

FP1 Revision Worksheet Number 5

- By differentiating *from first principles*, find the gradient function for the curve:
 $y = 2x^2 + 7$
- Find the general solution of the following trig equation:
 $\sin^2 x = \frac{1}{2}$
- Sketch the curve $y = \frac{5x-4}{4-x}$ and hence or otherwise, solve the inequality
 $\frac{5x-4}{4-x} < 0$
- Either give a value for the following integrals or a reason why the integral does not exist:
 - $\int_0^5 \frac{1}{x^3} dx$
 - $\int_{-\infty}^{-2} \frac{4}{x^5} dx$
- Find a matrix that does the composite transformation of first rotating by 60° clockwise about the origin and then reflecting in the line $y = (\tan 22.5^\circ)x$
- Evaluate the following sum: $\sum_{r=2}^7 (r-1)^2$
- Use Euler's method with a step length of 0.05 to estimate y when $x=2.1$ given that $y=10$ when $x=2$ and $\frac{dy}{dx} = \frac{20}{x}$
- Show that the equation $x^3 - 3x + 1 = 0$ has a root between 1 and 2. Use interval bisection to find an interval of width 0.125 which contains the root.
- The quadratic equation $x^2 + 2x - 3 = 0$ has roots α and β . Find the following:
 - $\alpha + \beta$
 - $\alpha\beta$
 - $\alpha^2 + \beta^2$
 - $\frac{1}{\alpha} + \frac{1}{\beta}$
- Sketch the following curve, and write down its name and the co-ordinates of the centre, and any points where it crosses the co-ordinate axes:
 $\frac{(x-4)^2}{25} + \frac{(y+2)^2}{100} = 1$