Edexcel AS Mathematics Integration

Topic assessment

1. Find $\int\left(2\sqrt{x}-\frac{3}{\sqrt{x}}\right)\mathrm{d}x$. [3]

2. (a) Find $\int_1^2\left(\frac{6}{x^2}-\frac{k}{x^3}\right)\mathrm{d}x$, where k is a constant. [4]

   (b) Find the value of k for which $\int_1^2\left(\frac{6}{x^2}-\frac{k}{x^3}\right)\mathrm{d}x=0$. [1]

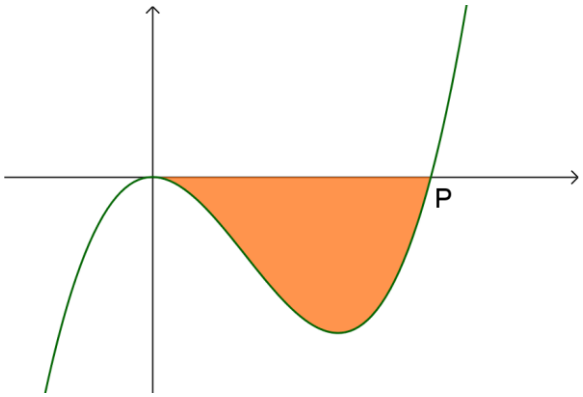
3. Given that $\mathrm{f}'(x)=6x^2-2x+3$ and that $\mathrm{f}(1)=2$, find $\mathrm{f}(x)$. [4]

4. Find the equation of the curve with gradient function $\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{1}{x^2}-x\sqrt{x}$ which passes through the point (1, 2). [4]

5. (a) Sketch the curve $y=2-x-x^2$. [2]

   (b) Find the area of the region enclosed by the curve and the x-axis. [2]

6. The diagram below shows the curve $y=x^3-ax^2$, where a is a positive constant.



   Find the area of the shaded region in terms of a. [6]

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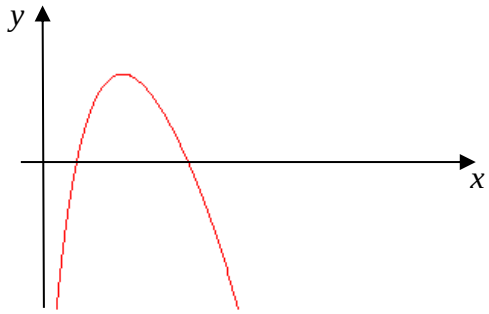
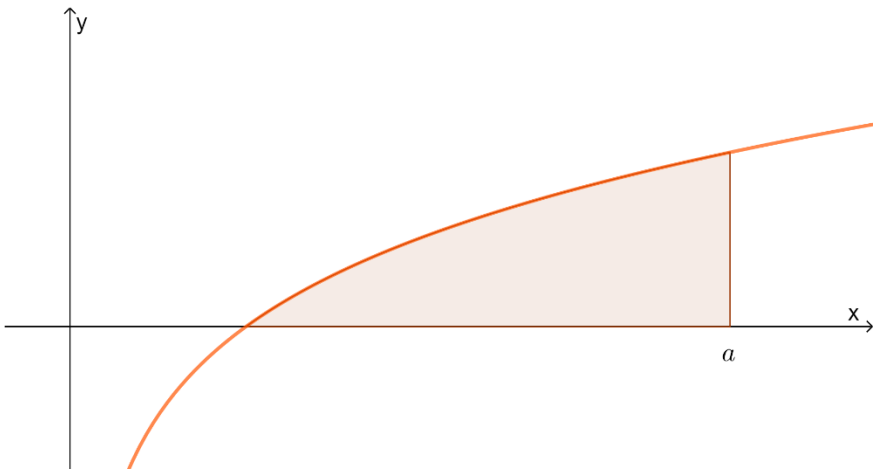
7. The diagram shows part of the curve $y = 5 - x^2 - \frac{4}{x^2}$.



Find the area enclosed between the curve and the x-axis. Give your answer in exact form. Solutions based entirely on graphical or numerical methods are not acceptable. [5]

8. The diagram shows the curve $y = x^{\frac{1}{3}} - 4x^{-\frac{1}{3}}$.



The shaded region shown is bounded by the curve, the x-axis and the line $x = a$.
The shaded region has area 10 square units.
Find the value of a. Give your answer to 3 significant figures.
Solutions based entirely on graphical or numerical methods are not acceptable. [9]

Total: 40 marks