

# **"BETWEEN PAPERS"**

# **PRACTICE**

**(HIGHER TIER ONLY)**

**SUMMER 2018**

# **QUESTIONS**

**NOT A "BEST" GUESS PAPER.**

**NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT!**  
**YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 IT MAY STILL COME**  
**UP ON PAPERS 2 OR 3 ...**

**WE KNOW HOW IMPORTANT IT IS TO PRACTICE, PRACTICE, PRACTICE .... SO WE'VE COLLATED A LOAD OF**  
**QUESTIONS THAT WEREN'T EXAMINED IN THE AQA 9-1 GCSE MATHS PAPER 1 BUT WE CANNOT**  
**GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...**

**ENJOY!**  
**MEL & SEAGER**

**Q1.** A menu has a choice of 3 starters, 5 main courses and 4 desserts.

How many different choices of a 3-course meal are possible?

Circle your answer.

12

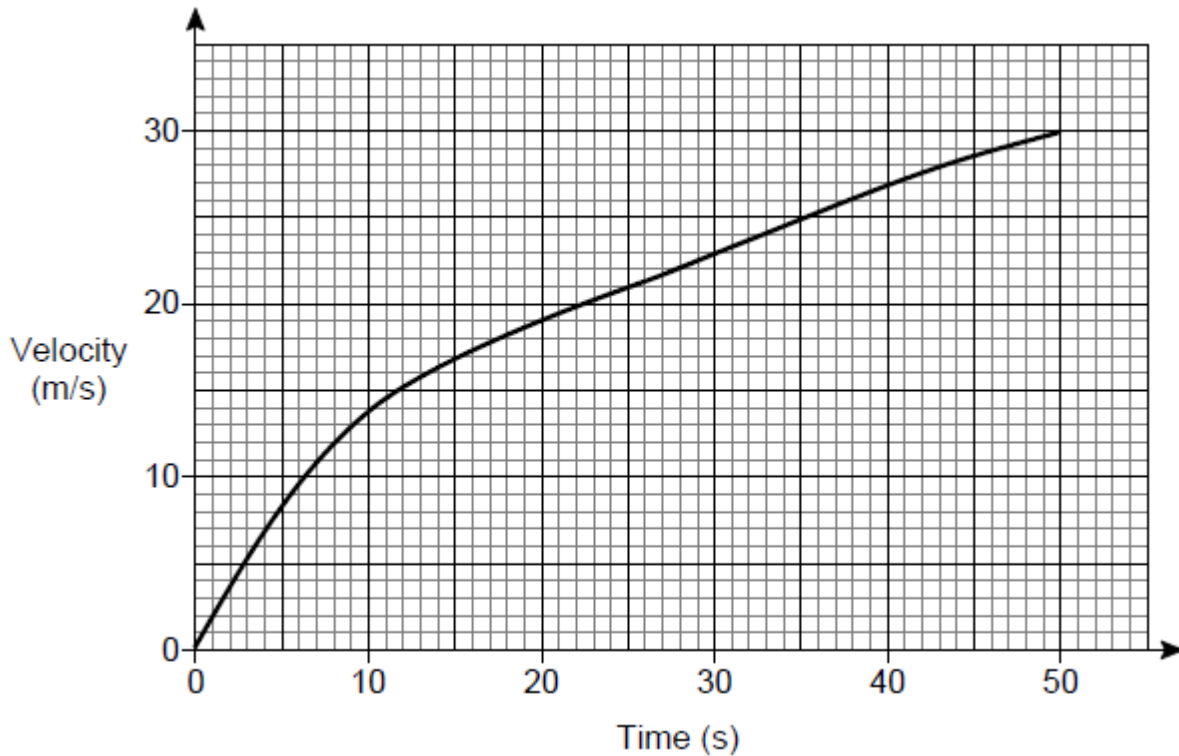
23

60

972

[1]

**Q2.** Here is the velocity-time graph of a car for 50 seconds.



(a) Work out the average acceleration during the 50 seconds.

Give the units of your answer.

[2]

(b) Estimate the distance travelled the last 30 seconds.

[2]

**Q3.** Convert  $0.1\overline{72}$  to a fraction in its lowest terms.

[3]

**Q4.** Expand and simplify  $(2x + 5)(2x - 5)(3x + 7)$

[3]

**Q5.** Use the quadratic formula to solve  $5x^2 + 11x - 2 = 0$  Give your solutions to 2 decimal places.

[3]

**Q6.** Which expression gives the area, in  $\text{cm}^2$ , of this triangle?

Circle your answer.

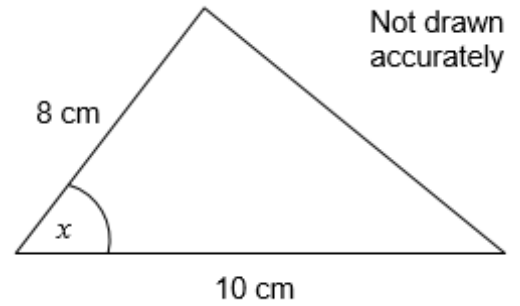
$$80 \sin x$$

$$80 \cos x$$

$$40 \sin x$$

$$40 \cos x$$

[1]



**Q.7** A sequence of numbers is formed by the iterative process  $a_{n+1} = (a_n)^2 - a_n$

a) Describe the sequence of numbers when  $a_1 = 1$

Show working to justify your answer.

[1]

b) Describe the sequence of numbers when  $a_1 = -1$

Show working to justify your answer.

[2]

c) Work out the value of  $a_2$  when  $a_1 = 1 - \sqrt{2}$

[2]

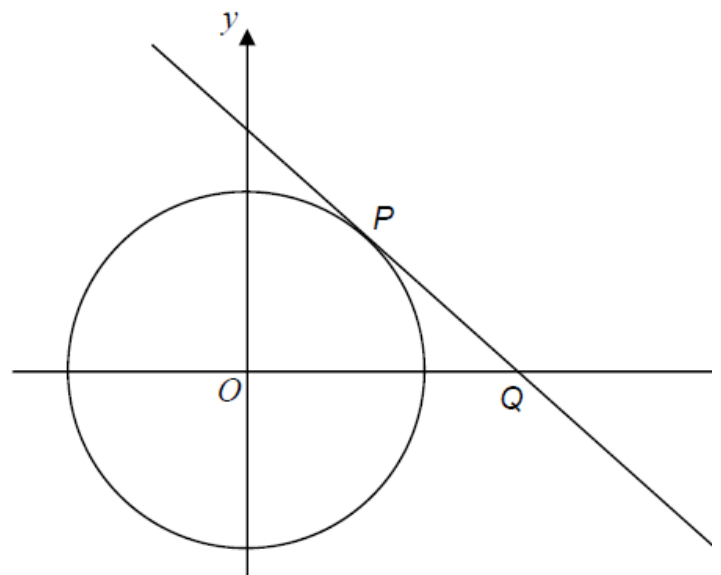
**Q8.** The diagram shows the circle

$$x^2 + y^2 = 10$$

P lies on the circle and has x-coordinate 1

The tangent at P intersects the x-axis at Q.

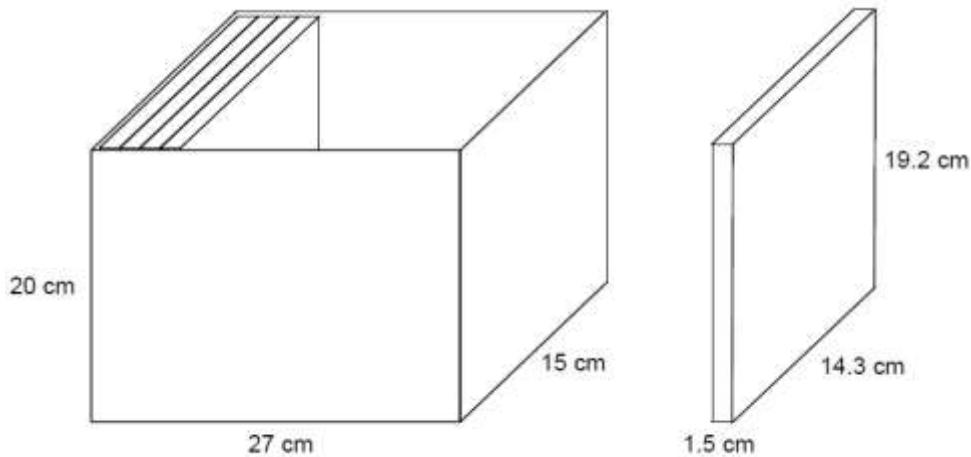
Work out the coordinates of Q.



[5]

**Q9.** A box is a cuboid with dimensions 27 cm by 15 cm by 20 cm  
These dimensions are to the nearest centimetre.

DVD cases are cuboids with dimensions 1.5 cm by 14.3 cm by 19.2 cm  
These dimensions are to the nearest millimetre.



Show that 17 DVD cases, stacked as shown, will definitely fit in the box.

[4]

**Q10.** Rationalise the denominator and simplify  $\frac{10}{3\sqrt{5}}$

[2]

**Q11.** Tony and Ian are each buying a new car.

There are three upgrades that they can select:

- metallic paint (10 different choices)
- alloy wheels (5 different choices)
- music system (3 different choices).

a) Tony selects all 3 upgrades.

Show that there are 150 different possible combinations.

[1]

b) Ian selects 2 of these upgrades.

Show that there are 95 different possible combinations.

[3]

**Q12.** B, C and D are points on a circle.

$$\text{Angle } ABC = 92^\circ$$

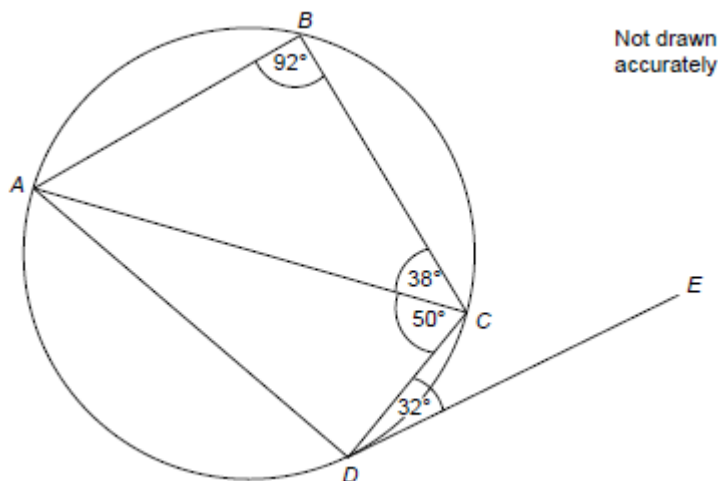
$$\text{Angle } ACB = 38^\circ$$

$$\text{Angle } ACD = 50^\circ$$

$$\text{Angle } CDE = 32^\circ$$

Tick whether each statement is true or false.

Give a reason for each answer.



**Statement**

**True**

**False**

*AC is a diameter*

☐
☐

Reason

**Statement**

**True**

**False**

*Angle  $ADC = 88^\circ$*

☐
☐

Reason

**Statement**

**True**

**False**

*$ABCD$  is a trapezium*

☐
☐

Reason

**Statement**

**True**

**False**

*$DE$  is a tangent to the circle*

☐
☐

Reason

[4]

**Q13.** The area of a right-angled, isosceles triangle is  $4 \text{ cm}^2$

Work out the perimeter of the triangle in centimetres. Give your answer in the form  $a + b\sqrt{c}$ , where  $a, b$  and  $c$  are integers.

[4]

**Q14.** Show that  $\frac{2w+4}{w^2-25} \times \frac{w+5}{w^2+3w+2} \times (3w^2-16w+5)$

Simplifies to  $\frac{aw+b}{cw+d}$  where  $a, b, c$  and  $d$  are integers.

[5]

**Q15.** Solve  $5x - y = 5$

$$2y - x^2 = 11$$

You must show your working.

Do not use trial and improvement.

[6]

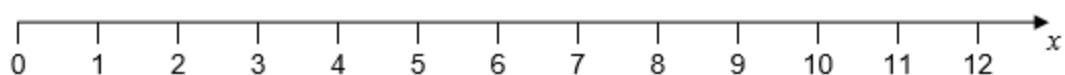
**Q16.** a) Solve the inequality  $\frac{3x}{2} \leq 9$

[2]

b) Solve the inequality  $4(x+2) > 12$

[2]

c) Represent the solution set that satisfies both answers to parts (a) and (b) on the number line.

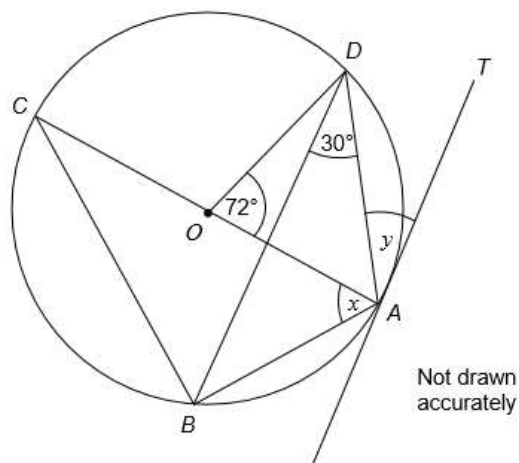


[1]

**Q17.** A, B, C and D are points on a circle, centre O.

AC is a diameter of the circle.

AT is a tangent to the circle.



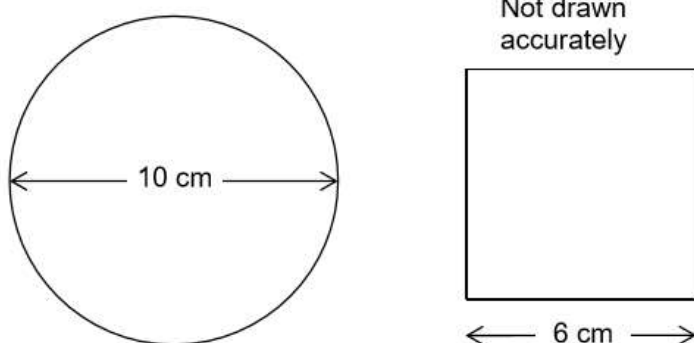
Work out the size of angle  $x$  and the size of angle  $y$ .

[4]

**Q18.** Write  $\sqrt{12} + \frac{15}{\sqrt{3}}$  in the form  $a\sqrt{b}$  where  $a$  and  $b$  are prime numbers

[3]

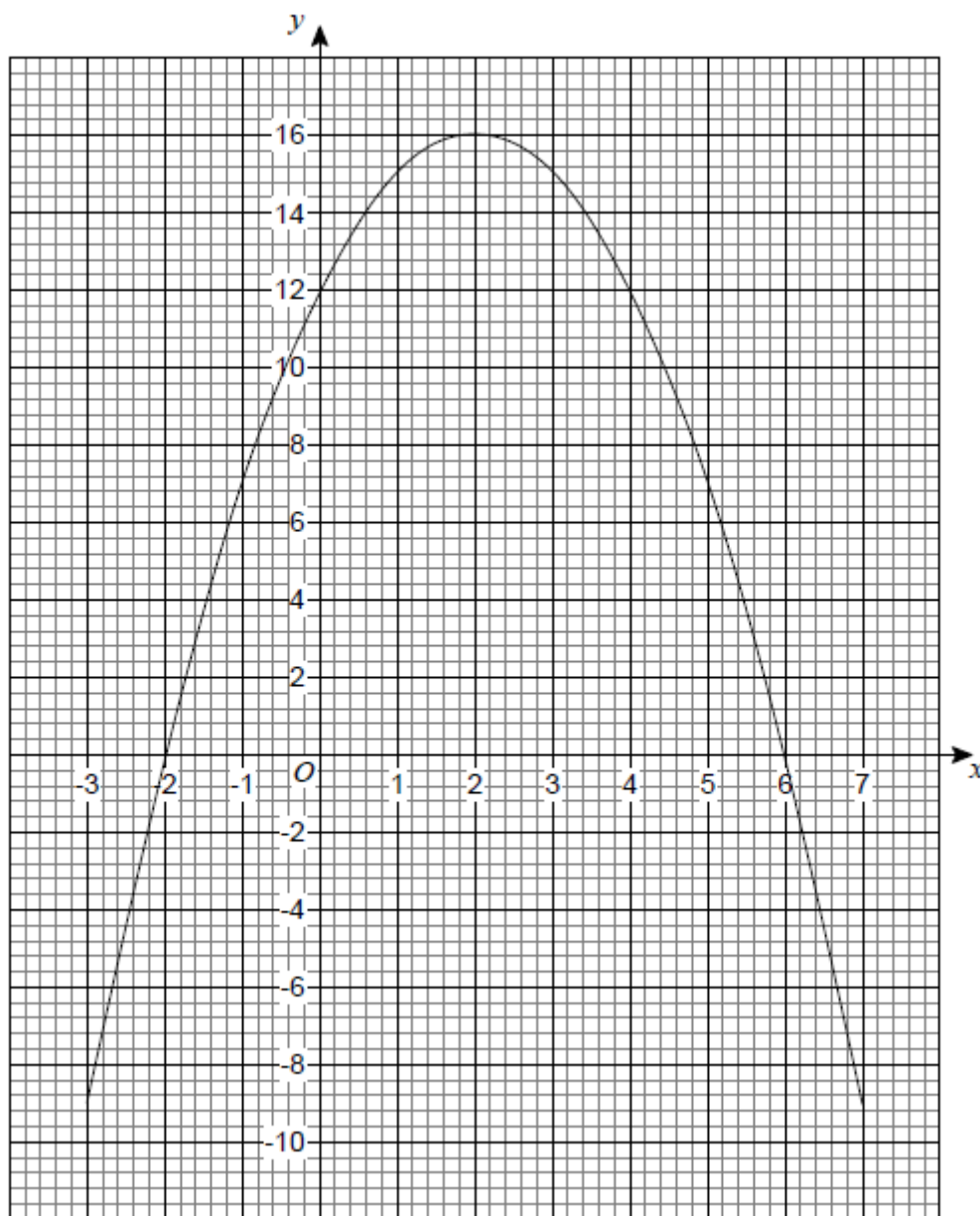
**Q19.** A circle has diameter 10 cm A square has side length 6 cm



Use Pythagoras' theorem to show that the square will fit inside the circle without touching the edge of the circle.

[3]

**Q20.** The graph  $y = a + bx - x^2$  is shown.



(a) Circle the coordinates of the turning point of the curve.

(-2, 0)      (0, 12) (2, 16)      (6, 0)

[1]

(b) Circle the value of  $a$ .

-2      12      16      6

[1]

(c) Circle the two roots of  $a + bx - x^2 = 0$

-2 and 6      2 and -6      2 and 6      -2 and -6

[1]

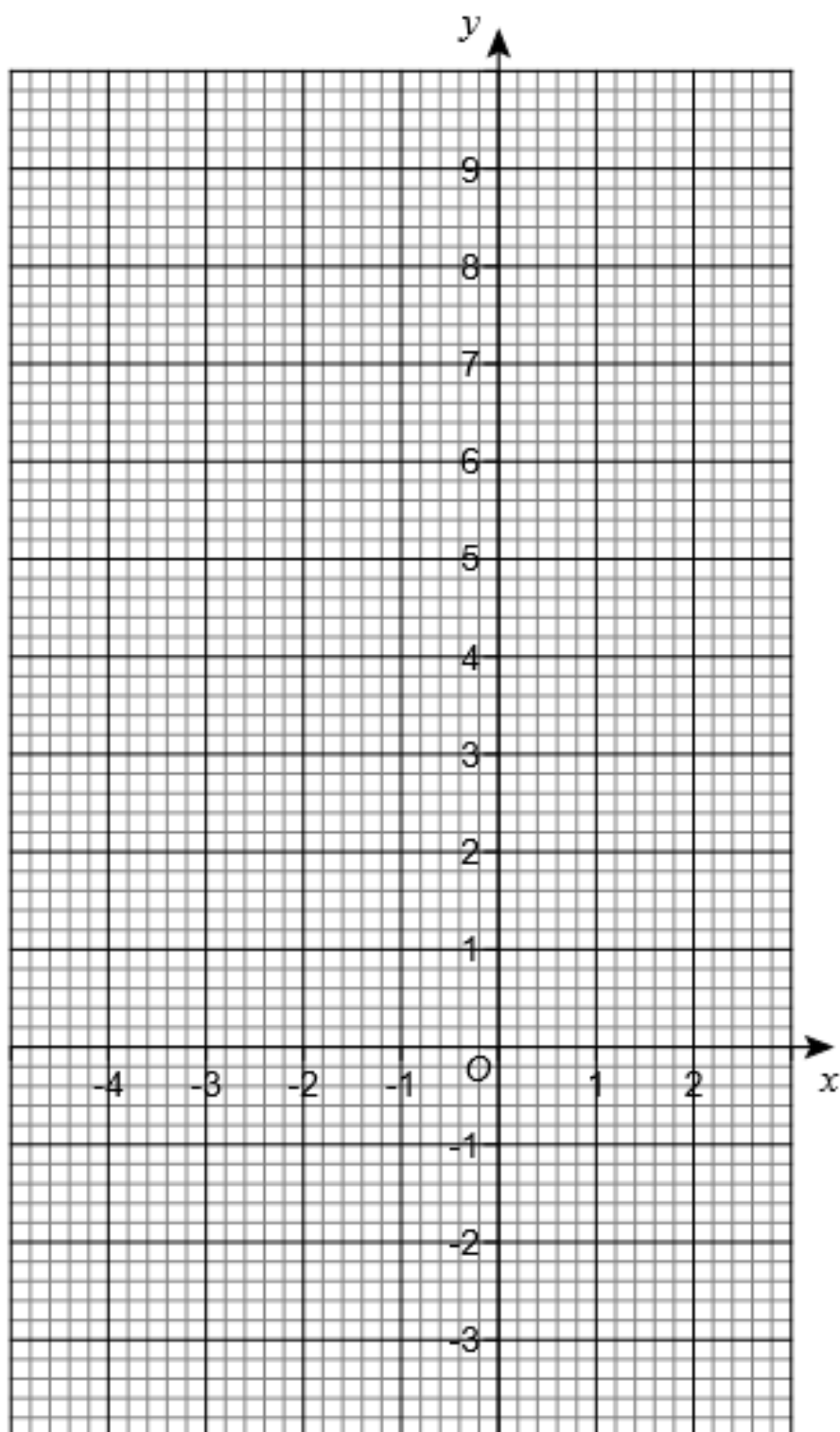
**Q21.** The region R satisfies the three inequalities

$$x > -3$$

$$x + y \leq 2$$

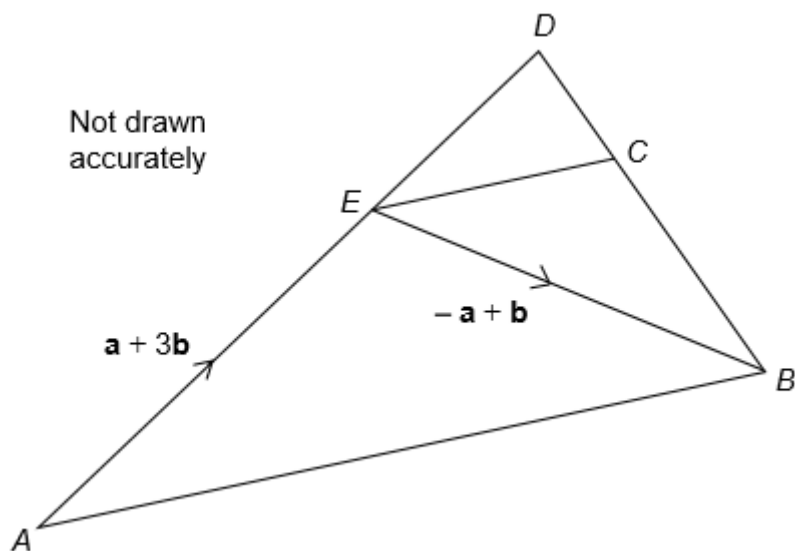
$$y \geq \frac{x}{2} - 1$$

Show the region R on the grid.



[4]

**Q22.** AED is a straight line.



$$\overrightarrow{AE} = \mathbf{a} + 3\mathbf{b}$$

$$\overrightarrow{EB} = -\mathbf{a} + \mathbf{b}$$

a) Work out the vector  $\overrightarrow{AB}$

[1]

b) Also  $\overrightarrow{ED} = \frac{1}{3} \overrightarrow{AE}$  and  $\overrightarrow{DC} = -\frac{1}{3} \mathbf{a}$

Prove that EC is parallel to AB.

[3]