

1. a) ATTEMPTS TO REARRANGE EQUATION M1

$\frac{3}{2}$  A1

b)  $-\frac{2}{3}$  SEEN OR THERE  $-\frac{1}{\frac{3}{2}}$  B1

$y-6 = -\frac{2}{3}(x-2)$  M1 CORRECT STRUCTURE  
f.g  $3y+2x=22$  A1 ALL CORRECT

c) D(11,0) SEEN OR INPUTO B1

B(0,3) SEEN OR INPUTO B1

ATTEMPT TO FIND |AB| OR |AD| M1

$\sqrt{13}$  OR  $\sqrt{117}$  OR  $3\sqrt{13}$  A1

FINAL ANSWER 39 c.a.o A1

2.  $34 = (k \times 4 - 3) \times \sqrt{4}$  M1

$k=5$  A1

$\int (5x - 3)\sqrt{x} dx$  B1

$5x^{\frac{3}{2}} - 3x^{\frac{1}{2}}$  M1

$(y =) 2x^{\frac{5}{2}} - 2x^{\frac{3}{2}} + C$  M42 -1 eeo

SUBS  $x=4$   $y=4$  INTO ) M1  
THEIR EQUATION

$C = -8$  OR  $y = 2x^{\frac{5}{2}} - 2x^{\frac{3}{2}} - 8$  A1

3. a) i)  $4\sqrt{3} - 6 + 6 - 3\sqrt{3}$  AT LEAST 3 CORRECT M1  
 $\sqrt{3}$  c.a.o A1

ii) MULTIPLY TOP BOTTOM BY  $\sqrt{6} - \sqrt{2}$  B1  

$$\frac{6 - \sqrt{12} + 3\sqrt{12} - 6}{6 - \sqrt{12} + \sqrt{12} - 2}$$
 AT LEAST 7 TERMS CORRECT M1  
 $\sqrt{3}$  c.a.o A1

b) SENSIBLE ATTEMPT f.g.  $8w^{\frac{1}{2}} = \frac{1}{w}$   $\xrightarrow{\text{O12}}$   $w^{-1}(8w^{\frac{3}{2}} - 1) = 0$  M1  
 $8w^{\frac{3}{2}}w = 1$

$w^{\frac{3}{2}} = \frac{1}{8}$  A1

$(\frac{1}{8})^{\frac{2}{3}}$  B1

$w = \frac{1}{4}$  A1 c.a.o

4. a)  $a=5, b=-3, c=5$  B3

b) (MINIMUM VALUE IS) 5 DO NOT ACCEPT COORDINATES f.g. (3,5) A1

c)  $\sqrt{(2-5)^2 + (2x+1-6)^2}$  WITH OR WITHOUT  $\sqrt{\phantom{x}}$  M1

$x^2 - 10x + 25$  OR  $4x^2 - 20x + 25$  M1

COINCIDENTLY ARRIVES AT THE ANSWER GIVEN A1

d)  $\sqrt{5}$  c.a.o A1

e)  $(3, 7)$  B1 B1

5. a)  $y_3 = 7$   
 $y_4 = 17$   
 $y_5 = 31$   
 $y_6 = 65$

MA3 -1 eeroo

b)  $2^n \pm$  SOMETHING ELSE M1  
 $2^n + (-1)^n$  A1

6. a) STRETCH, HORIZONTALLY, SCALE FACTOR OF 2  
 (SIGN OF  $f(\frac{1}{2}x)$  SCORES 2 MARKS)

M1 A1 A1  
 dep on stretch

b)  $f(x-1) + 15$  B1  
 $\sqrt{8 \times 2^3 \cdot 15} + 15$  M1  
 22 c.a.o A1

7.  $(-4a)^2 - 4 \times 1 \times (2b+1) < 0$   
 SIMPLIFIES TO  $2b+1 > 4a^2$  o.e

M1 FORMING "DISCRIMINANT"  
 M1  $< 0$

M1

CONVINCINGLY REACHES THE ANSWER  
 GIVEN  $b > \frac{1}{2}(2a+1)(2a-1)$  WITHOUT  
 MISSING STEPS OR FUDGES

A1

8.  $\frac{1}{3}x^3 - \frac{1}{6} + x^{-1}$  o.e. B2 -1 eeo

$\left(\frac{dy}{dx} =\right) x^2 - x^{-2}$  M1 #

IMPUGNS OR STATES THAT  $P_1$  HAS GRAD  $\frac{15}{4}$  B1

" $x^2 - x^{-2}$ " = " $\frac{15}{4}$ " B1

$4x^4 - 15x^2 - 4 = 0$  M1

$(4x^2 + 1)(x^2 - 4)$  M1

$x^2 = 4$  (1 more extra) A1

$x = \begin{matrix} 2 \\ -2 \end{matrix}$  BOTH A1

$y = \begin{matrix} 3 \\ -\frac{10}{3} \end{matrix}$  EITHER A1

$y - 3 = \frac{15}{4}(x - 2)$  o.e.  $4y = 15x - 18$  MA1

$y + \frac{10}{3} = \frac{15}{4}(x + 2)$  o.e.  $12y = 45x + 50$  MA1

9.

$\left. \begin{matrix} 2b + 3c - 2 = d \\ (b - 3c + 1) - (2b + 3c) = d \\ (4b + 5c) - (b - 3c + 1) = d \end{matrix} \right\}$  B2 ANY TWO

REDUCES 3 EQUATIONS TO 2 EQUATIONS IN b & c (ATTEMPT) M1

$\left. \begin{matrix} b + 3c = 1 \\ 2b + 7c = 1 \end{matrix} \right\}$  EITHER MA1

ATTEMPTS TO SOLVE "THEIR" TWO EQUATIONS IN b & c M1

$b = 4$   $c = -1$  A2

$\frac{30}{2} [2 \times 2 + 29 \times 3]$  M1 STRUCTURE, M2  $\rightarrow \begin{pmatrix} 7 = 30 \\ 9 = 2 \\ d = 3 \end{pmatrix}$  each error

CONVINCING (WORKINGS MUST BE SEEN) M1

1365 GIVEN A1