

# MATH 151 SAMPLE TEST 3

Time Allowed 15 Minutes

On the test there will be 10 questions very similar to those below.

## Differentiation

Differentiate

1.  $y = 4x^{-2}$

2.  $y = x^{-3}$

Differentiate the polynomial:

3.  $f(x) = 4x^3 - x + 1$

4.  $g(x) = x^5 - 4x^2 - x$

## Stationary Points

Find the co-ordinates of the stationary point of

5.  $y = 4x^3 - 1$

6.  $y = 4 - x^3$

Find the  $x$  values for the stationary points of

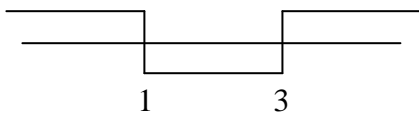
7.  $y = x^3 - 12x - 6$

8.  $y = x^3 - 6x^2 + 4$

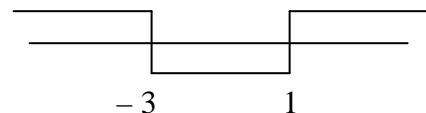
9.  $y = x^3 + 2x^2 - 4$

## Sign Diagrams

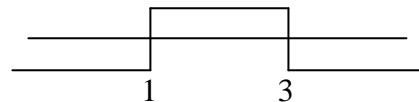
(a)



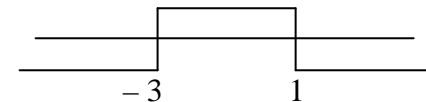
(b)



(c)



(d)



Which sign diagram above corresponds to the derivative of

10.  $f(x) = \frac{1}{3}x^3 - 2x^2 + 3x - 1$

11.  $f(x) = \frac{1}{3}x^3 + x^2 - 3x + 1.$

## Increasing Intervals

On what interval is the function  $f(x)$  increasing if the derivative is

12.  $f'(x) = (x + 2)(x - 4)$

13.  $f'(x) = (x + 2)(4 - x)$

## Minimum and Maximum Points

Determine the  $x$  value for the minimum point of

14.  $f(x) = \frac{1}{3}x^3 + x^2 - 2$

15.  $f(x) = \frac{1}{3}x^3 + 2x^2 + 3x - 2$

Determine the  $x$  value for the maximum point of

16.  $f(x)$  in question 14

17.  $f(x)$  in question 15

## Integration

Integrate

18.  $f(x) = 3x^2 - 4$

19.  $f(x) = 4x^3 - 6x$

20.  $f(x) = \frac{5}{x^2}$

21.  $f(x) = \frac{-1}{x^3}$

## Definite Integral

Evaluate

22.  $\int_0^4 6x \, dx$

23.  $\int_0^2 3x^2 \, dx$