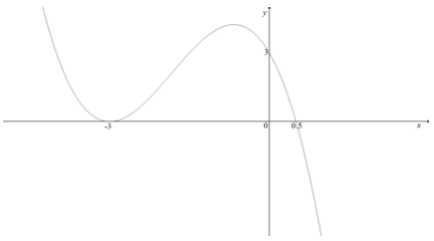
| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 5(b) | 1 of each and 6 police officers = 20 | **B1** | For ${}^4C_1 \times {}^5C_1 \times {}^6C_6$ must be evaluated, could be implied by a correct total |
| | 2 of each and 4 police officers = 900 | **B1** | For ${}^4C_2 \times {}^5C_2 \times {}^6C_4$ must be evaluated, could be implied by a correct total |
| | 3 of each and 2 police officers = 600 | **B1** | For ${}^4C_3 \times {}^5C_3 \times {}^6C_2$ must be evaluated, could be implied by a correct total |
| | 4 of each and no police officers = 5 | **B1** | For ${}^4C_4 \times {}^5C_4$ must be evaluated, could be implied by a correct total |
| | Total = 1525 | **B1** | |
| 6(a) | $\mathrm{q}'(x) = -\frac{1}{3}(2(2x-1)(x+3)+2(x+3)^2)$oe | **2** | **M1** for attempt to differentiate, allow one arithmetic slip.<br>**A1** – allow unsimplified. |
| | $\left[\mathrm{q}'(x) = -\frac{2}{3}\right](3x^2+11x+6)=0$<br>$x=-3$ and $x=-\frac{2}{3}$ | **2** | **Dep M1** for equating *their* $\mathrm{q}'(x)$to zero and attempt to solve *their* 3-term quadratic to get two solutions for $x$ = …<br>**A1** for both $x$ values correct **nfww** |
| 6(b) |  | **3** | **B1** for correct cubic shape with maximum point in correct quadrant.<br>**B1** for correct cubic shape touching at $(-3,\ 0)$ and passing through $(0.5, 0)$, intercepts must be marked.<br>**B1** for correct cubic shape passing through $(0,\ 3)$intercept must be marked. |
| 6(c) | $k<0$ | **B1** | Condone $y<0$ |
| | $x=-\frac{2}{3},\ y=\frac{343}{81}$ or $y=4.23$ | **M1** | For finding the value of $y$ at *their* max point.<br>If incorrect must see substitution of *their* $x=-\frac{2}{3}$ **nfww** |
| | $k>\frac{343}{81}$ or $k>4.23$ | **A1** | Condone $y>\frac{343}{81}$ or $y>4.23$ |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 7 | $6\left(x^{\frac{1}{3}}\right)^2 - x^{\frac{1}{3}} - 2 = 0$<br>or $6m^2 - m - 2 = 0$ where $m = x^{\frac{1}{3}}$ oe | **B1** | |
| | $x^{\frac{1}{3}} = \frac{2}{3},\ x^{\frac{1}{3}} = -\frac{1}{2}$ oe | **M1** | For attempt to solve 3-term quadratic equation in the form $6m^2 \pm m \pm 2 = 0$ and obtain $x^{\frac{1}{3}}$ =.... or $m = ...$ from correct work only |
| | $x = \frac{8}{27},\ x = -\frac{1}{8}$ | **2** | **Dep M1** for dealing with the power of $\frac{1}{3}$ correctly at least once.<br>**A1** for both |
| 8 | $(2x)^2 = 256x^{16}$ soi $n = 8$ | **B1** | |
| | $\binom{8}{1}(2x^2)^7 \times \left(-\frac{1}{4x}\right) = ax^{13}$ oe<br>leading to $a = -256$ | **2** | **M1** for attempt at 2nd term with *their n* to find *a*, need to see one step to evaluate.<br>Allow a sign error in simplifying but not missing in $-\frac{1}{4x}$ |
| | $\binom{8}{2}(2x^2)^6\left(-\frac{1}{4x}\right)^2 = bx^c$<br>leading to $b = 112$ | **2** | **M1** for attempt at 3rd term with *their n* to find *b*, need to see one step to evaluate.<br>Allow a sign error but not missing in $\left(-\frac{1}{4x}\right)^2$ |
| | $c = 10$ | **B1** | Can be seen by observation. |