EXAM-STYLE CLASS TEST

MARKS	DURATION	QUESTIONS
32	50 minutes	3

Name: _____ Class: _____

Date: _____

MARK ____ / 32

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 At a STATIONARY point of a cubic ... (1)

A) $f(x) = 0$ **B)** $x = 0$

C) $f'(x) = 0$ **D)** $f''(x) = 0$

1.2 $h(x) = ax^3 + bx^2$ has turning points at $(0\ ;\ 0)$ and $(4\ ;\ 32)$. Then ... (1)

A) $a = -1$ and $b = 6$ **B)** $a = -1$ and $b = -6$

C) $a = 6$ and $b = -1$ **D)** $a = 1$ and $b = -6$

1.3 For $h(x) = -x^3 + 6x^2$, the x-intercept other than the origin is at ... (1)

A) $x = 4$ **B)** $x = 6$

C) $x = 32$ **D)** $x = -6$

1.4 For $h(x) = -x^3 + 6x^2$, h is INCREASING for ... (1)

A) $x < 0$ or $x > 4$ **B)** $x < 0$

C) $0 < x < 4$ **D)** $x > 4$

1.5 For $h(x) = -x^3 + 6x^2$, h is CONCAVE DOWN for ... (1)

A) $x > 4$ **B)** $x < 2$

C) $0 < x < 4$ **D)** $x > 2$

1.6 The POINT OF INFLECTION of a cubic is where ... (1)

A) $f(x) = 0$ **B)** the graph cuts the y-axis

C) $f''(x) = 0$ **D)** $f'(x) = 0$

1.7 A cubic whose coefficient of x^3 is POSITIVE ... (1)

A) rises to the right and falls to the left
B) has no turning points
C) is increasing everywhere
D) falls to the right and rises to the left

1.8 How many turning points can a cubic graph have? (1)

A) at most three
B) exactly one
C) exactly two
D) at most two

1.9 For $f(x) = x^3 - 3x^2$, the LOCAL MINIMUM is at ... (1)

A) $(2\ ;\ 4)$
B) $(2\ ;\ -4)$
C) $(0\ ;\ 0)$
D) $(-2\ ;\ -20)$

1.10 To decide whether a stationary point is a maximum or a minimum, you can ... (1)

A) test the sign of $f(x)$ at that point
B) count the x-intercepts
C) check whether x is positive
D) test the sign of $f'(x)$ at that point

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 [12 MARKS]

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

2.1 Calculate the coordinates of the x-intercepts of f. (4)

2.2 Determine the coordinates of the stationary points of f. **(5)**

2.3 Determine the coordinates of the point of inflection. **(3)**

QUESTION 3 [10 MARKS]

Answer the questions below about the same graph.

3.1 Write down the values of x for which f is concave up. **(2)**

3.2 Determine the equation of the tangent to f at $x = 1$. **(4)**

3.3 For which values of k will $-x^3 + 6x^2 = k$ have THREE distinct real roots? Justify your answer. **(4)**

TOTAL: 32 marks

This question paper consists of 3 questions.

© Danemathics — free to print and share for classroom use.