Day 59	S Tier 10-a-day

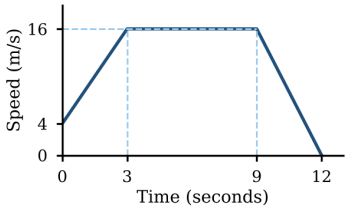
1 Simplify fully $\frac{x^2 - 81}{x^2 + 5x} \div \frac{x^2 - 7x - 18}{x}$

2 The price of a phone is increased by 60%.
The new price is then decreased by 25%.
Work out the overall percentage change in the price.

3 A sector of a circle has radius 3 cm and angle 240°.
(a) Work out the length of the arc of the sector.
(b) Work out the area of the sector. Give each answer in terms of π.

4 A and B are points on the curve $y = x^3 + 5x$.
The x coordinate of A is -3 and the x coordinate of B is -1.
Work out the gradient of the line AB.

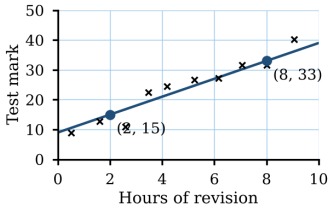
5 The graph shows the speed of a cyclist during 12 seconds.
(a) Work out the acceleration during the first 3 seconds.
(b) Work out the average speed over the whole 12 seconds.



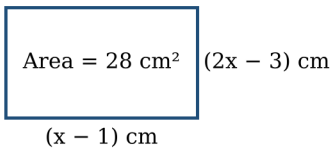
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6 The point P(3, 1) is reflected in the x-axis.
The image is then rotated 180° about the origin.
(a) Write down the coordinates of the final image of P.
(b) Describe fully the single transformation that is equivalent to these two transformations.

7 The scatter graph shows hours of revision (x) and test mark (y).
The line of best fit passes through (2, 15) and (8, 33).
(a) Find its equation in the form y = mx + c.
(b) Explain what its gradient tells you.



8 The diagram shows a rectangle of length $(x - 1)$ cm, width $(2x - 3)$ cm and area 28 cm^2.
(a) Show that $2x^2 - 5x - 25 = 0$.
(b) Work out the length of the diagonal of the rectangle. Give your answer correct to 3 significant figures.



9 A population of rabbits starts at 3,000 and grows by 20% each year.
After how many whole years will the population first be at least double its starting value?
(Calculator)

10 A square has sides of length $(5 + \sqrt{6})$ cm.
Work out the area of the square.
Give your answer in the form $a + b\sqrt{6}$