8 $f(x) = 3x^2 + px - 7$

The equation $f(x) = 0$ has roots α and β.

(a) Without solving the equation

(i) write down the value of $\alpha^2\beta^2$

(ii) find, in terms of p, $\alpha^2 + \beta^2$

(4)

Given that $3\alpha - \beta = 8$

(b) find the possible values of p.

(5)

Given also that p is negative,

(c) form an equation with roots $\frac{1}{\alpha^2}$ and $\frac{1}{\beta^2}$

(3)

Question 8 continued

Question 8 continued

Question 8 continued

(Total for Question 8 is 12 marks)

9

$$f(x) = 2x^3 + ax^2 + bx + 15 \qquad \text{where } a \text{ and } b \text{ are constants.}$$

The remainder when $f(x)$ is divided by $(x - 1)$ is -12

The remainder when $f(x)$ is divided by $(x + 1)$ is 48

(a) Find the value of a and the value of b.

(6)

(b) Show that $f\left(\frac{1}{2}\right) = 0$

(1)

(c) Express $f(x)$ as a product of linear factors.

(4)

(d) Solve the equation $f(x) = 0$

(1)

Question 9 continued

Question 9 continued

Question 9 continued

(Total for Question 9 is 12 marks)