SQA Past paper questions

2023 – Paper 1 – Question 10

(a) Show that $(x+5)$ is a factor of $x^4+3x^3-7x^2+9x-30$. 2

(b) Hence, or otherwise, solve $x^4+3x^3-7x^2+9x-30=0$, $x\in\mathbb{R}$. 5

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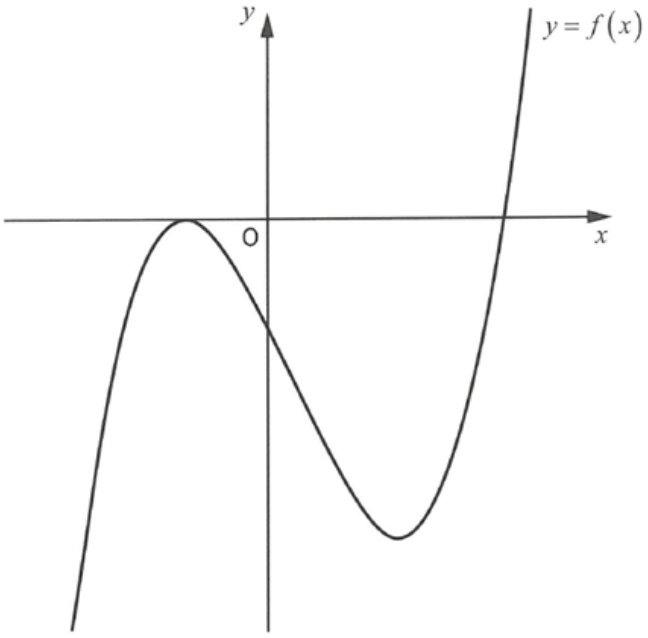
2022 – Paper 1 – Question 13

(a) (i) Show that $(x+2)$ is a factor of $f(x)=x^3-2x^2-20x-24$. 2

(ii) Hence, or otherwise, solve $f(x)=0$. 3

The diagram shows the graph of $y=f(x)$.



(b) The graph of $y=f(x-k)$, $k>0$ has a stationary point at $(1,0)$.
State the value of k. 1

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2019 – Paper 2 – Question 10

(a) Show that $(x+3)$ is a factor of $3x^4+10x^3+x^2-8x-6$. 2

(b) Hence, or otherwise, factorise $3x^4+10x^3+x^2-8x-6$ fully. 5

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2018 – Paper 2 – Question 7

(a) (i) Show that $(x-2)$ is a factor of $2x^3-3x^2-3x+2$. 2

(ii) Hence, factorise $2x^3-3x^2-3x+2$ fully. 2

The fifth term, u_5, of a sequence is $u_5 = 2a-3$.

The terms of the sequence satisfy the recurrence relation $u_{n+1} = au_n - 1$.

(b) Show that $u_7 = 2a^3-3a^2-a-1$. 1

For this sequence, it is known that

- $u_7 = u_5$
- a limit exists.

(c) (i) Determine the value of a. 3

(ii) Calculate the limit. 1

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2017 – Paper 2 – Question 2

(a) Show that $(x-1)$ is a factor of $f(x)=2x^3-5x^2+x+2$. 2

(b) Hence, or otherwise, solve $f(x)=0$. 3

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2016 – Paper 2 – Question 3(a)

(i) Show that $(x+1)$ is a factor of $2x^3 - 9x^2 + 3x + 14$. 2

(ii) Hence solve the equation $2x^3 - 9x^2 + 3x + 14 = 0$. 3

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2015 – Paper 1 – Question 3

Show that $(x + 3)$ is a factor of $x^3 - 3x^2 - 10x + 24$ and hence factorise $x^3 - 3x^2 - 10x + 24$ fully. 4

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Specimen – Paper 1 – Question 7

(a) Show that $(x + 1)$ is a factor of $x^3 - 13x - 12$. 3

(b) Factorise $x^3 - 13x - 12$ fully. 2

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2010 – Paper 1 – Question 22

(a) (i) Show that $(x - 1)$ is a factor of $f(x) = 2x^3 + x^2 - 8x + 5$.

(ii) Hence factorise $f(x)$ fully. 5

(b) Solve $2x^3 + x^2 - 8x + 5 = 0$. 1

(c) The line with equation $y = 2x - 3$ is a tangent to the curve with equation $y = 2x^3 + x^2 - 6x + 2$ at the point G.

Find the coordinates of G. 5

(d) This tangent meets the curve again at the point H.

Write down the coordinates of H. 1

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2006 – Paper 1 – Question 9

Show that $(k + 3)$ is a factor of $k^3 + 3k^2 - k - 3$ and hence factorise $k^3 + 3k^2 - k - 3$ fully. **5**

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2005 – Paper 1 – Question 8

A function f is defined by the formula $f(x) = 2x^3 - 7x^2 + 9$ where x is a real number.

(a) Show that $(x - 3)$ is a factor of $f(x)$, and hence factorise $f(x)$ fully. **5**

(b) Find the coordinates of the points where the curve with equation $y = f(x)$ crosses the x- and y-axes. **2**

(c) Find the greatest and least values of f in the interval $-2 \leq x \leq 2$. **5**

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2004 – Paper 1 – Question 2

$f(x) = x^3 - x^2 - 5x - 3$.

(a) (i) Show that $(x + 1)$ is a factor of $f(x)$.

(ii) Hence or otherwise factorise $f(x)$ fully. **5**

(b) One of the turning points of the graph of $y = f(x)$ lies on the x-axis. Write down the coordinates of this turning point. **1**

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2003 – Paper 2 – Question 1

$f(x) = 6x^3 - 5x^2 - 17x + 6$.

(a) Show that $(x - 2)$ is a factor of $f(x)$.

(b) Express $f(x)$ in its fully factorised form. **4**

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