Pearson Edexcel

Teaching and Learning

Activity 6

Extracts from Practice paper 4

Make a plan for doing these questions.
Write down the key idea(s) and then the mathematical processes that need to be done to make a successful attempt.

2. (a) Express $\dfrac{1}{(2x+3)(3x+2)}$ in partial fractions.

(3)

(b) Hence find, in the form $y = f(x)$, the general solution of the differential equation

$$(2x+3)(3x+2)\frac{dy}{dx} = 5y \qquad x > 0, y > 0$$

(5)

3. Using the substitution $u = 1 + \tan x$, find the exact value of

$$\int_0^{\frac{\pi}{3}} \frac{1}{\cos^2 x + \sin x \cos x}\, dx$$

(6)

4.

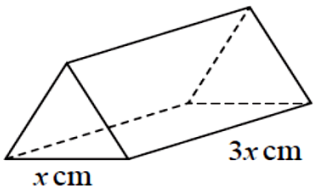

Figure 1

Figure 1 shows a right triangular prism. The cross-section is an equilateral triangle with side x cm and the length of the prism is $3x$ cm, with $x > 2$

Given that the cross-sectional area of the prism is changing at a rate of $(2 - x)$ cm^2 s^{-1}

(a) find, in terms of x, an expression for $\dfrac{dx}{dt}$

(4)

(b) find the rate of decrease of the volume of the prism when $x = 2.05$

(4)