1. a) $\frac{1}{2} \times 6 \times 10 \times \sin(0.8^c)$ M1

21.52... A1 c.a.o

b) $\frac{1}{2} \times 6^2 \times 0.8$ M1

14.40... A1

FINAL ANSWER 7.12... A1 c.a.o

c) USE OF COSINE RULE (CORRECTLY) M1

$|AC| = 7.24...$ A1

6×0.8 OR 4.8 SEEN MA1

FINAL ANSWER 16.0... A1 c.a.o

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2. a) STATES -4 B1

b) $(2+p)(2\times2^2+5\times2-4)-4 = 10$
$(p+2)\times14 - 4 = 10$ M1

SOLVES E.G. $14p + 28 - 4 = 10$ OR $14(p+2) = 14$ M1

$p = -1$ A1

c) $(x-1)(2x^2+5x-4)-4$

ATTEMPT TO MULTIPLY & SIMPLIFY USING THEIR p M1

$2x^3+3x^2-9x$ A1

$x(2x^2+3x-9)$ M1

$x(x+3)(2x-3)$ A1 c.a.o

3. a) $\left(1+\frac{x}{2}\right)^7 = 1 + \frac{7}{2}x + \frac{21}{4}x^2 + \frac{35}{8}x^3$ B1 B1 B1

b) $1 + \frac{4}{x} + \frac{4}{x^2}$ B1

SIGHT OF $\frac{7}{2}x$, $21x$, $\frac{35}{2}x$ ANY TWO AFTER MULTIPLICATION M1

42 or $42x$ A1 c.a.o

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4. $\frac{a}{1-r} = 675$ B1

$ar = 27x\,ar^4$ B1

$r^3 = \frac{1}{27}$ M1

$r = \frac{1}{3}$ A1

SOB INTO $\frac{a}{1-\text{"}\frac{1}{3}\text{"}}$ & ATTEMPTS TO SOLVE M1

$a = 450$ c.a.o A1

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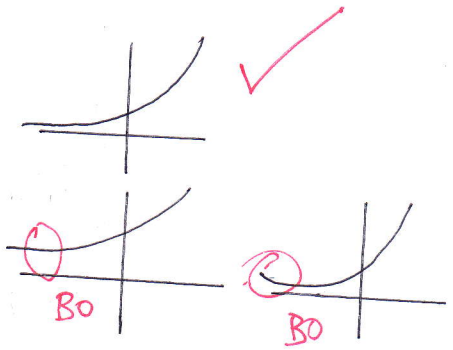
5. a) VERTICAL STRETCH M1 SCALE FACTOR 3 M1 dep on stretch

b) B1 CORRECT SHAPE

B1 (0,3)

PENALISE BAD EFFORT ON SHAPE



c) $3 \times 2^x = 2^{-x}$ B1

$3 \times 2^x = \frac{1}{2^x}$ M1

$3 \times 2^x \times 2^x = 1$ OR $2^{2x} = \frac{1}{3}$ A1

CORRECT USE OF LOGS M1

A.W.R.T -0.792 A1 c.a.o

ALTERNATIVE

$\log 2^{-x} = \log 3 + \log 2^x$

$-x\log 2$ OR $x\log 2$ CORRECTS x

6. a) $x^{\frac{1}{2}} + 4x^{-\frac{1}{2}}$ B1 B1 (MAY BE EARNED IN (c))

$f'(x) = \frac{1}{2}x^{-\frac{1}{2}} - 2x^{-\frac{3}{2}}$ M1

"$\frac{1}{2}x^{-\frac{1}{2}} - 2x^{-\frac{3}{2}}$" $= 0$ B1

ATTEMPTS SOLUTION E.G $\frac{x^{\frac{3}{2}}}{2x^{\frac{1}{2}}} = 2$ OR $\frac{x^{\frac{3}{2}}}{x^{\frac{1}{2}}} = 4$ M1

$x = 4$ A1 C.A.O

$y = 4$ A1 C.A.O) OR STATES (4, 4)

b) STATES, IMPLIES OR USES GAP OF 0.75
E.G 1 1.75 2.5 3.25 4 (NEED NOT HAVE ALL VALUES) B1

5 4.3466 4.1110 4.0216 4 M1
AT LEAST 4 CORRECT

"$\frac{0.75}{2}$" $\left[\text{"5"} + \text{"4"} + 2(\text{"4.3466"} + \text{"4.1110"} + \text{"4.0216"}) \right]$ M1

A.W.R.T 12.73 A1 C.A.O

c) $\int_1^{\text{"4"}} \text{"}x^{\frac{1}{2}} + 4x^{-\frac{1}{2}}\text{"}\, dx$ B1

$\frac{2}{3}x^{\frac{3}{2}} + 8x^{\frac{1}{2}}$ A1 A1 ft so long as fractional indices

"$[\ldots] - [\ldots]$" E.G $\left(\frac{16}{3} + 16\right) - \left(\frac{2}{3} + 8\right)$ OR $\frac{64}{3} - \frac{26}{3}$ M1 ft

$\frac{38}{3}$ A1 C.A.O

d) $\dfrac{\text{"12.73..."} - \text{"}\frac{38}{3}\text{"}}{\text{"}\frac{38}{3}\text{"}} \times 100$ M1 (MAY WRITE IT AS $\dfrac{\frac{38}{3} - 12.73}{\frac{38}{3}}$)

0.53 % OR 0.5 % A1 C.A.O

e) (DIAGRAM) WITH CORRECT REASONING TO THE FACT THAT TRAPEZIUMS GO OVER THE CURVE B1

7. USE OF $\tan\theta = \frac{\sin\theta}{\cos\theta}$ B1

$4\sin^2\theta = 15\cos\theta$ M1

USE OF $\sin^2\theta = 1 - \cos^2\theta$ B1

$4\cos^2\theta + 15\cos\theta - 4 = 0$ O.E M1

$(4\cos\theta - 1)(\cos\theta + 4) = 0$ O.E M1

$\cos\theta = \frac{1}{4}$ IGNORE EXTRAS A1

75.5 OR 76° A1

284.5 OR 284° A1

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8. ATTEMPTS GRAD OF L. e.g. $\frac{11-8}{10-1} = \frac{1}{3}$ M1 A1

EQUATION OF L $y - 8 = \frac{1}{3}(x-1)$ OR $3y = x + 23$ M1

EQUATION OF PERPENDICULAR $y - 6 = "-3"(x-5)$ M1 A1
OR $y = 21 - 3x$

SOLVES SIMULTANEOUSLY "$3y = x + 23$" M1
"$y = 21 - 3x$"

$x = 4$ A1

$y = 9$ A1

ATTEMPTS DISTANCE BETWEEN $(5,6)$ & "$(4,9)$" M1

$\sqrt{10}$ C.a.o. A1