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VCE Mathematical Methods ½
Polynomials [1.5]
Test

19 Marks. 20 Minutes Writing. 1 Minute Reading.

Results:

Test Questions	_____ / 19

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Section A: Test Questions (19 Marks)

Question 1 (4 marks)

Tick whether the following statements are **True** or **False**.

Statement	True	False
a. The minimum number of roots for a cubic is three.		
b. The root of a polynomial that has a factor of $x + 3$ is $x = 3$.		
c. If $f(1) = 2$, then $f(x) \div (3x - 6)$ has a remainder of 2.		
d. The remainder of $(x^3 + 3x^2 - x + 2) \div (x - 2)$ is 20.		
e. To factorise a quartic, we generally need to find two roots by trial and error.		
f. The rational root theorem suggests that $ax^3 + bx^2 + cx + d$ will have roots that are factors of d divided by the factors of a.		
g. Graphs of polynomials where the highest degree is odd, both start and finish at either positive or negative infinity.		
h. All repeated roots correspond to turning points on the graph of a polynomial.		

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Question 2 (3 marks)

Consider the function $f(x) = x^3 + ax^2 + bx$. If $x - 1$ is a factor of $f(x)$ and the remainder of $f(x) \div (x + 4)$ is given by -20, find the value(s) of a and b.

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Question 3 (3 marks)

Solve the following equation for x.

$$2x^3 + 11x^2 = 12(x + 3)$$

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Question 4 (3 marks)

Sketch the graph of the following function on the axes below. Label all axes intercepts with their coordinates.

$$y = (x - 2)^2(x - 3)(x + 1)$$

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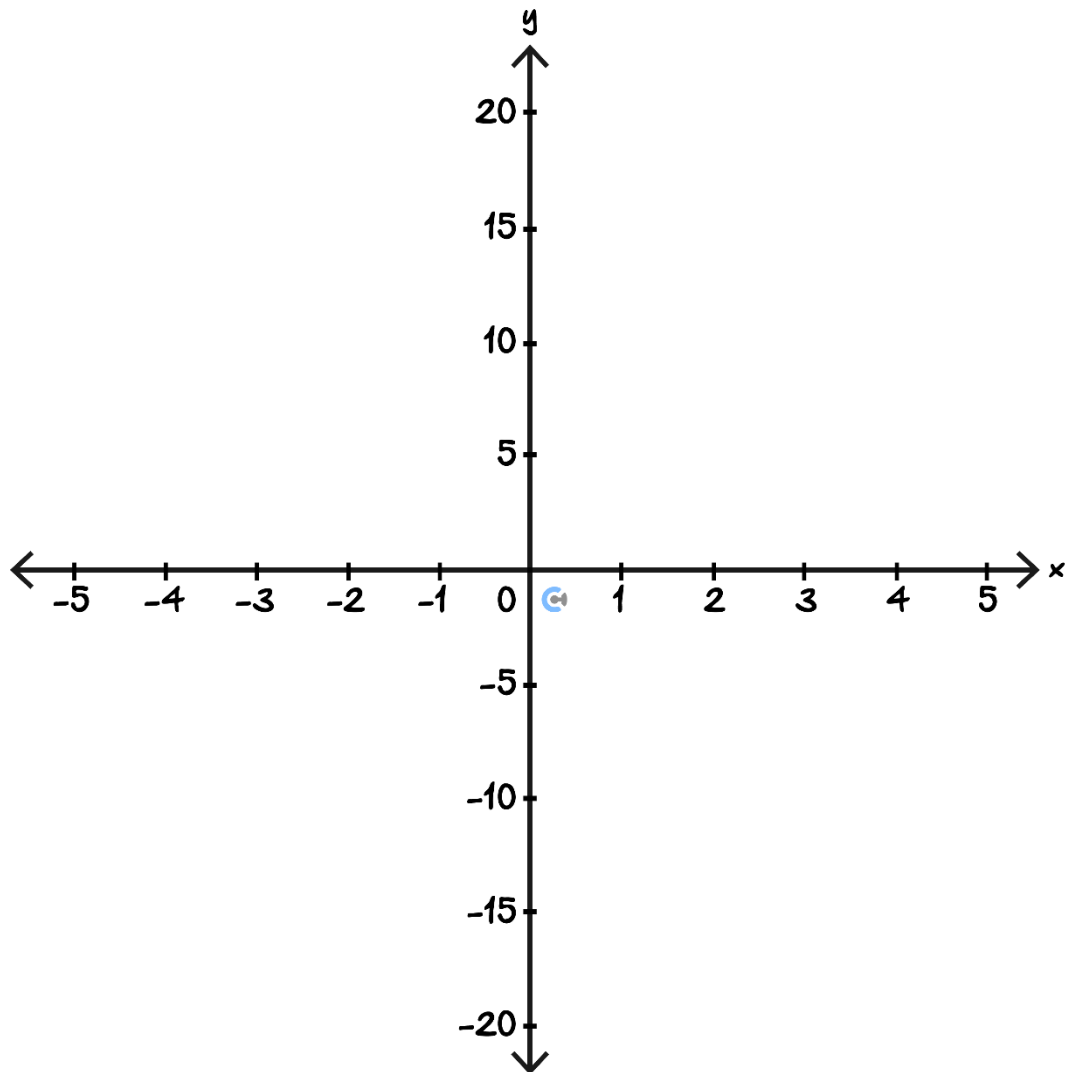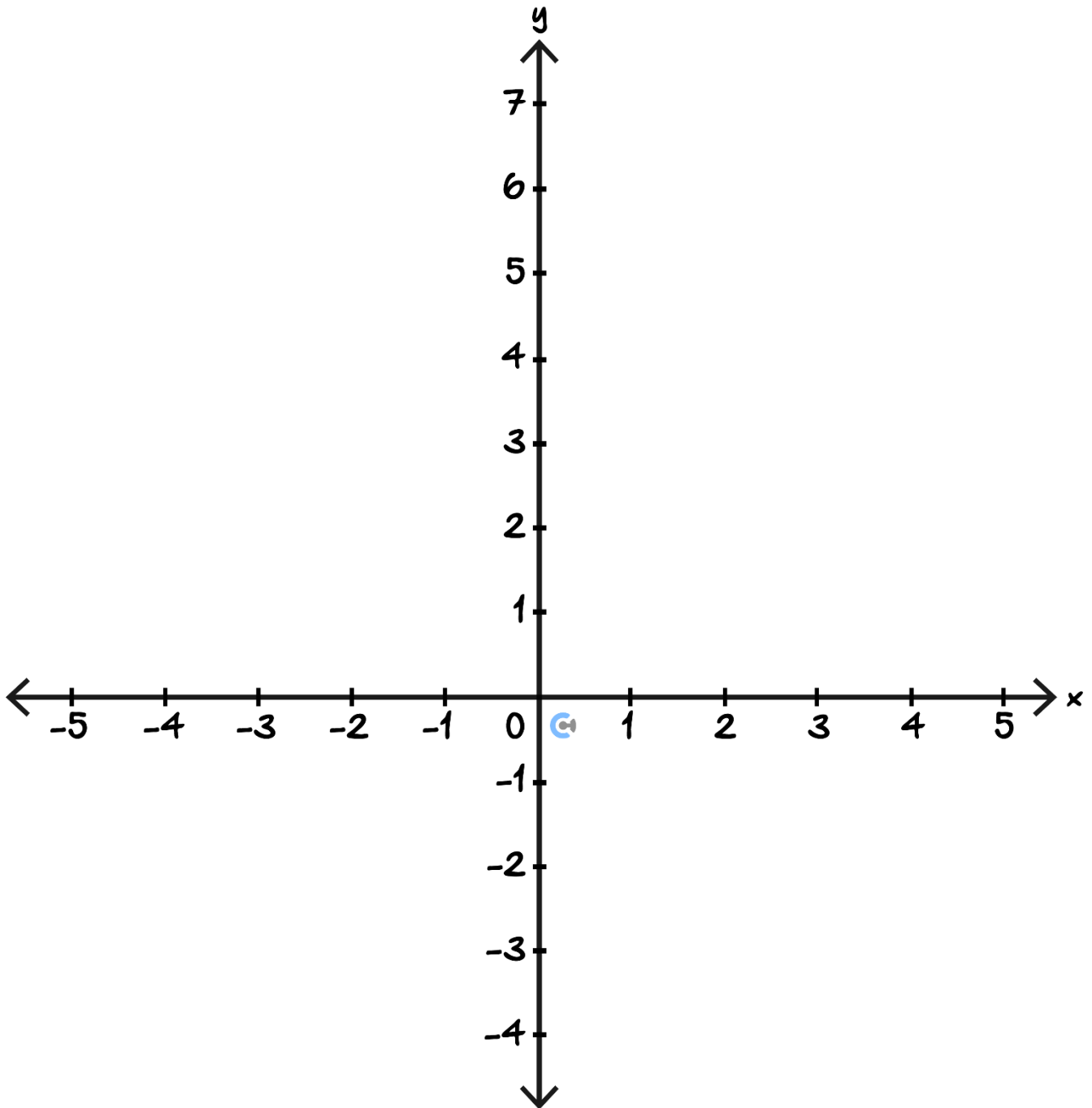
Question 5 (6 marks)

Consider the function $f(x) = 2x^3 - 5x^2 - ax + 6$.

It is known that the remainder, when $f(x)$ is divided by $x - 3$, is 12.

a. Show that $a = 1$. (1 mark)

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

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c. Sketch the graph of $y = f(x)$ on the axes below. Label all axis intercepts with coordinates. (2 marks)

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