## FINDING EQUATIONS OF GRAPHS.

Hints:
(a) See where graph crosses $x$ axis. eg at 2 and 4 so basis is $y=\boldsymbol{a}(x-2)(x-4)$
(b) See where graph crosses $y$ axis to work out the value of $\boldsymbol{a}$


Crosses $x$ axis at 2 and 4 so equ is of the form $y=a(x-2)(x-4)$.
Crosses $y$ axis at 4 so subs $x=0, y=4$ to find the constant $\boldsymbol{a}$.
$4=a(0-2)(0-4)$
$4=8 a$
$a=1 / 2$
Equation is $y=1 / 2(x-2)(x-4)$

$$
O R y=\frac{(x-2)(x-4)}{2}
$$

Find the equations of the following curves:

## 1.


$\square$
2.

N.B. when parabola goes through the point $(0,0)$ use another point such as the max point $(3,3)$
3.

N.B. when parabola does not cross the $x$ axis it is of the form $\boldsymbol{y}=\boldsymbol{a}(\boldsymbol{x}-\boldsymbol{b})^{2}+\boldsymbol{c}$
From the graph, $\boldsymbol{b}$ and $\mathbf{c}$ should be obvious.
Work out c using ( 0,3 ).

5.

6.


Equ will be of the form :
$y=p x(x-a)(x-b)$
$\boldsymbol{a}$ and $\boldsymbol{b}$ should be obvious.
To find $\boldsymbol{p}$ you need to subs a point such as $(2,1)$ or $\min (6,-3)$
$\square$
Equ will be of the form :
$y=p x(x-a)^{2}$
a should be obvious.
To find $\boldsymbol{p}$ you need to subs a point such as $(2,2)$ or $\max (1,4)$
7.


Equ will be of the form :
$y=p x(x-a)^{2}$
a should be obvious.
To find $\boldsymbol{p}$ you need to subs a point such as
$(1,4)$
8.

9.


Equ will be of the form :
$y=p x^{2}(x-a)^{2}$
a should be obvious.
To find $\boldsymbol{p}$ you need to subs a point such as $\max (2,4)$

Equ will be of the form :
$y=p(x+a)(x+b)(x-c)(x-d)$
$a, b, c$ and $d$ should be obvious.
To find $\boldsymbol{p}$ you need to subs a point such as $(0$, 3 ) or (2, -6)
N.B. Sometimes the graph seems to go through points such as $(3,-1)$ but it does not.


Equ will be of the form :
$y=p(x+a)^{2}(x-b)^{2}$
$\boldsymbol{a}$ and $\boldsymbol{b}$ should be obvious.
To find $\boldsymbol{p}$ you need to subs a point such as $\max (0,4)$


Equ will be of the form : $\boldsymbol{y}=\underline{\boldsymbol{b}}$ or $\boldsymbol{x} \boldsymbol{y}=\boldsymbol{b}$

$$
x
$$

Choose a point such as $(2,2)$ or $(4,1)$ to find $\boldsymbol{b}$
13.

14.

15.

16.


Equ will be of the form : $\boldsymbol{y}=\boldsymbol{b}^{\boldsymbol{x}}$ and such graphs go through (0, 1)
Look for a point such as $(1,3)$ to find $\boldsymbol{b}$

This does not go through $(0,1)$ so the equation is of the form $\mathrm{y}=\boldsymbol{a} \times \boldsymbol{b}^{\boldsymbol{x}}$
Subs $\boldsymbol{x}=\mathbf{0}, \boldsymbol{y}=\mathbf{3}$ to find $\boldsymbol{a}$ and then look for a point such as $(1,6)$ to find $\boldsymbol{b}$


19.


This "growth" or exponential curve does not approach zero so its equ must be of the form: $\boldsymbol{y}=\boldsymbol{b}^{x}+\boldsymbol{c}$ clearly $\mathrm{c}=1$
Find a suitable point for substitution such as $(1,3)$ or $(2,5)$ to find $\boldsymbol{b}$

Equ must be of the form: $\boldsymbol{y}=\boldsymbol{b}^{\boldsymbol{x}}-\boldsymbol{c}$ clearly $\boldsymbol{y}$ $=b^{x}-2$
Find a suitable point to subs and find $\boldsymbol{b}$

Equ must be of the form: $\boldsymbol{y}=\boldsymbol{-} \boldsymbol{b}^{\boldsymbol{x}}+\boldsymbol{c}$
20.


Find the equ in the form $\boldsymbol{y}=\boldsymbol{a} \times \boldsymbol{b}^{\boldsymbol{x}}-\boldsymbol{c}$ use the coordinates $(0,1)$ and $(1,7)$

