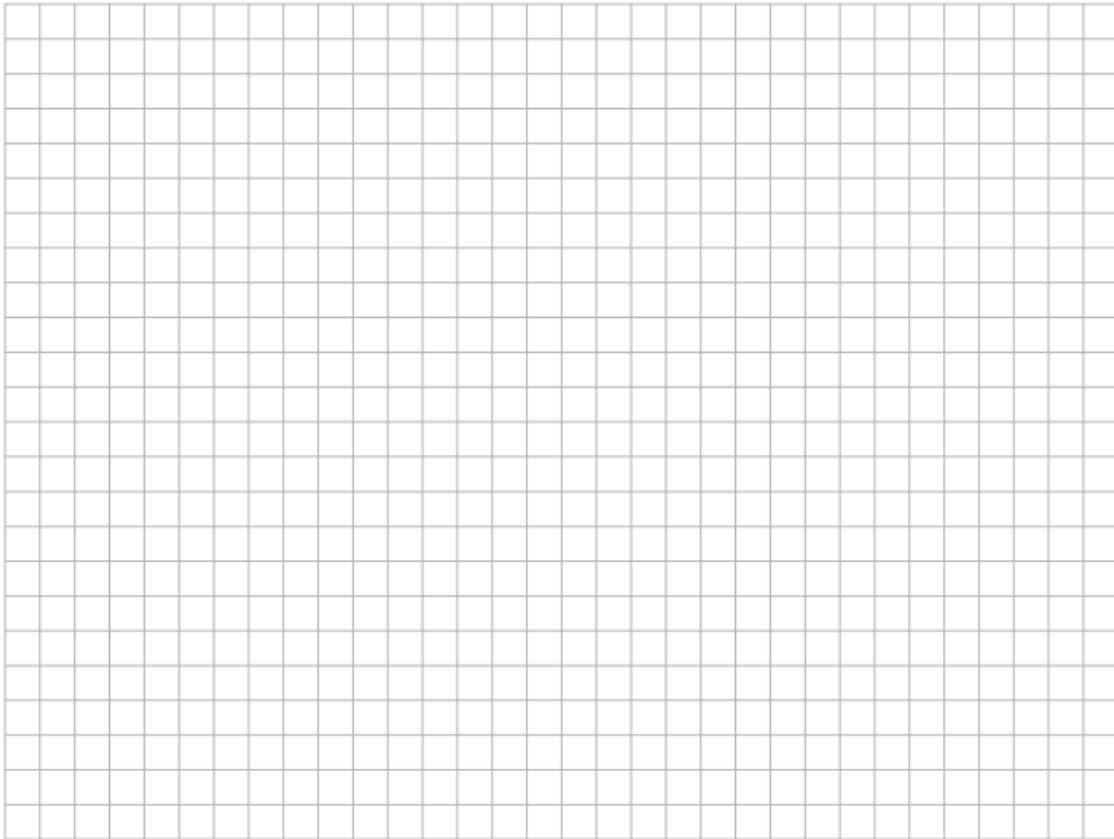


**(ii)** Verify your answer to **(c)(i)**.





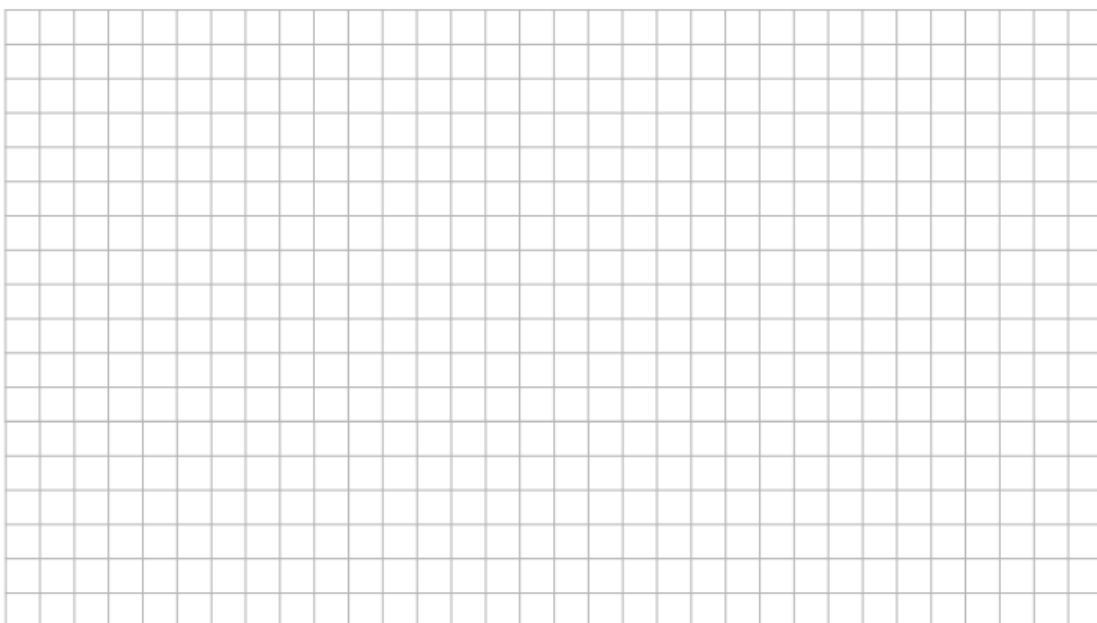
- (c) Divide  $2x^3 + x^2 - 13x + 6$  by  $x + 3$ .



- (d) A company employs two drivers, John and David. Each has use of a company car and small van. The company buys €30 worth of Toll Tags for each driver. Each time that a vehicle goes through the M50 Toll, a charge will be deducted from the Toll Tags.

John goes through the M50 toll five times in his car and four times in his small van. He then has €7.90 remaining on his Toll Tags. David goes through the M50 Toll twice in his car and six times in his small van. He then has €8.40 left on his Toll Tags.

Calculate how much it costs for a car and for a small van to go through the M50 Toll.



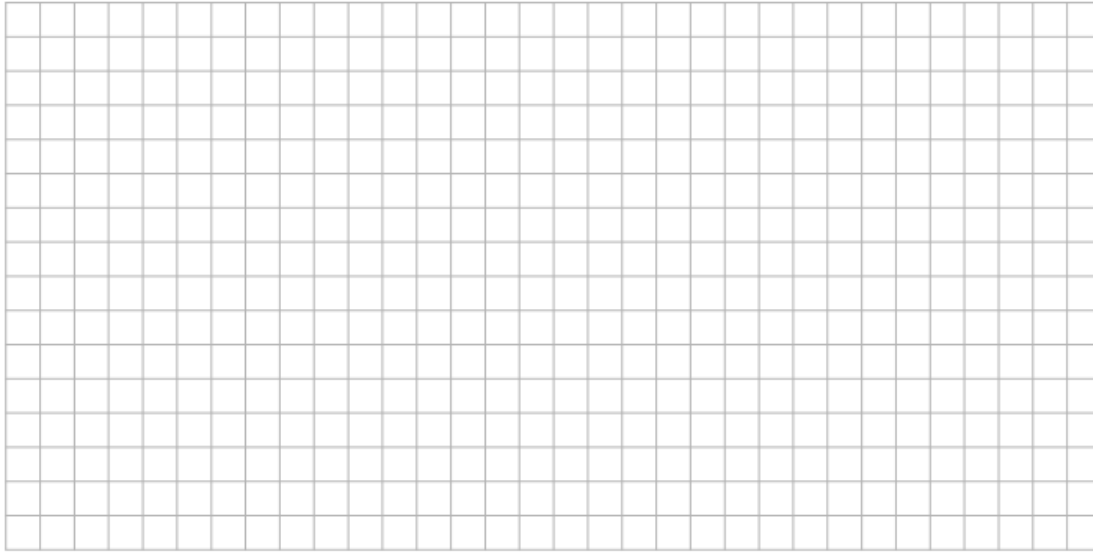




**Question 11****(Suggested maximum time: 10 minutes)**

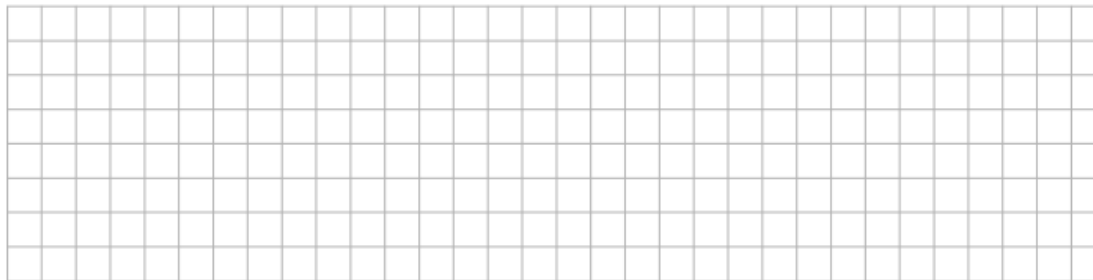
- (a) Solve the following inequality and show the solution on the number line.

$$-2 \leq \frac{1}{2}x - 3 < 1, x \in \mathbb{N}.$$



- (b) Josephine hopes to go to college. She has saved €3000. She will attend college for 32 weeks in her first year. She plans to have at least €800 left at the end of the year.

- (i) If she spends € $x$  each week, write an inequality to represent her spending during the year.



- (ii) Hence, or otherwise, find the maximum amount Josephine can spend each week.





## 2012

### Question 8

(Suggested maximum time: 5 minutes)

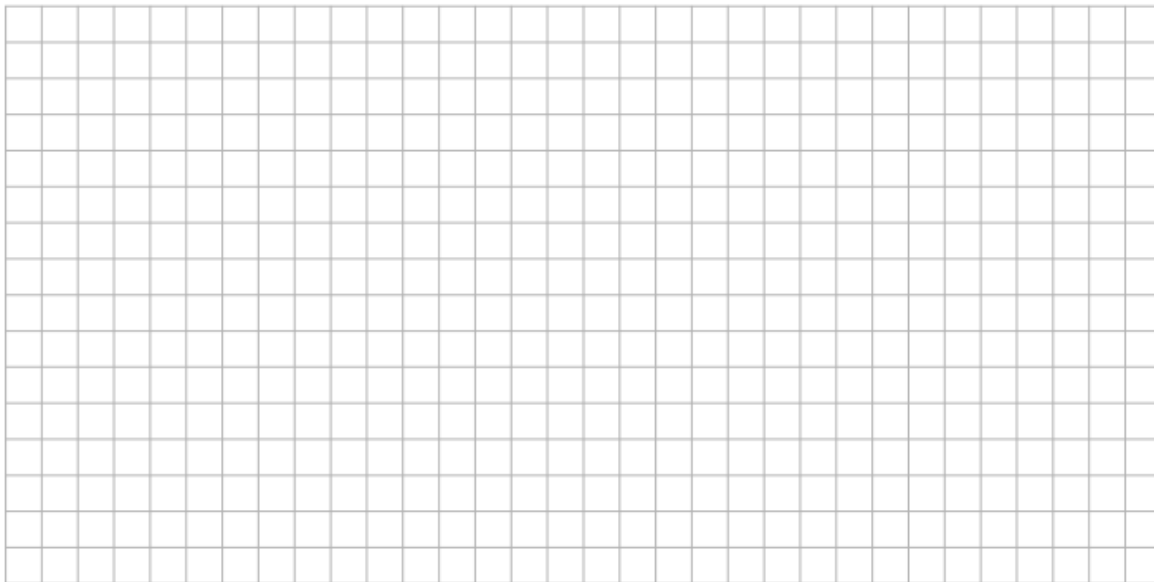
A capacitor is a device which stores electricity. The formula  $W = \frac{1}{2}CV^2$  gives the energy stored in the capacitor, where  $W$  is the energy,  $C$  is the capacitance and  $V$  is the voltage, and standard units are used throughout.

- (a) Find the amount of energy stored in a capacitor when  $C = 2500$  and  $V = 32$ .

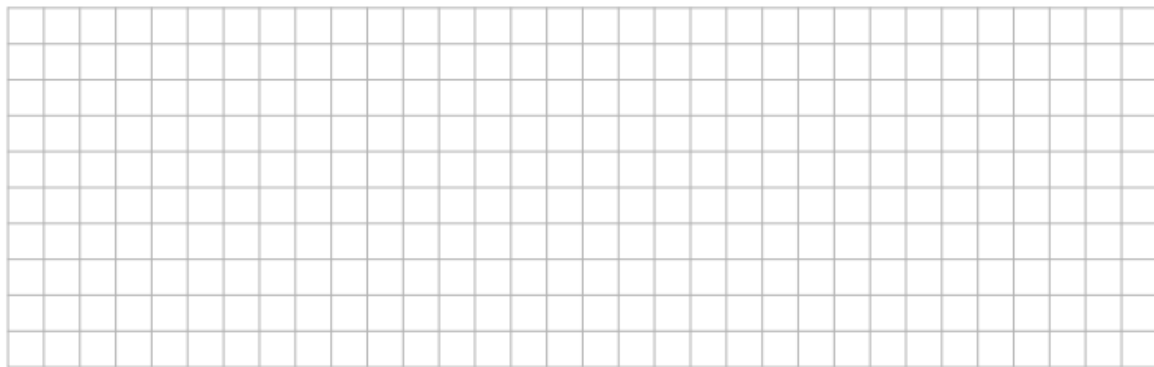
- (b) Write  $V$  in terms of  $W$  and  $C$ .



(ii)  $8x^2 - 14x + 3 = 0$



(iii)  $\frac{2x+5}{3} - \frac{4x-1}{2} = -\frac{1}{2}$



- (b) Find the roots of the equation  $2x^2 - 7x - 6 = 0$ .  
Give your answers correct to two decimal places.

