

# Maths Advent Calendar

**1**

Simplify  
 $x^2(5x^{-0.5})^3$

**2**

For a function  
 $f(x)$  what does  
 $f(-x)$  do to the  
graph?

**3**

Solve  
 $4 - 5x^2 - 2x$   
 $= 0$

**4**

Differentiate  
 $y$   
 $= 2x^4 - 5x^2 + 3$

**5**

Find the values of  
 $x$  such that  
 $5(2x + 4)$   
 $> x - 7$

**6**

Find the centre of  
the circle  
 $x^2 + y^2 - 6x$   
 $+ 4y = -4$

**7**

Find the gradient  
of  
 $15x + 3y = 7$

**8**

Write  $x^2 + 6x - 1$   
in completed  
square form.

**9**

Without using a  
calculator, what is  
 $\sin 45^\circ$

**10**

Given that  $5^x =$   
 $125$ , find  $x$

**11**

Integrate  
 $x^3 - 2x + 5$

**12**

For a function  
 $f(x)$  what does  
 $3f(4x)$  do to the  
graph?

**13**

How to you find  
the gradient of a  
normal?

**14**

Find the values of  
 $x$  such that  
 $3x - 6 \leq 6x - 3$

**15**

Solve  
 $t^2 + 6t + 1 = 4$

**16**

Find  
 $\int_{-1}^5 -x^2 + 4x + 5$

**17**

Solve  
 $2x(x + 3) + 2$   
 $= -2x$

**18**

Find the gradient  
of  
 $y = x^4 + 7x^2$  at  
 $x = 1$

**19**

Find the first 4  
terms of  $(3 + x)^8$

**20**

Solve the  
equation  
 $3^{0.5x-1} = \frac{\sqrt{3}}{81}$

**21**

Find the minimum  
point of  
 $2x^2 + 7x - 3$

**22**

For a function  
 $f(x)$  what does  
 $f(x + 3) + 1$  do  
to the graph?

**23**

Differentiate  
 $\frac{3x^5 + 1}{\sqrt{x}}$

**24**

Find the values of  
 $x$  such that  
 $6x^2 + 11x - 2$   
 $< 0$

# Merry Christmaths!