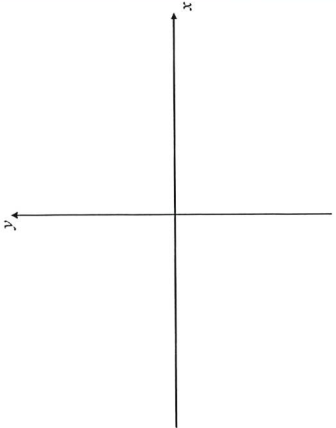


Mixed questions 1

1110. (a) Express $\sqrt{8}$ in the form $a\sqrt{b}$ where a and b are integers. (b) Find x if $x^{\frac{1}{3}} = 8$ (c) Express $8^{-\frac{1}{2}}$ as a fraction (d) Write 8^x as a power of 2	
1111. (i) Simplify $(2 + \sqrt{3})(2 - \sqrt{3})$ (ii) Express $\frac{3}{2 + \sqrt{3}}$ in the form $a + b\sqrt{3}$ where a and b are integers.	
1112. Express $\sqrt{63}$ in the form $a\sqrt{b}$ where a and b are integers.	
1113. Simplify $\frac{x^{-1}}{(x^2)^{-1}}$	
1114. (a) Write the following as powers of 3 (i) $\sqrt{3}$ (ii) 27^x (b) Hence solve the equation $27^x \times 3^{x-1} = \sqrt{3}$	
1115. Express $\frac{5}{\sqrt{7+2}}$ in the form $a + b\sqrt{7}$ where a and b are rational numbers.	
1116. If $2^x = 4\sqrt{2}$ find x.	
1117. Express p in terms of q if $3^p = 27^{q+1}$	
1118. Expand $(x^{\frac{1}{2}} - 3x^{\frac{1}{2}})^2$	

1119. Given $x = 2^m$ and $y = 4^n$ find, in terms of m and n, $16xy$ as a power of 2	
120. Simplify $4x^2 - (6 - x^2)$	
121. Simplify $6x^3y + 3y^2 - 2y(x^2 - x^3 + y)$	
122. Expand $(x^2 + 5x - 3)(3x^2 - 2)$	
123. Expand $(x - 3)^2$	
124. Factorise $10x^3 - 5x^2 + 20x$	
125. Factorise $y^2 - 9$	
126. Factorise $2x^3 - 32x$	
127. Factorise $x^2 + 6x + 8$	
128. Factorise $x^2 - 2x - 15$	
129. Factorise $5x^2 + x - 18$	
130. Factorise $5x^2 - 9x - 18$	
131. Factorise $(x - 2)^2 - 5(x - 2)(x - 1)$	
132. Simplify these fractions: (a) $\frac{6x}{2}$ (b) $\frac{x^3y^2}{x^2y}$ (c) $\frac{9a^2}{6ab}$	
133. Simplify these fractions: (a) $\frac{x+2}{(x+2)(x+1)}$ (b) $\frac{x^2+3x}{x^2-2x-15}$ (c) $\frac{x^2-1}{x^2-7x+6}$	

134. Work out: (a) $\frac{5}{x} + \frac{3}{x}$ (d) $\frac{2}{x-1} + \frac{3}{2x}$	(b) $\frac{x}{2} - \frac{1}{y}$ (e) $\frac{x}{3} + \frac{2}{x}$	(c) $\frac{2}{x} + \frac{2}{y}$ (f) $\frac{1}{x+1} - \frac{2}{x-1}$
135. Write $x^2 + 6x + 8$ in completed square form. Hence solve the equation $x^2 + 6x + 8 = 0$		
136. Complete the square for $3x^2 - 24x + 24$		
137. Solve $x^2 - 5x = 0$		
138. Solve $x^2 - 5 = 0$		
139. Solve $x^2 - x - 12 = 0$		
140. Solve $x^2 = 7 - 2x$ by completing the square. Give the exact answers.		
141. Solve $x^2 - 2x - 1 = 0$ giving the roots in surd form.		

142. Solve $(2x - 5)^2 = 2x$ giving solutions in simplified surd form.	
143. Factorise and complete the square on $x^2 + x - 6$. Sketch the curve of $y = x^2 + x - 6$. Label the intercepts with the axes and the vertex clearly.	
144. Write $2x^2 + 12x + 16$ in the form $a(x + b)^2 + c$	
145. Solve the inequality $3x - 2x^2 \leq 0$	
146. Find both solutions of the equation $x + 3 = \frac{10}{x}$	

147. Find the values of p and q for which
 $x^2 - 6x + p = (x - q)^2 + 4$

148. Solve the pair of equations

$$y - x = 4$$

$$y^2 - 5x^2 = 20$$

Comment on your solution.

149. By substituting $t = x^{\frac{1}{2}}$ find the values of x for which $x - 5x^{\frac{1}{2}} + 6 = 0$

150. Find the range(s) of values of x that satisfy the inequality $x^2 > 2x + 8$

151. Rearrange $y = \frac{x+1}{x-1}$ to find x in terms of y

Mixed questions 2

185. Find the equation of the line through the points $(-2, 11)$ and $(4, 7)$

186. Find the equation of the perpendicular bisector of the line joining the points $(1, 7)$ and $(9, 3)$

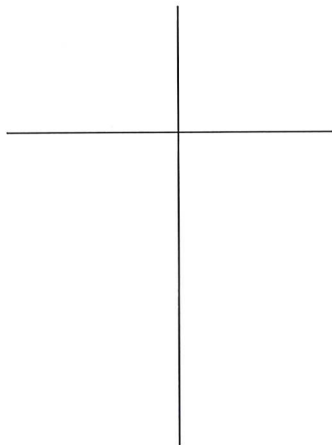
187. The electrical resistance of a wire is inversely proportional to the square of the radius. Given that the resistance is 0.02 ohms when the radius is 0.1 cm, find the resistance when the radius is 0.3 cm. Give your answer to 1 significant figure.

188. Triangle ABC has vertices A $(-1, 2)$, B $(5, 2)$ and C $(4, 9)$. N is the foot of the perpendicular from B to AC. Find: (a) the equation of AC (b) the equation of BN.

189. Show that the line $y = 2x - 7$ touches the curve $y = x^2 - 6$

190. If $f(x) = x^2 + x - 2$

- (i) Find where the curve $y = f(x)$ cuts the axes.
- (ii) By completing the square find the minimum point of $y = f(x)$
- (iii) Sketch $y = f(x)$
- (iv) On the same diagram sketch and label $y = 2f(x)$



191. The coordinates of A, B and C are $(3, -1)$, $(5, 3)$ and $(2, 2)$ respectively. Find the length AB, in the form $a\sqrt{b}$, and the mid-point of AB. Show that ACB is a right angle.

192. $f(x) = x(x-3)^2$ (i) Sketch $y = f(x)$ (ii) On the same diagram sketch $y = f(3x)$.

