S4 Homework – Week 22

Q1. Expand and simplify:

a. $(2x - 5)^2$ b. $3 – (x + 1)^2$ c. $(x + 3)(x - 2) – 2(x+ 4)$

Q2. David invests £4,300 in a saving account which offers an interest rate of 2.73% p.a. How much compound interest would he accrue over a period of 3 years?

Q3. A function is defined by $f(x) = x^2 + 5x$, evaluate:

a.$f(-2)$ b. $f(3)$ c. $f(k) = 6$

Q4. A formula is given as $V = 2x - 3y^2$.
Change the subject of the formula to y.

Q5. A parabola is given by the equation $y = x^2 - 6x + 5$.

a. Write the equation in the form $y = (x - a)^2 + b$.
b. Hence, state the coordinates and nature of the turning point of the graph.
c. Write down the equation of the axis of symmetry.

Q6. Find the points where the graph of $y = x^2 + 14x + 45$ crosses the x-axis.

Q7. A straight line has equation $3x + 2y = 9$.

a. Find the coordinates of the point where the line crosses the x-axis.
b. Find the point of intersection of the line with $4x - y = 23$.

Q8. Fully factorise:

a. $36x^2 – 25$ b. $x^2 – x – 42$ c. $6x^2 - 19x – 7$

Q9. Find the **perimeter** of a circle sector with a radius of 14cm and an angle of 225° at its center.

Q10. A pack of 20 chocolate brownies are reduced by 30% and now cost £1.49. How much did they cost originally?

Q11. A parabola has the equation $y = 8 – 2(x + 5)^2$

i. Find the co-ordinates of the turning point
ii. State the equation of the axis of symmetry.

Q12. Find the equation of the straight line parallel to $3y - x = 24$ which passes through (-3, -4).

Q13. A sample of test scores from class 5Q3 are shown below.

85, 76, 82, 91

a. Find the standard deviation correct to 1 decimal place.

In class 5Q4, there was a mean score of 84.3 and a standard deviation of 9.5.

b. Make two statements comparing the test scores in the two classes.

Q14. Express in the form $(x + p)^2 + q$.

a. $x^2 + 6x + 2$ b. $x^2 - 10x - 4$ c. $x^2 - 7x – 8$

Q15. The orbit of a planet around a star is circular. The radius of the orbit is 4.96×10^7 km.
Find the circumference of the orbit. Give your answer in scientific notation.

Q16. Two hang bags are mathematically similar. The cost is proportional to its volume.
The smaller bag measures 24cm and costs £8.99. The large bag measures 36cm, calculate its cost.

Q17. Solve the simultaneous equations given below

$3d - 6e = 38$
$5d + 7e = 14$