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SUPERVISOR'S USE ONLY

Level 3 Calculus, 2016

91579 Apply integration methods in solving problems

9.30 a.m. Wednesday 23 November 2016
 Credits: Six

Achievement	Achievement with Merit	Achievement with Excellence
Apply integration methods in solving problems.	Apply integration methods, using relational thinking, in solving problems.	Apply integration methods, using extended abstract thinking, in solving problems.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

Show ALL working.

Make sure that you have the Formulae and Tables Booklet L3–CALCF.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

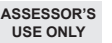
TOTAL

ASSESSOR'S USE ONLY

For parts (a) and (b) find each integral.
Remember the constant of integration.

[illegible]

- ASSESSOR'S
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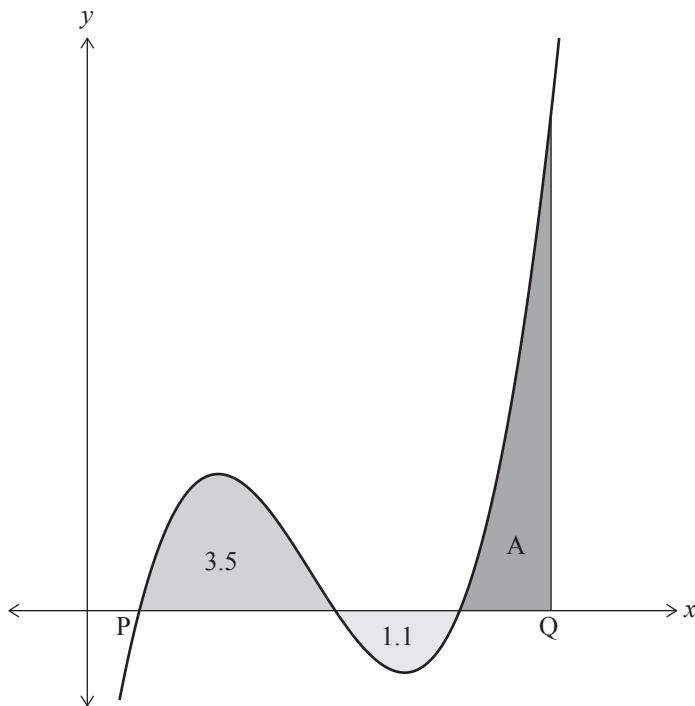
**ASSESSOR'S
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QUESTION TWO

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- (a) Find $\int (5x^2 - 1)^2 dx$.

- (b) The graph of a function $y = f(x)$ is shown below.



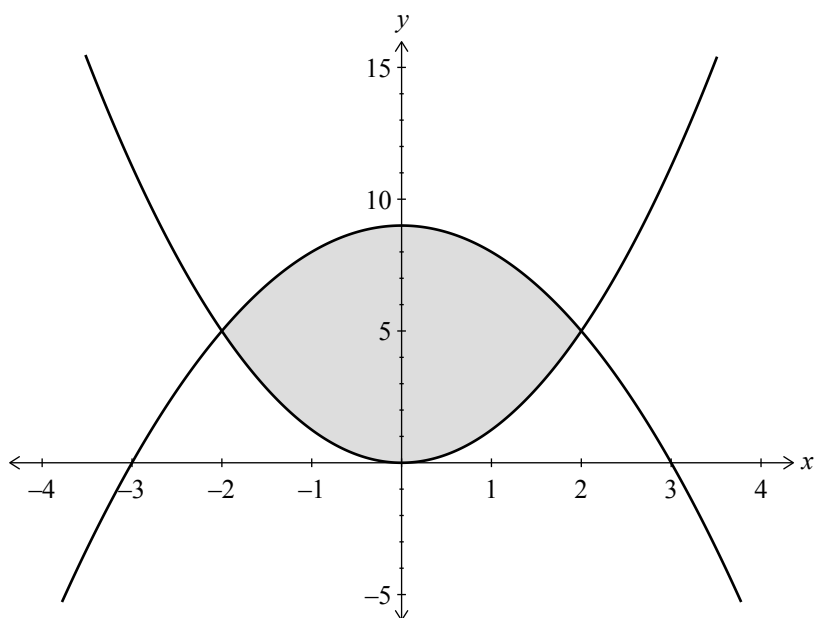
The areas of two of the shaded regions are given.

If $\int_P^Q f(x) dx = 9.4$, what is the area of shaded region A?

- You must use calculus and give the results of any integration needed to solve this problem.*

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- (e) The graphs of $y = (k - 1)x^2$, $k > 1$ and $y = 9 - x^2$ are shown in the diagram below.



The shaded region has an area of 24.

Find the value of k .

You must use calculus and give the results of any integration needed to solve this problem.

QUESTION THREE

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- (a) Find the value of k if $\int_1^4 \left(4 + \frac{k}{x^2}\right) dx = 0$.

- (b) Use the values given below to find an approximation to $\int_1^4 f(x) dx$, using Simpson's rule.

x	1	1.5	2	2.5	3	3.5	4
$f(x)$	1.4	2	3	3.8	2.8	2.2	1.8

- You must use calculus and give the results of any integration needed to solve this problem.*

Calculus 91579, 2016

Extra paper if required.
Write the question number(s) if applicable.

QUESTION
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