1. $\int 6x^2 - 4x \, dx$ M1

$(f(x) =)\ 2x^3 - 2x^2 + c$ A2 -1 eeoo

$3 = 2 - 2 + c$ M1

$c = 3$ OR $(f(x) =)\ 2x^3 - 2x^2 + c$ A1

2. $\dfrac{6 + 3\sqrt{7}}{5 + 2\sqrt{7}}$ B1

$\dfrac{(6+3\sqrt{7})(5-2\sqrt{7})}{(5+2\sqrt{7})(5-2\sqrt{7})}$ M1

$\dfrac{-12 + 3\sqrt{7}}{-3}$ M2

$4 - \sqrt{7}$ A1

3 a) (I) $\sqrt[3]{8}$ B1

$\frac{5}{2}$ o.e A1

(II) $2^{-12} \times 2^{11}$ M1

$\frac{1}{2}$ A1

b) $\dfrac{3x^3y^2}{9x^4y^6}$ M2

$\frac{1}{3}x^{-1}y^{-4}$ OR $\dfrac{1}{3xy^4}$ A1

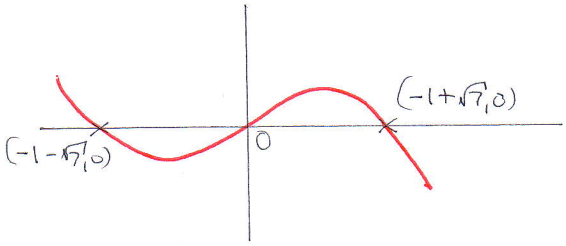
4. $(y =)\ (x+1)^2 + 2$ B2

$(y =)\ x^2 + 2x + 3$ OR $a = 2$, $b = 3$ A1

5. (a) $x^2+2x-6=0$ M1

$(x+1)^2=7$ M1

$x=-1\pm\sqrt{7}$ A1



dep B1 SHAPE

M1 THROUGH O

M1 CORRECT SURD INTERCEPTS

ft SO LONG AS THERE ARE SURDS FROM COMPLETING THE SQUARE E.g $1\pm\sqrt{5}$

(b) $2\sqrt{7}$ A1 ft SO LONG AS - - - - - - - - - e.g $2\sqrt{5}$

---

6. (a) $-2y+18=0$ O.E. M1

$(0,9)$ OR $p=9$ A1

(b) REARRANGES $3x+18=2y$ TO FIND GRADIENT M1

IMPLIES THE REQUIRED GRADIENT IS $-\frac{2}{3}$ B1

CORRECT USE OF $y-y_0=m(x-x_0)$ OR $y=mx+c$ M1

$y=-\frac{2}{3}x+9$ O.E. A1

(c) $3x+18=0$ OR $0=-\frac{2}{3}x+9$

OR $0=-2x+9$ OR SIMILAR B1

$(-6,0)$ A1

$(\frac{27}{2},0)$ O.E A1

$\frac{1}{2}\times 9\times 19.5$ O.E M1 ft

87.75 * WITH CONVINCING WORKINGS A1

7. (a) $\frac{20}{2}[12 + 240]$ OR $\frac{20}{2}[2\times 12 + 19\times 12]$ M4

ONE FOR EACH CORRECT OF THE CIRCLED NUMBERS
+
1 MARK FOR USE OF APPROPRIATE FORMULA

2520 A1

(b) $\frac{20}{2}[16 + 244]$ OR $\frac{20}{2}[2\times 16 + 19\times 12]$ OR $280 + 4\times 20$ M2

−1 eeoo

MUST BE SEEN IN THE APPROPRIATE FORMULA

2600 A1 c.a.o

---

8 CONDONE IF NOT THERE

$[(-)(5k+7)]^2 - 4\times 3(k+2)(3k+1) > 0$ B1

AT LEAST ONE SIGNIFICANT STEP OF SIMPLIFICATION M1 allow 1 error & follow through

E.g $25k^2 + 70k + 49$

OR

$\pm 36k^2 \pm 84k \pm 24$

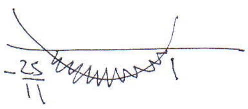
$-11k^2 - 14k + 25 > 0$ M1 ft.

$11k^2 + 14k - 25 < 0$ A1 c.a.o

$(11k+25)(k-1) < 0$ M1

SIGHT OF $-\frac{25}{11}, 1$ A1 dep

(MAY BE IMPLIED IN A DIAGRAM ETC)



M1

$-\frac{25}{11} < k < 1$ A1 dep

---

9. $48 + 4k = u_4$ M1

$4u_4 + 12k = 178$ M1

SUBSTITUTES OR ELIMINATES (DECENT ATTEMPT) M1

$k = -\frac{1}{2}$ o.e $u_4 = 46$ A2

10. a) $x = 0$ OR y AXIS B1

$y = 2$ B1

b) $0 = 2 + \frac{1}{x}$ M1

$\left(-\frac{1}{2}, 0\right)$ OR $-\frac{1}{2}$ O.E A1

c) $2 + x^{-1}$ B1

$\left(\frac{dy}{dx} =\right) -x^{-2} = -\frac{1}{x^2}$ A1

$-\frac{1}{\left(-\frac{1}{2}\right)^2}$ OR -4 M1 OR A1 NOT BOTH

(NORMAL GRADIENT) IS $\frac{1}{4}$ A1

"$y - 0 = \frac{1}{4}\left(x + \frac{1}{2}\right)$" M1 ft

$8y = 2x + 1$ A1 convincingly

d) $8\left(2 + \frac{1}{x}\right) = 2x + 1$ M1

$15 + \frac{8}{x} = 2x$ M1

$2x^2 - 15x - 8 = 0$ A1 O.E

$(2x+1)(x-8)$ M1

$(8, \frac{17}{8})$ A2 O.E

ANALOGOUS MARKS IF THEY FOLLOWED DIFFERENT SUBSTITUTION
! BE GENEROUS !