INTEGRATION – WORKSHEET

COURSE/LEVEL

NSW Secondary High School Year 12 HSC Extension Mathematics. Syllabus reference: 11.1 – 11.5

1. Find the primitives of:

    (i) $\sqrt[3]{x^5}$ (i) $\dfrac{5}{x^3}$

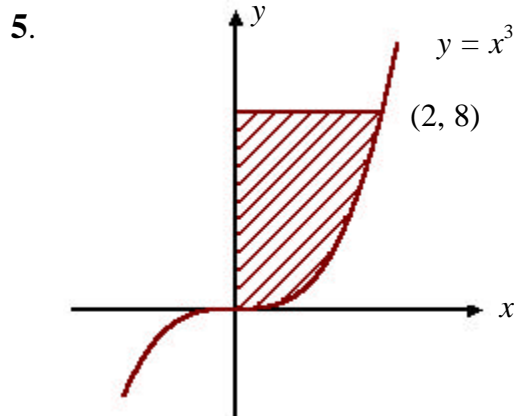   (iii) $(1-x)^8$ (iv) $\sqrt{3x-1}$

2. Find the area bounded by the curve $y = 3x - x^2$ and the x–axis.

3. Complete the following table:

x	0	1	2	3	4
$f(x) = \dfrac{1}{x-1}$					

Hence evaluate $\displaystyle\int_0^4 \dfrac{dx}{x+1}$ using 5 function values of Simpson's Rule.

4. Find the area enclosed between the parabola $y = x^2 + 2x$ and the straight line $y = x$.

5.

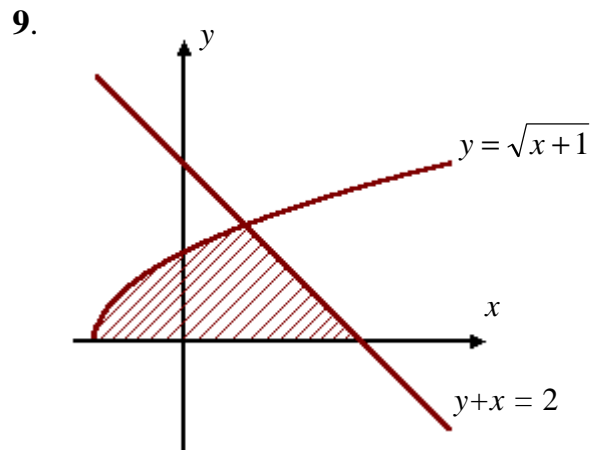Find the area of the shaded region.

6. If $f''(x) = 6x - 8$ and $f'(0) = 6, f(1) = 1$, find $f(x)$.

7. The area bounded by the parabola $y = 9 - x^2$ and the x–axis is rotated about the x–axis. Find the volume generated.

8. If $y = \sqrt{1 - 4x^2}$,

    (a)   find $\dfrac{dy}{dx}$.

    (b)   Hence evaluate $\displaystyle\int_0^{\frac{1}{2}} \dfrac{x\,dx}{\sqrt{1 - 4x^2}}$.

9.

Calculate the area of the shaded region.

10. Use the substitution $u = x^2 + 1$ to find $\displaystyle\int x\left(1 + x^2\right)^3 dx$.

11. By letting $u = 2x + 1$, evaluate

$\displaystyle\int_1^4 x\sqrt{2x + 1}\, dx$.

12. Use the substitution $t = u^2 - 1$ to evaluate $\displaystyle\int_0^1 \dfrac{t}{\sqrt{t-1}}\, dt$.