# JOHN EDMONDSON HIGH SCHOOL

**Year 11 Mathematics Advanced**
**Assessment Task 2**
**Term 2 2024**

## Assignment Questions: Weighting 30%

Date assignment given to student: Wednesday 22nd May 2024

This assignment must be submitted with your full name clearly written on all pages.

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| **1.** | What is the value of $\frac{5.25-0.45}{1.24+4.5}$ correct to 2 significant figures? | **1 mark** |
| **2.** | Calculate $\sqrt{\frac{3.7^5-1}{4.31+7.25}}$ correct to 2 decimal places. | **1 mark** |
| **3.** | The distance from Sydney to Melbourne is 99 500 000 cm. Write this number in scientific notation in metres. | **1 mark** |
| **4.** | Find integers $a$ and $b$ such that $\frac{2}{7-\sqrt{5}}=\frac{a+b\sqrt{5}}{22}$ | **2 marks** |
| **5.** | Express $\frac{1}{\sqrt{3}-2}$ in the form $a\sqrt{3}+b$ | **2 marks** |
| **6.** | Simplify $3\sqrt{2}+2\sqrt{98}$ | **2 marks** |
| **7.** | Write $\frac{2}{\sqrt[5]{(3p-1)^8}}$ with fractional and / or negative indices. | **1 mark** |

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| **8.** | Simplify: $\dfrac{2^n - 2^{n-1}}{2^n + 2^{n+1}}$ | **2 marks** |
| **9.** | Factorize: $xa + 3x - 2a - 6$ | **2 marks** |
| **10.** | The sides of a right-angled triangle are $(x+1)cm$, $(x+3)cm$ and $(x+5)cm$. Find the length of each side by using Pythagoras' Theorem. Show all working. | **3 marks** |
| **11.** | Factorize fully: $a^2 - 4a + 4 - 9b^2$ | **2 marks** |
| **12.** | Simplify $\dfrac{2}{x-3} \times \dfrac{x^2 - 2x - 3}{10}$ | **2 marks** |
| **13.** | Solve $-3 < 5y + 2 \leq 17$ and graph the solution on a number line | **3 marks** |
| **14.** | Solve $2^{2x+1} = 16$ | **2 marks** |
| **15.** | Solve $9^{3x+4} = 1$ | **2 marks** |
| **16.** | Solve $\lvert 8y - 9 \rvert = 5y - 7$ | **3 marks** |
| **17.** | Use the quadratic formula to solve $4x^2 - 2x - 3 = 0$ expressing the answer in surd form. | **2 marks** |
| **18.** | Solve simultaneously:<br>$a^2 - b^2 = 25$<br>$a + b = 3$ | **3 marks** |
| **19.** | The function $f(x)$ is defined as follows:<br>$f(x) = \begin{cases} x+1, & -2 \leq x < 3 \\ 4, & 3 \leq x \leq 5 \end{cases}$<br>(i) Find $f(-2) + f(2) - f(5)$<br>(ii) Draw a neat sketch of the function for the given domain | **1 mark**<br>**2 marks** |
| **20.** | Solve $\left(\frac{1}{2}\right)^{x+2} = \sqrt[3]{4}$ | **3 marks** |
| **21.** | Show whether $f(x) = 2x - 3x^3$ is an odd function, an even function or neither. | **2 marks** |

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| **22.** | Sketch $y = \frac{1}{x-3} + 2$ showing all intercepts, asymptotes and state its domain and range. | **4 marks** |
| **23.** | Sketch $y = \sqrt{4 - x^2}$ and state its domain and range. | **3 marks** |
| **24.** | Find the centre and radius of the circle given by $x^2 + 6x + y^2 - 16 = 0$ | **2 marks** |
| **25.** | State the domain and range for $x^2 + 6x + y^2 - 16 = 0$ | **2 mark** |
| **26.** | Consider the function given by $y = x^2 - 2x - 3$<br>(i) Draw a neat sketch of the curve $y = x^2 - 2x - 3$ showing the x and y intercepts.<br>(ii) Find the axis of symmetry and state the vertex. Show this on your graph. | **2 marks**<br>**2 marks** |
| **27.** | Find the values of $k$ for which the equation $x^2 - 7x + k = 0$ has real roots. | **2 marks** |
| **28.** | (i) Determine the discriminant for the quadratic equation $x^2 + (k+2)x + 4 = 0$<br>(ii) For what values of $k$ does the equation have real roots | **1 mark**<br>**1 mark** |
| **29.** | Solve $4^x = 12(2^x) - 32$ | **3 marks** |
| **30.** | The points $A(2, 0)$, $B(8, 4)$, $C(4, 6)$ and $D(x_1, y_1)$ form the 4 vertices of a parallelogram<br>(i) Draw a number plane and mark *A, B,* & *C* on it.<br>(ii) Find the gradient of line *AB*<br>(iii) Show that the equation of the line *l* parallel to *AB* and going through *C* is $2x - 3y + 10 = 0$<br>(iv) If the equation of the line *p* through *A* parallel to *BC* is $x + 2y - 2 = 0$, find the point $D(x_1, y_1)$ the intersection of the lines *l* and *p*. Mark this point on your diagram. | **1 mark**<br>**1 mark**<br>**2 marks**<br>**2 marks** |

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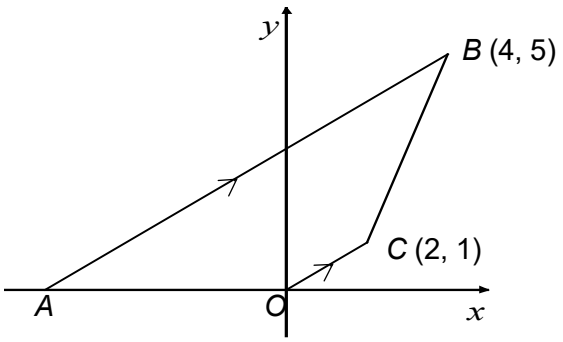
| **31.** | In the diagram below $ABCO$ is a trapezium with $AB \parallel OC$.<br>  <br> | |
| | (i) Find the coordinates of the midpoint of $BC$. | **1 mark** |
| | (ii) Calculate the exact length of $OC$. | **1 mark** |
| | (iii) Find the gradient of $OC$. | **1 mark** |
| | (iv) Find the size of $\angle AOC$, correct to the nearest degree. | **2 marks** |
| | (v) Show that the equation of the line $AB$ is $x - 2y + 6 = 0$. | **2 marks** |
| | (vi) Find the coordinates of $A$. | **1 mark** |

End of Assignment