1. Evaluate, without a calculator
(a) $3 \frac{1}{2}+1 \frac{2}{3}$
(b) $2 \frac{1}{4} \times 2 \frac{1}{3}$
(c) $3 \frac{1}{5} \div 1 \frac{1}{3}$
2. The population of a city is 435000 at present, and is increasing at a rate of $3 \cdot 2 \%$ per annum. What is the expected population in 4 years from now? Give your answer to the nearest ten thousand.
3. Two groups of students are given the same test.
(a) The marks of Group A are

| 73 | 47 | 59 | 71 | 48 | 62 |
| :--- | :--- | :--- | :--- | :--- | :--- |

Find the mean and standard deviation. Show working.
(b) In Group B the mean is 60 and the standard deviation is $29 \cdot 8$. Compare the results of the two groups.
4. Find the equation of each of these trig graphs.
(a)

(b)

5. Solve by factorisation
(a) $5 x=x^{2}$
(b) $2 x^{2}-5 x-3=0$
6. A ship leaves port P and sails a distance of 20 km on a bearing $059^{\circ}$, reaching port B . At B, the ship changes direction and sails for 25 km on a bearing of $132^{\circ}$ to port C .
(a) Draw a sketch to show this information.
(b) Calculate the direct distance from P to C .
7. Solve:
(a) $2+5 x \leq 8 x-16$
(b) $2 x>3-(x+6)$
(c) $\frac{m}{3}=\frac{(1-m)}{5}$
(d) $2 y-\frac{(3 y-1)}{4}=4$
8. (a) A cylindrical water urn has radius 24 cm and height 60 cm . Calculate its volume in cubic centimetres.
(b) Another urn has height 50 cm and the same volume. Find its radius.
9. The depth, $d$ metres, of water in a harbour entrance over a 24 hour period starting at midnight is given by the formula $d=6-2 \sin 30 h^{\circ}$, where $h$ is the number of hours after midnight.
The graph below shows the depth of water in the harbour entrance for the first 12 hours of the 24 hour period.


A fishing boat, needing a depth of 5 metres, wants to dock in the harbour.
Find, algebraically, the times over the $\mathbf{2 4}$ hour period during which the boat can pass through the harbour entrance.
10. In the diagram below, $\mathrm{BC}=10 \cdot 5 \mathrm{~cm}$.

Calculate the length of AD .

11. (a) The estimated population of gulls on an island is 12000 .

If the population increases at $6 \%$ p.a., estimate the population 4 years from now, rounding your answer to 2 significant figures.
(b) The price of an article, including $32 \%$ profit, is $£ 316 \cdot 80$.

Calculate the price before the profit is added.

