6492MD: Assignment 3

Before completing this assessment you need to work through

either	or
Maths in Focus 11 Mathematics Advanced 3RD EDITION Published: 21/12/2018 ISBN: 9780170413152 Author: Margaret Grove Chapter 5 Further Functions Chapter 6 Introduction to Calculus	Maths in Focus 11 Mathematics Extension 1 3RD EDITION Published :08/11/2018 ISBN :9780170413299 Author : Margaret Grove Chapter 7 Further Functions Chapter 8 Introduction to Calculus

What you need to do

- Attempt all questions.
- **Write your answers using a black pen on your own paper.**
- Show all necessary working. Marks are given for correct working.
- Leave plenty of space around your answers for your teacher's comments.
- If you have studied the work in your textbook, and you are stuck on an assignment question, you can contact us for help.
- It is important to present your work clearly and well to avoid having it returned to you unmarked as a non-serious attempt.

Write your answers using a black pen on <u>your own paper</u>.
Three multiple choice questions: Choose the **correct** answer A B C or D.
No working is required for multiple choice questions.

1. If $f(x) = (x-1)^2$ and $g(x) = x$, then an expression for $\dfrac{f(x)}{g(x)}$ is

A	$x - 2 - \frac{1}{x}$	B	$x - 2 + \frac{1}{x}$
B	$x - 1 - \frac{1}{x}$	D	$x - 1 + \frac{1}{x}$

2. If $f(x) = (x-1)^2$ and $g(x) = -x$, find $f\big(g(x)\big)$.

A	$(x-1)^2$	B	$(x+1)^2$
C	$-x^2 - 2x + 1$	D	$x^2 - 2x - 1$

3. The displacement (x metres) of a particle at t seconds is given by
    $x = 2t^2 - 3t + 1$. It's acceleration is given by

A	$4t - 3 \ \text{ms}^{-1}$	B	$4t - 3 \ \text{ms}^{-2}$
C	$4 \ \text{ms}^{-1}$	D	$4 \ \text{ms}^{-2}$

For the following questions, **write your answers using a black pen on <u>your own paper</u>.**
Show all necessary working. Marks are given for correct working.

4. Here are the graphs of seven relations.

(a) For each function, state whether it is odd, even or neither.

(b) Write the equation for each sketch. You may choose from these seven alternatives.

$$y = |x| + 3 \qquad y = 3 - x^2 \qquad y = 3^x \qquad y = |x + 3|$$

$$y = -3x^3 \qquad y = \frac{3}{x} \qquad (x - 3)^2 + (y - 3)^2 = 9$$

(i)

(ii)

(iii)

(iv)

(v)

(vi)

(vii)
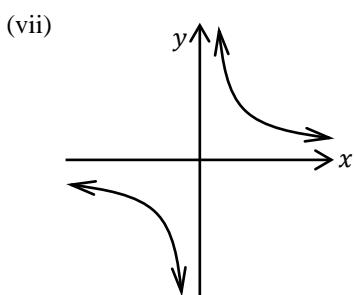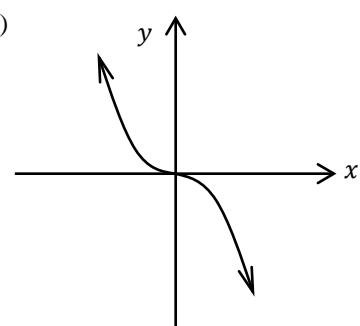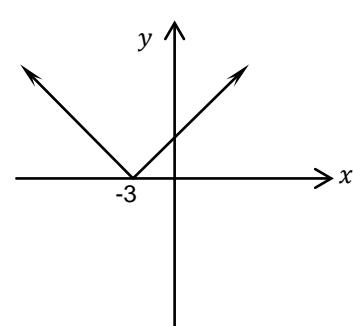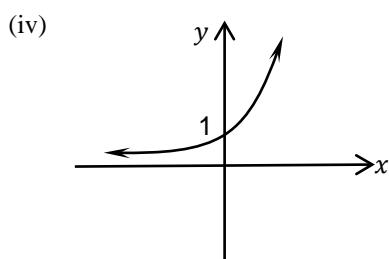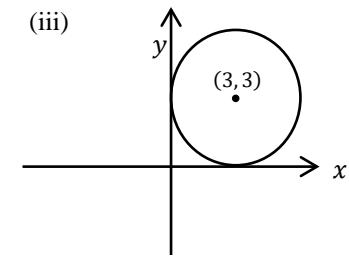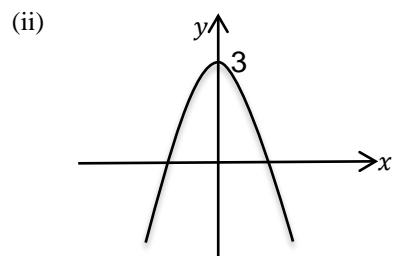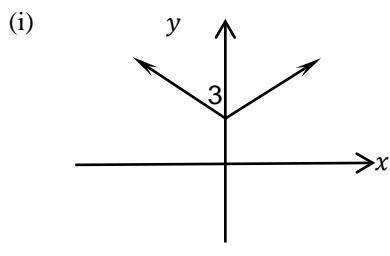
5. State the domain and range of the functions defined in question 4 (i) and (iv).

6. If $f(x) = -x + 2$,

(a) write down in simplest form

(i) $f(-x)$ (ii) $-f(x)$ and   (iii) $-f(-x)$.

(b) on the same number plane, neatly sketch and clearly label the functions

(i) $y = f(x)$ (ii) $y = f(-x)$ (iii) $y = -f(x)$, and   (iv) $y = -f(-x)$.

7. If $g(t) = \frac{t}{t-1}$ find

(a) $g(5)$

(b) $g(x + 1)$

(c) the value of t if $g(t) = 2$.

(d) State the domain of g.

(e) State the range of g.

(f) State the asymptotes of g.

8. (a) Use the completing square method to rewrite the equation of the circle
    $x^2 + y^2 + 2x - 4y - 44 = 0$ in the form $(x - x_0)^2 + (y - y_0)^2 = r^2$.

(b) What is the centre and radius of the circle?

9.
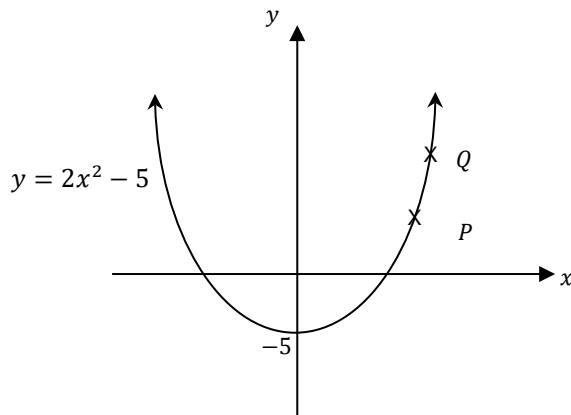
On the curve $y = 2x^2 - 5$ lie two points P and Q.
Let the abscissa of P be x and the abscissa of Q be $x + h$.

(a) State the coordinates of P and Q.

(b) Using these points find the gradient of the secant PQ.

(c) Find the gradient of the tangent at P by letting $h \to 0$.

10. Show that $\lim\limits_{x \to 1} \dfrac{3x - 3}{x^2 - 1} = \lim\limits_{x \to \infty} \dfrac{3x^2 - x}{2x^2}$.

11. If $P = 20t + 45t^2$ find $\dfrac{dP}{dt}$.

12. Differentiate $1.5\sqrt{x^3} - \dfrac{4}{x}$ with respect to x.

13. Use the product rule to find the derivative of $x\sqrt{x + 1}$.

14. Use the quotient rule to differentiate $\dfrac{x^2 + 3}{2x + 7}$.

Checklist

I have:

- answered every question
- written my answers using a black pen on my own paper
- shown necessary working.

If you are unable to complete this task for a specific reason, please contact your teacher to discuss alternative arrangements for demonstrating your skills and knowledge.