3.

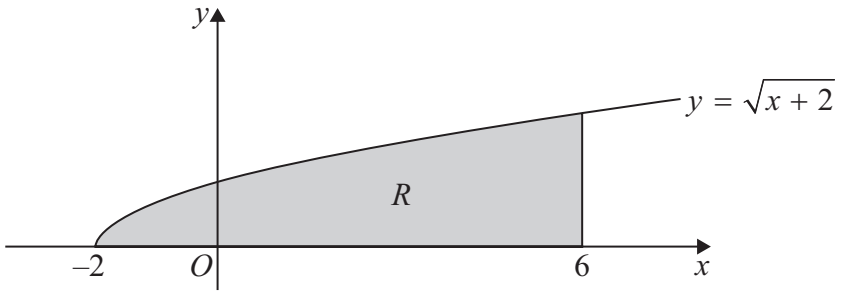

Figure 1

Figure 1 shows a sketch of part of the curve with equation $y = \sqrt{x+2}$ $x \geqslant -2$

The finite region R, shown shaded in Figure 1, is bounded by the curve, the x-axis and the line with equation $x = 6$

The table below shows corresponding values of x and y for $y = \sqrt{x+2}$

x	–2	0	2	4	6
y	0	1.4142	2	2.4495	2.8284

(a) Use the trapezium rule, with all of the values of y in the completed table, to find an approximate value for the area of R, giving your answer to 3 decimal places.

(3)

Use your answer to part (a) to find the approximate value of

(b) $\displaystyle\int_{-2}^{6} (2x + \sqrt{4x+8})\,\mathrm{d}x$

(3)

(Total for Question 3 is 6 marks)

4. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

$$f(x) = 3x^3 + ax^2 + bx - 10$$

Given that $(x - 2)$ is a factor of $f(x)$,

(a) use the factor theorem to show that $2a + b = -7$

(2)

Given also that when $f(x)$ is divided by $(x + 1)$ the remainder is -36

(b) find the value of a and the value of b.

(4)

(c) Hence find the quotient and remainder when $f(x)$ is divided by $(x - 5)$

(3)

(Total for Question 4 is 9 marks)

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5. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

Given that k is a constant and

$$\int_2^4 \left(\frac{4}{\sqrt{x}} + k \right) dx = 30$$

find the exact value of k.

(5)

(Total for Question 5 is 5 marks)