1. $4 + 4\sqrt{3} + 3$ OR $7 + 4\sqrt{3}$
OR
$1 - 2\sqrt{3} + 3$ OR $4 - 2\sqrt{3}$ M1

" $(7 + 4\sqrt{3}) - (4 - 2\sqrt{3})$ M1

$\frac{3 + 6\sqrt{3}}{\sqrt{3}}$ A1

ATTEMPT TO RATIONALISE e.g. $\frac{(3+6\sqrt{3})\sqrt{3}}{\sqrt{3}\sqrt{3}}$
OR $\frac{3\sqrt{3}}{\sqrt{3}\sqrt{3}} + \frac{6\sqrt{3}}{\sqrt{3}}$ M1

$6 + \sqrt{3}$ A1 c.a.o

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2. $\int 4 + \frac{1}{x^2}\,dx$ OR $\int 4 + x^{-2}\,dx$ B1

SIGHT OF $4x - x^{-1}$ + O.E M1 M1

$5 = 4\times 1 - \frac{1}{1} + C$ O.E M1

$C = 2$ OR $y = 4x + \frac{1}{x} + 2$ O.E A1

---

3. $(x - 0.8)^2 - 0.8^2 - 3.36 = 0$ M1

$(x - 0.8)^2 = 4$ M1

$x = 2.8$ O.E A1

$x = -1.2$ O.E. A1

(ALLOW QUADRATIC FORMULA APPROACH)

4. $(a+2d)+(a+5d)+(a+8d)=90$ B1

$\frac{12}{2}[2a+11d]=408$ B1

$a+5d=30$ OR $2a+11d=68$ M1

SOLVING SIMULTANEOUSLY M1

$d=8$ A1

$a=-10$ A1

---

5 IN THIS QUESTION ALLOW THE USE OF $<$ OR $\leq$

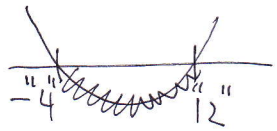
$(x-2)(x-6)<60$ B1

$2[(x-2)+(x-6)]>14$ B1

$x^2-8x-48<0$ M1

SIGHT OF BOTH -4 & 12 A1

QUADRATIC



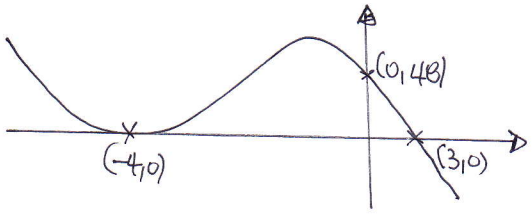
OR SIMILAR M1

$-4<x<12$ A1 dep

$x>7.5$ A1

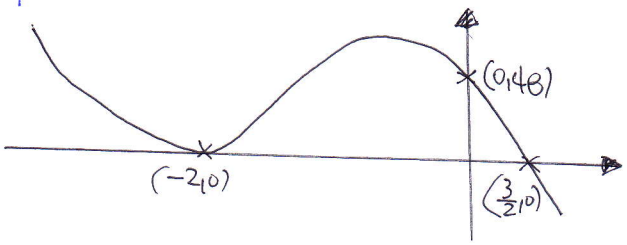
$7.5<x<12$ A1 c.a.o

6. a)



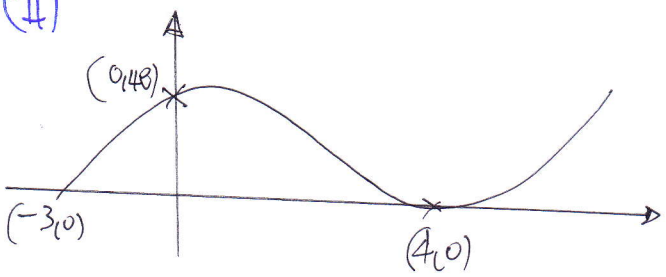
SHAPE INC TOUCHING POINT B1
(0,48) B1
(-4,0) (3,0) B1

b)(I)



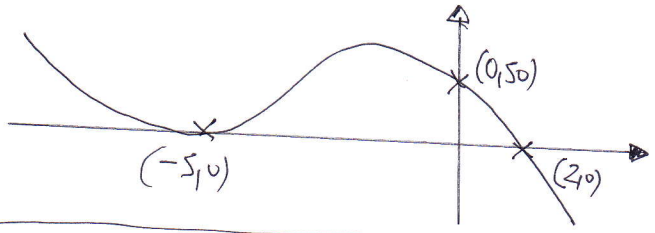
CORRECT SHAPE B1
(0,48), (-2,0), (3/2,0) B1

(II)



CORRECT SHAPE B1
(0,48) (-3,0) (4,0) B1

(III)



CORRECT SHAPE
(-5,0) (2,0) M1
(0,50) M1
dep

THROUGHOUT (b) FOLLOW THROUGH THEIR "(0,48)" FROM PART (a)

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7. a) $p = 10$ $q = -2$ OR $C(10, -2)$ B1 B1

b) GRAD AC $\frac{-2-6}{10-2}$ o.e (OR GRAD AD) M1

STATES GRAD AC IS -1 A1

IMPLIES GRAD OF l IS 1 M1 ft

$y - 2 = 1(x - 6)$ OR $y = x - 4$ M1 ft

E (10, 6) A1 A1

8. $2-\frac{1}{x}=\frac{1}{2-x}$ B1

$2x(2-x)-(2-x)=x$ M1

$2x^2-4x+2=0$
$x^2-2x+1=0$) A1

$(-2)^2-4\times1\times1=0$ or $(x-1)^2=0$ M1

REPEATED ROOT $\Rightarrow$ CURVES TOUCH A1

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9. a) $k-4$ B1

$2k-4$ M1 ft

$-k+4$ M1 ft

$k+(-k+4)=4$ A1 c.a.o

b) $u_{26}=k-4$ B1

c) $4+(k-4)+(2k-4)+(-k+4)=6$

IF THEY HAVE NO ANSWER IN (a) ACCEPT $u_1+u_2+u_3+u_4=6$) M1

$k=3$ A1 c.a.o

d) $6\times6+$ "TWO MORE ITEMS" M1

39 A1 c.a.o

10. a) SETS $\frac{1}{4}(x^2-12x+35)=0$ B1

$(x-7)(x-5)$ M1

$\left(\frac{dy}{dx}=\right)\ \frac{1}{4}(2x-12)$ o.e M1

IMPLIES GRAD AT $(7,0)$ IS NEEDED M1

FINDS GRAD IS $\frac{1}{2}$' M1

$y-0=\text{"}\frac{1}{2}\text{"}(x-7)$ A1 ft

b) $\frac{1}{4}(2x-12)=$ "-2" M1 B1

$x=2$ A1

SUBS THEIR $x=2$ INTO y M1

OBTAINS $y=\frac{15}{4}$ o.e A1

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

e.g. $4y+8x=31$ M1

c) ATTEMPTS TO SOLVE SIMULTANEOUS EQUATIONS B1

SOLVES EQUATIONS AT LEAST ONE SIGNIFICANT STEP IN THE SOLUTION M1

$\$\left(\frac{9}{2}\right)1-\left(\frac{5}{2}\right)$ A1 A1