1. A is the point 3,4 and $B$ is the point 5,10 . Find the gradient of $A B$. A rough sketch will help.
2. Repeat question 1 for the following pairs of points.
(a) $\mathrm{C} 2,3$ and D 7,18.
(b) E 0,3 and F 7,-17.
(c) $\mathrm{G}-1,3$ and $\mathrm{H} 4,0$.
3. Find the length of the curved arc in each of these sectors.
(a)

(b)

4. Calculate the area of each of these sectors.
(a)

(b)

5. Calculate the size of angle $x^{\circ}$ in the sector opposite. The sector has area 20 square cm and radius 5.8 cm .

6. Calculate the volume of the prism sketched below. The cross-section is an equilateral triangle of sides 12 cm .

7. (a) A cylinder has radius 5 cm and height 8 cm . Calculate its volume.
(b) A second cylinder has radius 3 cm and the same volume as the first cylinder. Calculate the height of the second cylinder.
8. (a) A sphere has radius 4 cm . Calculate its volume.
(b) A cone has height 10 cm and the same volume as the sphere. Calculate the radius of the cone.
9. Factorise.
(a) $x^{2}+x-20$
(b) $k^{2}-25$
(c) $4 x^{2}-9 y^{2}$
(d) $1-16 y^{2}$
(e) $x^{2}-8 x+16$
(f) $2 x^{2}-x-6$
10. By first factorising numerator and denominator, simplify each of these fractions:
(a) $\frac{3 x+6}{x^{2}-4}$
(b) $\frac{a^{2}-a-6}{2 a^{2}-5 a-3}$
(c) $\frac{x+7}{x^{2}+6 x-7}$
11. Simplify these surds
(a) $\sqrt{12}$
(b) $\sqrt{18}$
(c) $\sqrt{128}$
(d) $\sqrt{108}$
(e) $\sqrt{75}$
(f) $\sqrt{320}$
12. Rationalise the denominator
(a) $\frac{3}{\sqrt{3}}$
(b) $\frac{15}{\sqrt{5}}$
(c) $\frac{27}{\sqrt{3}}$
13. (a) Express $x^{2}-6 x+13$ in the form $x-a^{2}+b$
(b) Express $x^{2}+2 x+11$ in the form $x+a^{2}+b$
(c) Express $x^{2}-8 x+10$ in the form $x-a^{2}+b$
(d) Express $x^{2}+x+1$ in the form $x+a^{2}+b$
14. Multiply out and simplify:
(a) $4 x-1^{2}$
(b) $3 x+1 \quad x-3-2 x \quad 2 x-1$
(c) $\quad 2 x-3^{2}-x+2^{2}$
(d) $x-2 \quad x^{2}-2 x+3$
