EXAM-STYLE CLASS TEST

MARKS	DURATION	QUESTIONS
35	55 minutes	3

Name: ..... Class: .....

Date: .....

MARK ____ / 35

INSTRUCTIONS AND INFORMATION

1. Answer **ALL** the questions in this question paper.
2. Answer QUESTION 1 by **circling** the letter (A–D) in the answer grid at the end of that section.
3. Show **ALL** calculations clearly.
4. Show all units where applicable.
5. Number the answers correctly according to the numbering system used in this question paper.
6. A non-programmable calculator may be used, unless stated otherwise.
7. Write neatly and legibly.

QUESTION 1 [10 MARKS]

Four options are given as possible answers to the following questions. Choose the correct answer and circle the letter (A–D) in the grid at the end of this section. If you want to change your choice, put a cross through the wrong letter and circle your new choice.

1.1 If $y = 4x^5 - 6x^4 + 3x$, then $\frac{dy}{dx} = \ldots$ (1)

A) $20x^4 - 24x^3 + 3x$ **B)** $20x^4 - 24x^3 + 3$

C) $20x^5 - 24x^4 + 3$ **D)** $4x^4 - 6x^3 + 3$

1.2 The derivative of a CONSTANT is ... (1)

A) undefined **B)** 0

C) the constant itself **D)** 1

1.3 If $f(x) = \sqrt{x}$, then $f'(x) = \ldots$ (1)

A) $\frac{1}{\sqrt{x}}$ **B)** $2\sqrt{x}$

C) $\frac{1}{2x}$ **D)** $\frac{1}{2\sqrt{x}}$

1.4 If $y = \frac{3}{x}$, then $\frac{dy}{dx} = \ldots$ (1)

A) $\frac{-3}{x^2}$ **B)** $\frac{-3}{x}$

C) $-3x$ **D)** $\frac{3}{x^2}$

1.5 Before differentiating $(3x + 2)(x - 1)$, you should ... (1)

A) differentiate each bracket and multiply the results

B) expand the brackets first

C) differentiate the first bracket only

D) take logarithms

1.6 If $f(x) = x^3 - 3x$, then $f'(2) = ...$ (1)

A) 9

B) 2

C) 12

D) 6

1.7 D_x notation means ... (1)

A) the value of the function at x

B) the domain of the function

C) differentiate with respect to x

D) the discriminant

1.8 The gradient of the TANGENT to $y = x^2$ at $x = 3$ is ... (1)

A) 3

B) 9

C) 2

D) 6

1.9 If $f'(a) = 0$, the graph of f has ... (1)

A) a point of inflection at $x = a$

B) an asymptote at $x = a$

C) an x-intercept at $x = a$

D) a stationary point at $x = a$

1.10 If $y = (2x)^3$, then $\frac{dy}{dx} = ...$ (1)

A) $3(2x)^2$

B) $8x^2$

C) $24x^2$

D) $6x^2$

ANSWER GRID — CIRCLE YOUR ANSWERS FOR QUESTION 1

1.1	A	B	C	D
1.2	A	B	C	D
1.3	A	B	C	D
1.4	A	B	C	D
1.5	A	B	C	D
1.6	A	B	C	D
1.7	A	B	C	D
1.8	A	B	C	D
1.9	A	B	C	D
1.10	A	B	C	D

QUESTION 2 [13 MARKS]

Answer the questions below. Show ALL your working.

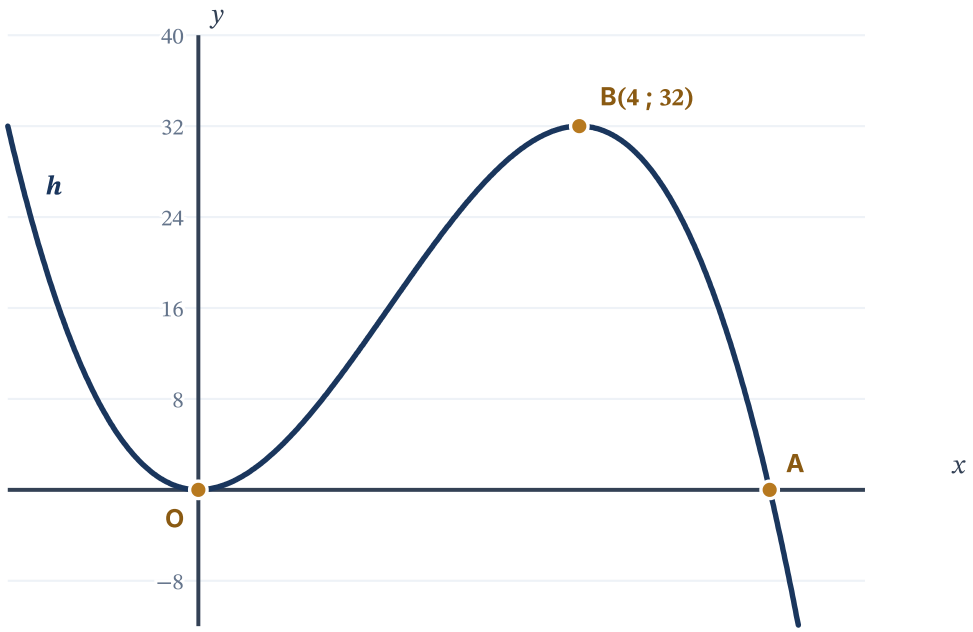
2.1 Determine $f'(x)$ from FIRST PRINCIPLES if $f(x) = 2x^2 - 3x$. **(5)**

2.2 Determine $\frac{dy}{dx}$ if $y = 4x^5 - 6x^4 + 3x$. **(3)**

2.3 Determine $D_x[\,(\frac{3x}{2} - \frac{1}{3x})^2\,]$. **(5)**

QUESTION 3 [12 MARKS]

The graph of $h(x) = ax^3 + bx^2$ has turning points at the origin O(0 ; 0) and at B(4 ; 32). A is the other x-intercept of h.



3.1 Show that $a = -1$ and $b = 6$. **(5)**

3.2 Calculate the coordinates of A. **(3)**

3.3 Write down the values of x for which h is INCREASING. **(2)**

3.4 Write down the values of x for which h is CONCAVE DOWN. **(2)**

TOTAL: 35 marks

This question paper consists of 3 questions.

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