1) Simplify $\sqrt{405}$

2) A car bought for £22000 depreciates in value by 4.3% each year. Write down a formula for the value of the car, V, after t years.

3) Use the formula $s = \frac{1}{2}(u + v)t$ to find the distance travelled in 10 seconds if the initial velocity was 5m/s, and the final velocity was 12m/s.

4) Evaluate $16^{\frac{3}{4}}$ (i.e 16 to the power of ¾)

5) A block has a mass of 300g and a density of 75g/cm³. Calculate the volume.

HAA1.2

1) Find the nth term of the quadratic sequence 6, 18, 38, 66, …

2) Sketch the curve $y = \sin x$

3) Find the equation of the line with gradient 3 passing through the point (5, 10)

4) Work out $2.4 \times 10^3 + 4.1 \times 10^4$

5) Express $x^2 - 8x + 30$ in completed square form

1) Simplify $\sqrt{112}$

2) £5000 is invested with an interest rate of 2.3% per annum. Write a formula for the value of the investment V, after t years

3) Use the formula $s = \frac{1}{2}(u + v)t$ to find the final velocity when the initial velocity was 12m/s, and it took 3 seconds to travel 48m

4) Evaluate $16^{\frac{3}{2}}$ (i.e 16 to the power of $\frac{3}{2}$)

5) A block has a volume of 10cm³ and a density of 75g/cm³. Calculate the mass.

HAA1.4

1) Find the nth term of the quadratic sequence 8, 17, 32, 53, …

2) Sketch the curve $y = \cos x$

3) Find the equation of the line with gradient -2 passing through the point (6 , 3)

4) Work out $5 \times 10^4 + 8.5 \times 10^3$

5) Express $x^2 + 12x - 30$ in completed square form

1) Simplify $\sqrt{98}$

2) A car bought for £23,500 depreciates in value by 7.5% per annum. Write a formula for the value of the car V, after t years

3) Use the formula $s = \frac{1}{2}(u + v)t$ to find how long it took to travel 45m if the initial velocity was 8m/s and the final velocity was 10m/s

4) Evaluate $9^{\frac{5}{2}}$ (i.e 9 to the power of $\frac{5}{2}$)

5) A block has a volume of 4 m³ and a mass of 32kg. Calculate the density.

HAA1.6

1) Find the nth term of the quadratic sequence 6, 22, 48, 84, …

2) Sketch the curve $y = x^3$

3) Find the equation of the line with gradient $-\frac{1}{2}$ passing through the point (3 , 5)

4) Work out $3.5 \times 10^4 + 5 \times 10^3$

5) Express $x^2 - 12x - 30$ in completed square form

1) Simplify $\sqrt{125} + 3\sqrt{5}$

2) Find the coordinates of the vertex of the graph

$y = x^2 - 8x + 24$

3) Use the formula $v = u + at$ to find the final velocity when the initial velocity is 10m/s, the acceleration is -3m/s² and the time is 4s

4) Expand and simplify $(x + 2)(x - 3)(x + 4)$

5) What is the exact value of sin 30°

1) A pressure of 30N/m² results from a force of 240N acting over an area x m². Find x

2) If $f(x) = 10 - 3x^2$, find the value of $f(-2)$

3) If the nth term of a sequence is $\dfrac{3n}{4n-2}$, write down the first three terms

4) Work out $6 \times 10^2 \times 3 \times 10^4$, giving your answer in standard form

5) Solve simultaneously $7x - 5y = 40$ and $2x - 5y = 15$

1) Simplify $\sqrt{48} + 3\sqrt{3}$

2) Find the coordinates of the vertex of the graph

$y = x^2 + 8x + 10$

3) Use the formula $v^2 = u^2 + 2as$ to find the final velocity after 16m when the initial velocity is 10m/s, the acceleration is 3m/s²

4) Expand and simplify $(x + 3)^2(x - 2)$

5) What is the exact value of cos 45°

HAA2.4

1) A pressure of $10N/m^2$ results from a force of 360N acting over an area x m². Find x

2) If $f(x) = 2x + 3x^2$, find the value of $f(-5)$

3) If the nth term of a sequence is $\frac{4-2n}{4n-2}$, write down the first three terms

4) Work out $5.2 \times 10^3 \times 3 \times 10^5$, giving your answer in standard form

5) Solve simultaneously $3x + 2y = 6$ and $4x - y = 19$

1) Simplify $\sqrt{75} + \sqrt{12}$

2) Find the coordinates of the vertex of the graph

$y = x^2 - 6x + 10$

3) Use the formula $v^2 = u^2 + 2as$ to find the initial velocity, if, after 7m, the final velocity was 9m/s, the acceleration was 4m/s²

4) Expand and simplify $(x - 4)^3$

5) What is the exact value of cos 60°

HAA2.6

1) A force of 420N acts over an area of 60 m².
   What is the pressure?

2) If $f(x) = 3x - 2x^2$, find the value of $f(3)$

3) If the nth term of a sequence is $\frac{4-2n}{n^2}$, write down the first three terms

4) Work out $6 \times 10^5 \times 6 \times 10^8$, giving your answer in standard form

5) Solve simultaneously $2x - 3y = 10$ and $8x + y = 1$

1) Simplify $2\sqrt{3} \times 4\sqrt{75}$

2) Find the nth term of $\frac{3}{7}, \frac{4}{9}, \frac{5}{11}, \frac{6}{13}$

3) Solve $sin\ x = 0.5$ for $0° \leq x < 360°$

4) Find the inverse function of $f(x) = 3x + 2$

5) Find the next term in the sequence 2, 6, 18, 54, …

1) Find the equation of the line passing through
(3 , 4) and (5 , 10)

2) Solve using the quadratic formula (and a calculator),
$3x^2 + 5x - 7 = 0$

3) Factorise $6x^2 + 23x + 20$

4) Simplify $\frac{2x}{5} + \frac{3x-4}{6}$

5) Write down the first three terms of the sequence defined by:
$x_1 = 2 , x_{n+1} = 5x_n + 2$

1) Simplify $4\sqrt{7} \times 3\sqrt{7}$

2) Find the nth term of $\frac{3}{4}, \frac{5}{9}, \frac{7}{16}, \frac{9}{25}$

3) Solve $\cos x = 0.5$ for $0° \leq x < 360°$

4) Find the inverse function of $f(x) = \frac{x+3}{4} - 5$

5) Find the next term in the sequence $6, 3, \frac{3}{2}, \frac{3}{4}, ...$

1) Find the equation of the line passing through
(3 , 4) and (1 , 3)

2) Solve using the quadratic formula (and a calculator),
$4x^2 - 5x - 9 = 0$

3) Factorise $8x^2 - 10x - 18$

4) Simplify $\dfrac{3x+1}{4} - \dfrac{2x-5}{6}$

5) Write down the first three terms of the sequence defined by:
$x_1 = 5 , x_{n+1} = -3x_n + 2$

1) Simplify $2\sqrt{45} \times 3\sqrt{20}$

2) Find the nth term of $\frac{7}{1}, \frac{5}{8}, \frac{3}{27}, \frac{1}{64}$

3) Solve $tan(x) = \sqrt{3}$ for $0° \leq x < 360°$

4) Find the inverse function of $f(x) = 4 - \frac{x}{3}$

5) Find the next term in the sequence $\frac{4}{3}$, 4, 12, 36, , ...

1)   Find the equation of the line passing through
     (4 , 7) and (1 , 13)

2)   Solve using the quadratic formula (and a calculator),
     $3.2x^2 - 2.8x - 7.3 = 0$

3)   Factorise $6x^2 - x - 15$

4)   Simplify $\frac{3x+2}{3} - \frac{4-3x}{5}$

5)   Write down the first three terms of the sequence defined by:
     $x_1 = 2 , x_{n+1} = 2x_n + 1$

HAA4.1

1) Expand $(x-3)^2(x+4)$

2) r is directly proportional to s. When $r = 60$, $s = 5$.
Find the value of r when $s = 3$

3) Simplify $\dfrac{x^2+7x+6}{7x-2-6x+3}$

4) If $f(x) = 7 - 2x^2$, find the value of $f(3)$

5) Find the coordinates of the vertex of the graph
$y = x^2 - 8x - 5$

HAA4.2

1) Find the equation of the line parallel to $2y + 4x = 7$ passing through the point (4 , 1)

2) Simplify $\frac{2x+3}{3} + \frac{2x-5}{4}$

3) Sketch the graph of $y = -x^2$

4) A block has a volume of 20cm³, and a density of 4.5g/cm³. Calculate its mass

5) Rationalise the denominator

$$\frac{6\sqrt{3}}{\sqrt{3} - 2}$$

1) Expand $(x + 3)^3$

2) r is directly proportional to s. When $r = 40$, $s = 5$.
   Find the value of r when $s = 7$

3) Simplify $\dfrac{x^2+7x+12}{2(x+3)-(x+2)}$

4) If $f(x) = 3 + 2x^2$, find the value of $f(-3)$

5) Find the coordinates of the vertex of the graph
   $y = x^2 + 10x + 12$

HAA4.4

1) Find the equation of the line parallel to $2y - 6x = 7$ passing through the point (-2 , 7)

2) Simplify $\frac{3x+2}{4} - \frac{2x-3}{6}$

3) Sketch the graph of $y = x^2 + 4$

4) A block has a mass of 20g, and a density of 4g/cm³. Calculate its volume

5) Rationalise the denominator
$$\frac{2\sqrt{5}}{\sqrt{5} + 2}$$

HAA4.5

1) Expand $(x + 3)(x - 2)^2$

2) a is directly proportional to b. When $a = 5$, $b = 10$.
Find the value of b when $a = 7$

3) Simplify $\dfrac{x^2 - 25}{x + 5}$

4) If $f(x) = 3 - 2x^2$, find the value of $f(-5)$

5) Find the coordinates of the vertex of the graph
$y = x^2 - 6x + 12$

HAA4.6

1) Find the equation of the line parallel to $3y + 6x = 5$ passing through the point (4 , -3)

2) Simplify $\dfrac{2x-5}{3} - \dfrac{2x-4}{6}$

3) Sketch the graph of $y = x^3$

4) A pressure of 24 N/m² results from a force of 12 N acting over an area x m². Find x

5) Rationalise the denominator

$$\dfrac{6\sqrt{7}}{\sqrt{7} - 1}$$

1) Solve simultaneously $3x - 3y = 9$ and $2x - y = 9$

2) One solution of $\cos x = 0.939692$ is $x = 20°$

   What is the other solution in the range $0° \leq x < 360°$?

3) Find the 50$^\text{th}$ term of the sequences 7, -1, -9, -17, -25, …

4) Find $fg(x)$ where $f(x) = 3x + 2$ and $g(x) = x^2$

5) Simplify $\dfrac{2}{x+3} - \dfrac{x}{x+2}$

HAA5.2

1) Shape B is an enlargement of shape A with scale factor 3.
   If the area of shape B is 36cm², what is the area of shape A?

2) Work out $4 \times 10^6 \times 6 \times 10^5$, giving your answer in standard form

3) Solve using the quadratic formula (and a calculator)
   $5x^2 - 3x - 6 = 0$

4) Evaluate 9^{-2} and $9^{\frac{1}{2}}$

5) The value of x is given as 230 rounded to 2 significant figures.
   State the upper and lower bounds

1) Solve simultaneously $3x - 4y = 26$ and $5x + 3y = 24$

2) One solution of $\sin x = 0.422618 \ldots$ is $x = 25°$
   What is the other solution in the range $0° \leq x < 360°$?

3) Find the 50th term of the sequences -8, -1, 6, 13, …

4) Find $gf(x)$ where $f(x) = 3x + 2$ and $g(x) = x^2$

5) Simplify $\dfrac{3}{2x+6} + \dfrac{3x-5}{x+3}$

HAA5.4

1) Shape B is an enlargement of shape A with scale factor 4.
   If the area of shape B is 48cm², what is the area of shape A?

2) Work out $3.2 \times 10^5 \times 4 \times 10^7$, giving your answer in standard form

3) Solve using the quadratic formula (and a calculator)
   $2.3x^2 + 4.5x - 6.7 = 0$

4) Evaluate $8^{\frac{2}{3}}$ and $4^{\frac{3}{2}}$

5) The value of x is given as 8.9 rounded to 1 decimal place.
   State the upper and lower bounds

1) Solve simultaneously $3x + 4y = 14$ and $x + 6y = 7$

2) One solution of $\sin x = -0.342020 \ldots$ is $x = 200°$
   What is the other solution in the range $0° \leq x < 360°$?

3) Find the 100th term of the sequences 46, 52, 58, 64, …

4) Find $fg(x)$ where $f(x) = 3x + 8$ and $g(x) = x^2 - 6$

5) Simplify $\dfrac{2}{x+3} - \dfrac{5}{x}$

1) Shape B is an enlargement of shape A with scale factor 3.
If the area of shape A is 36cm², what is the area of shape B?

2) Work out $(3.2 \times 10^9) \div (4 \times 10^4)$, giving your answer in standard form

3) Solve using the quadratic formula (and a calculator)
$1.2x^2 + 3.4x = 0$

4) Evaluate 4^{-2} and $4^{-\frac{1}{2}}$

5) The value of x is given as 400 rounded to **2** significant figures.
State the upper and lower bounds

1) Expand and simplify $(x - 3)^3$

2) If $f(x) = 3x^2$ and $g(x) = 3x - 1$ find $fg(x)$

3) Find the equation of the line perpendicular to $3y - x = 6$ passing through the point (2, -7)

4) Find the nth term of the sequence 4, 10, 20, 34, ...

5) A car travels 50km in 1 hour 20 minutes, what is its average speed?

HAA6.2

1) m is given as 40 correct to one significant figure.
Write an inequality to show the range of values m could be

2) Shape B is an enlargement of shape A with scale factor 3. If the volume of shape A is 6cm³, what is the volume of shape B?

3) Solve, by factorising, $3x^2 + 16x - 12 = 0$

4) Expand and simplify $\left(4 + \sqrt{3}\right)\left(4 - \sqrt{3}\right)$

5) Sketch the graph of $y = \sin x$ and $y = \cos x$

1) Expand and simplify $(x + 3)(x - 2)^2$

2) If $f(x) = \frac{4x+3}{2}$ find $f^{-1}(x)$

3) Find the equation of the line perpendicular to $2y = 3x + 8$ passing through the point (6, 1)

4) Find the nth term of the sequence 3, 15, 35, 63, 99, …

5) A car travels 40km in 2 hour 40 minutes, what is its average speed?

1) p is given as 40 correct to two significant figures.
Write an inequality to show the range of values p could be

2) Shape B is an enlargement of shape A with scale factor 3. If the area of shape A is 6cm², what is the area of shape B?

3) Solve, by factorising, $3x^2 + 13x - 10 = 0$

4) Expand and simplify $\left(\sqrt{5} + 1\right)\left(\sqrt{5} - 1\right)$

5) Sketch the graph of $y = x^2$ and $y = x^3$

1) Expand and simplify $(2x^2 - 3x + 4)(5x - 6)$

2) If $f(x) = \frac{4-2x}{5}$ find $f^{-1}(x)$

3) Find the equation of the line **parallel** to $2y = 3x + 8$ passing through the point (6, 1)

4) Find the nth term of the sequence 19, 16, 11, 4, -5, …

5) A car travels 40 km in 25 minutes, what is its average speed in km/h?

HAA6.6

1) t is given as 0.65 correct to two significant figures.
   Write an inequality to show the range of values t could be

2) Shape B is an enlargement of shape A with scale factor 5. If the volume of shape A is 2cm³, what is the volume of shape B?

3) Solve, by factorising, $6x^2 + 17x + 12 = 0$

4) Expand and simplify $(4 - 2\sqrt{3})(4 + 2\sqrt{3})$

5) Sketch the graph of $y = -x^2$ and $y = -x^3$