# Doubles assignment Tracking Test 1 part B ( 50 minutes) 

Name
\% Prediction before:
\% Prediction after:

1) Given

$$
\begin{gathered}
f(x)=1-x \\
g(x)=x^{2}-6 x+10
\end{gathered}
$$

a) Show that the graphs, $y=f(x)$ and $y=g(x)$ do not intersect.
b) Find the set of $x$ values that satisfy the inequality

$$
g(x)>f(x)+3
$$

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
2) The straight lines $l_{1}$ and $l_{2}$ with respective equations

$$
\begin{gathered}
y=3 x \\
3 x+2 y=13
\end{gathered}
$$

intersect at the point $P$.
a) Determine the gradient of $l_{2}$

Given that he lines $l_{1}$ and $l_{2}$ intersect at the line $y=-1$ at the points $A$ and $B$ respectively
b) Find that the area of the triable $A B P$, leave your answer in the form $\frac{a}{b}$, where $a$ and $b$ are integers
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
3) A right angled trapezium $A B C D$ is shown in the figure below.


The trapezium has parallel sides $A B$ and $C D$ of lengths $(2 x+1) \mathrm{cm}$ and $(x+1) \mathrm{cm}$. The height of the trapezium is $2 x \mathrm{~cm}$.
Given that the area of the trapezium is $16 \mathrm{~cm}^{2}$, determine the exact length of $B C$. Leave your answer in the form $a \sqrt{b}$, where $a$ and $b$ are integers.
4) Given

$$
f(x)=x^{2}(x+3)
$$

a) Sketch $y=f(x)$. Clearly show the coordinates of any points that the curve meets the coordinate axes (2 marks)

Given

$$
g(x)=(x-k)^{2}(x-k+3)
$$

b) Sketch $y=g(x)$. Clearly show the coordinates, in terms of $k$, of any points that the curve meets the coordinate axes
c) Given that the point $(1,0)$ lies on the graph with equation $y=g(x)$ determine, two possible values of $k$.
5) A particle is released from rest from a point $h m$ above level horizontal ground. One second later, another particle $B$ is projected vertically downwards with speed $10.78 \mathrm{~ms}^{-1}$ from the same point $A$ was released. Given that the particles reach the ground at the same time, determine the value of $h$.
6) A car is observed travelling along a straight horizontal road between two points on a road, $A$ and $B$, where $A B=1362 m$. At time $t=0 s$ the car goes past point $A$ with speed $30 \mathrm{~ms}^{-1}$. The car maintains this speed for 17 s . The car decelerates uniformly to a speed of $12 \mathrm{~ms}^{-1}$. The car maintains the speed of $12 \mathrm{~ms}^{-1}$ until it goes past $B$. The car took 70 s to travel from $A$ to $B$
a) Sketch a speed time graph to show the motion of the $\operatorname{car}$ from $A$ to
b) Calculate the deceleration of the car during the motion described above.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

| 1a | $\begin{gathered} 1-x=x^{2}-6 x+10 \\ x^{2}-5 x+9=0 \\ b^{2}-4 a c=25-36<0 \\ \therefore \text { no solutions } \end{gathered}$ | $\begin{aligned} & \hline \text { M1 } \\ & \text { A1 } \\ & \text { A1 } \\ & \text { A1 } \end{aligned}$ |
| :---: | :---: | :---: |
| 1b | $\begin{gathered} x^{2}-6 x+10>4-x \\ x^{2}-5 x+6>0 \\ (x-3)(x-2)>0 \\ x>3, x<2 \end{gathered}$ | M1 A1 M1A1 |
| 2 | $m=-\frac{3}{2}$ | B1 |
|  | $\begin{gathered} A:\left(-\frac{1}{3},-1\right) \\ B:(5,-1) \\ \text { Area }=\frac{1}{2}\left(5+\frac{1}{3}\right)\left(\frac{13}{3}+1\right) \end{gathered}$ | M1 A1 M1A1 |
| 3 | $\begin{gathered} \frac{2 x}{x}(x+1+2 x+1)=16 \\ 3 x^{2}+2 x-16=0 \\ (3 x+8)(x-2)=0 \\ x=2 \\ C B^{2}=(2 x)^{2}+x^{2} \\ C B^{2}=16+4 \\ C B=\sqrt{20} \\ =2 \sqrt{5} \end{gathered}$ | M1 <br> A1 <br> M1 <br> A1 <br> M1A1 <br> A1 <br> A1 |
| 4 |  | B1 (Shape, cross x axis once) <br> B1 both s coordinates marked |
|  |  | B1 Shape translated right direction <br> B1 crosses at k - marked B1 touches at 3+k marked |
|  | $\begin{gathered} 0=(1-k)^{2}(4-k) \\ k=1, k=4 \end{gathered}$ | $\begin{aligned} & \hline \text { M1 } \\ & \text { A1 } \end{aligned}$ |
|  | $\begin{gathered} A: h=4.9 t \\ B: h=10.78(t-1)+4.9(t-1)^{2} \\ 4.9 t=10.78(t-1)+4.9(t-1)^{2} \\ t=6 \\ h=176.4 \end{gathered}$ | M1 For either equation A1 for both equations M1A1 <br> M1A1 |



