GRAPHS OF FUNCTIONS

1. Draw the graph of $f(x) = 2 + x - x^2$ for $-3 \leq x \leq 4$ using a scale of 2cm to 1 unit on the x-axis and 1 cm to 1 unit on the y-axis.
   Use your graph to:
   a. $f(0.5)$
   b. $f(0)$
   c. x such that $f(x) = -5$
   d. x such that $f(x) = 0$
   e. $f^{-1}(-9)$
   f. x such that $f^{-1}(x) = 3.2$
   g. find the value(s) of k such that $f(x) = k$ has:
      i. 1 solution
      ii. 2 solutions
   h. Find the values of x for which f(x) has a negative gradient

2. Draw the graph of $f(x) = x^3 - 5x^2 + 5x + 6$ for $-2 \leq x \leq 4$ using 2cm to 1 unit on the x axis and 1 cm to 1 unit on the y axis
   Use your graph to:
   a. $f(-0.6)$
   b. x such that $f(x) = 6$
   c. $f^{-1}(8)$
   d. x such that $f^{-1}(x) = 1.8$
   e. find the value(s) of k such that $f(x) = k$ has:
      i. 1 solution
      ii. 2 solutions
      iii. 3 solutions
   f. Find the values of x for which f(x) has a:
      i. negative gradient
      ii. Zero gradient
      iii. Positive gradient

3. $f(x) = 1.25x^3$ for $-2 \leq x \leq 2$ using 2cm to 1 unit on the x axis and 1 cm to 1 unit on the y axis
   Using **your graph** find: [do NOT solve by calculation]
   a. $1.25x^3 = 5$
   b. x such that $f^{-1}(x) = -1.8$
   c. the gradient of the function when $x = 1.4$; hence state the gradient of the function when $x = -1.4$

4. $f(x) = \frac{3}{x}$ for $-3 \leq x \leq 3$ using 2cm to 1 unit on the x axis and 1 cm to 2 unit on the y axis

x	-3	-2	-1.8	-1.4	-1	-0.8	-0.4	-0.2		0.2	0.4	0.8	1	1.4	1.8	2	3
y																	

Using your graph find:

a. $f(0.6)$
b. $f^{-1}(-5)$
c. the gradient of the function when $x = -1$; hence state the gradient of the function when $x = 1$
d. Explain what happened to the y values:
    i. when the x values get very large (approaching ∞) or very small (approaching -∞)
    ii. when the x values get close to zero

5. $f(x) = \frac{2}{x^2}$ for $-3 \leq x \leq 3$ using 2cm to 1 unit on the x axis and 1 cm to 1 unit on the y axis

x	-3	-2	-1.8	-1.4	-1	-0.8	-0.4		0.4	0.8	1	1.4	1.8	2	3
y															

Using your graph find:

a. $f^{-1}(10)$
b. the gradient of the function when $x = -1$; hence state the gradient of the function when $x = 1$
c. explain what happens to the y values:
    iii. when the x values get very large (approaching ∞) or very small (approaching -∞)
    iv. when the x values get close to zero

6. $y = 2^x$ for $-4 \leq x \leq 4$ using 2cm to 1 unit on the x axis and 1 cm to 1 unit on the y axis

Using your graph find:

a. $2^{2.4}$
b. x such that $2^x = 3$
c. Explain what happened to the y values:
    i. when the x values get very large (approaching ∞)
    ii. when the x values very small (approaching -∞)