WESLEY COLLEGE
By daring & by doing

YEAR 12 MATHEMATICS SPECIALIST
SEMESTER TWO 2017
QUESTIONS OF REVIEW 6: Integration

Name: _____

Wednesday 9th August Time: 30 minutes Mark /24

Calculator free.

1. [5 marks – 1, 2 and 2]

a) Simplify $\int \frac{2x}{x^2 - 1} dx$

b) Express $\frac{2x}{(x-1)^2}$ in the partial fraction form $\frac{A}{(x-1)^2} + \frac{B}{x-1}$

c) Determine $\int \frac{2x}{(x-1)^2} dx$

2. [10 marks – 1, 3, 3 and 3]

a) Simplify $\int 12\cos^3 3x \sin 3x \, dx$ by inspection

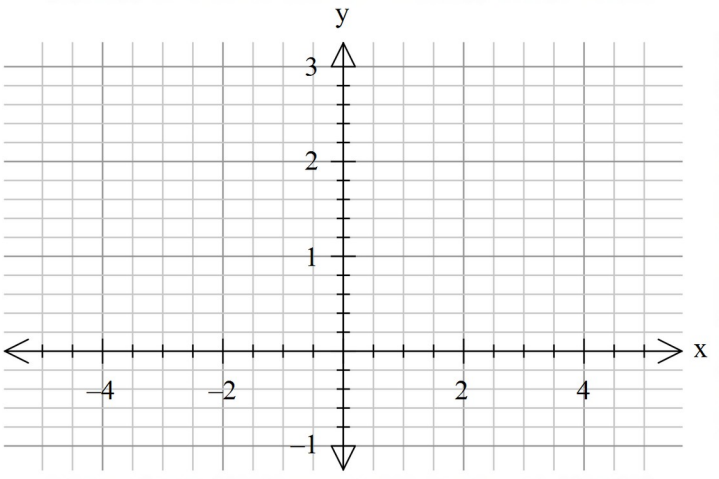
b) Use the substitution $t = \sin 3x$ to evaluate $\int_0^{\frac{\pi}{6}} 12\cos^3 3x \sin 3x \, dx$

c) Evaluate $\int_1^2 \frac{x}{\sqrt{x-1}} dx$ by using the substitution $t = x - 1$

d) Evaluate $\int_0^{\frac{1}{2}} \tan^2\left(\frac{\pi x}{2}\right) dx$

3. [5 marks – 1, 1, 1 and 2]

a) Draw a quick sketch of $y = \sqrt{4 - x}$



Describe the quantity represented by each of the integrals:

b) $\int_0^3 \sqrt{4 - x}\, dx$

c) $2\pi \int_0^4 x\sqrt{4 - x}\, dx$

d) $\pi \int_0^4 4 - (4 - x)\, dx$

4. [4 marks]

What is the volume generated when the curve $x = \sin y$, for $0 \le y \le \pi$, is revolved through 360° about the *y* axis?