| Day 216 | A Level Maths: C Tier 10-a-day |
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| **1** OA = $\begin{pmatrix} -3 \\ -1 \\ 3 \end{pmatrix}$ and OB = $\begin{pmatrix} -9 \\ -3 \\ 0 \end{pmatrix}$.<br>Find AB and \|AB\|, and a unit vector in the direction of AB. | |
| **2** Here are 7 values: 9, 9, 20, 2, 9, 5, 7<br>Find the mean and the standard deviation, to 3 s.f. | |
| **3** A block of mass 2 kg is pulled along rough horizontal ground at constant speed by a horizontal force of 11.76 N. Take g = 9.8 m $s^{-2}$.<br>Find the coefficient of friction between the block and ground. | |
| **4** Solve $4^x = 64$. | |
| **5** A block of mass 10 kg is pulled along rough horizontal ground by a horizontal force of 44.2 N.<br>The coefficient of friction is 0.4. Take g = 9.8 m $s^{-2}$. Find the acceleration. | |

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| **6** $f(x) = 8 \sin x + 15 \cos x + 3$.<br>Write $f(x)$ in the form $R \sin(x + \alpha) + 3$, with $\alpha$ in degrees to 1 d.p., and state the maximum value of $f(x)$. | |
| **7** Find the set of values of k for which $x^2 + kx + 25 = 0$ has no real roots. | |
| **8** $X \sim B(9, 0.2)$. Find $P(X = 0)$, giving your answer to 3 s.f. | |
| **9** Solve $\ln (x + 1) - \ln x = \ln 2$. | |
| **10** Solve the simultaneous equations:<br>$y = x^2 - x - 22$, $y = -x - 6$. | |