

S4 Homework 10

Non-calculator section:

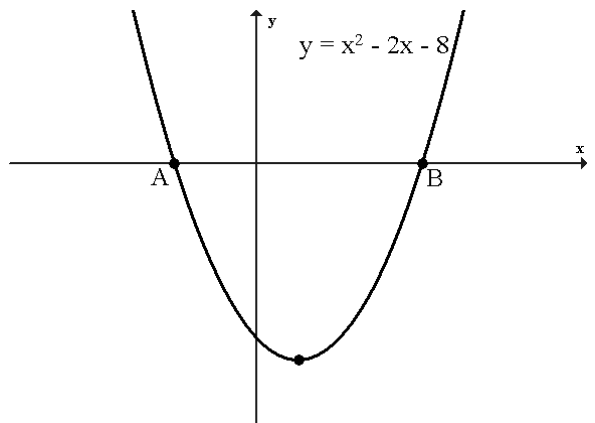
- Find the value of $2.8 - 33\frac{1}{3}\%$ of 4.29
- Express as a single fraction in its simplest form $\frac{\frac{3}{8}}{(1\frac{1}{2})^2}$.
- (a) $f(x) = \frac{\sqrt{5}}{\sqrt{2x^2 - 3}}$. Express $f(3)$ with a rational denominator.

(b) Simplify $\frac{4a^{\frac{1}{2}} \times 6a^{\frac{3}{2}}}{a}$.
- Express $\frac{3}{x+1} - \frac{2}{x}$, $x \neq 0, -1$ as a single fraction in its simplest form.

5. The parabola opposite has equation

$$y = x^2 - 2x - 8.$$

- Find the coordinates of A and B.
- Find the minimum value of the parabola.
- The point C(7, m) lies on the parabola. Find m.

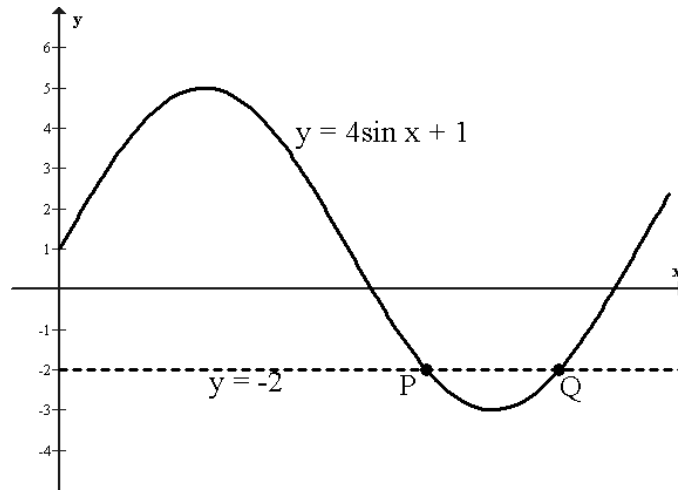


6. Solve $x - \frac{x-4}{3} \geq \frac{1}{2}$.

Calculator section:

7. The price of a bottle of cola in 6 different shops is
47p 56p 45p 40p 53p 52p
- Calculate the mean and standard deviation of these prices.
 - Each shop increases the price of a bottle of cola by 5p. **Write down** the new mean and standard deviation of the prices.

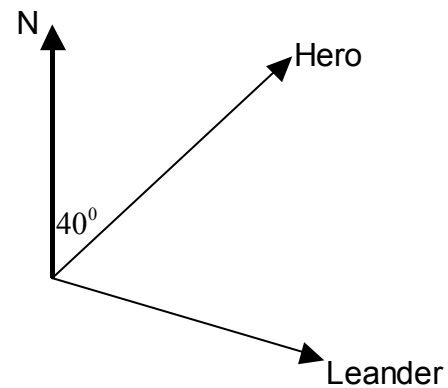
8. The graph below has equation $y = 4\sin x^\circ + 1$.



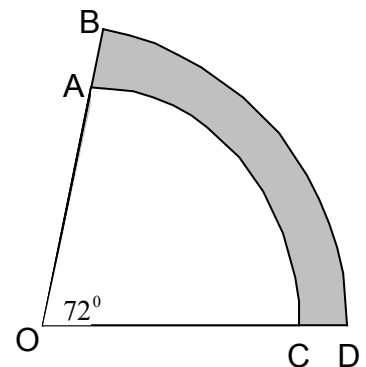
The line $y = -2$ has been drawn on the graph. Find the coordinates of P and Q.

9. Solve the equation $\frac{x(x+3)}{2} = 9$.

10. Two ships, Hero and Leander, leave port at the same time.
 Hero sails on a bearing of 040° at a speed of 20 kmph.
 Leander sails on a bearing of 110° at a speed of 16 kmph.
 How far apart are the ships after $1\frac{1}{2}$ hours?

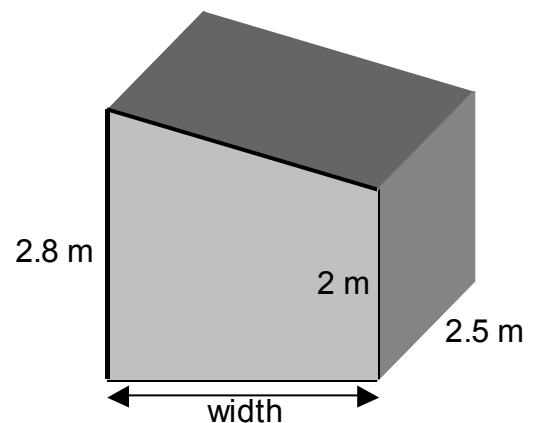


11. In the diagram opposite AC and BD are arcs of a circle with centres O. The radius $OA = 8\text{m}$ and the radius $OB = 10\text{m}$.
 Find the shaded area.



12. (a) The diagram shows a shed.
 The end view of the shed is a rectangle and a right-angled triangle.
 The volume of the shed is 18m^3 .
 Calculate the width of the shed.

(b) Another shed, which is mathematically similar, has a width of 4.5m.
 Calculate the volume of this shed.



13. A school is organising a boat trip on the River Clyde. The cost of tickets is given below.

Number of pupils	Adult ticket	Child ticket
0 - 9	£5	£3
10 - 19	£4.50	£2.50
20 - 29	£4	£2

□ **1 adult goes free with every 10 pupils** □

- (a) Find the cost of a boat trip consisting of 5 adults and 16 children.
(b) Find the cost, **£C**, of a boat trip for **a** adults and **d** children where $20 \leq d \leq 29$.

14. The diagram opposite shows a tunnel in the shape of part of a circle with radius OB . The height of the tunnel is 10 metres.

Calculate x .

