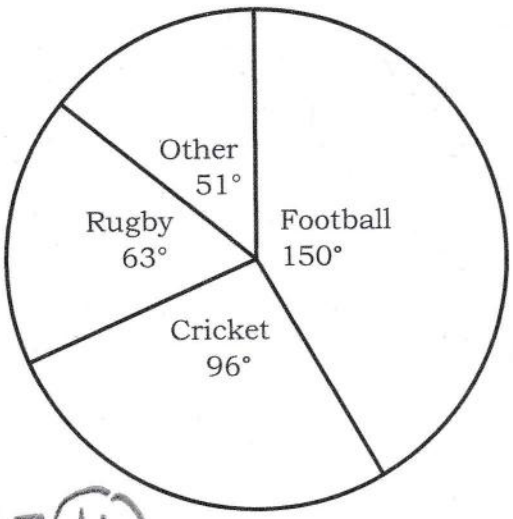
HIGHER TIER
MINI PRACTICE EXAM 6

NON-CALCULATOR
20 MINUTES ALLOWED

1.
120 people were asked their favourite sport.
The results are represented in the pie chart below.



(a) What fraction of the people answered Football? Give your answer in its simplest terms.

$\frac{150}{360} = \frac{15}{36} = \frac{5}{12}$

(2)

(b) How many more people answered Cricket than Rugby?

$C = \frac{96}{360} \times 120 = \frac{96}{3} = 32$

$R = \frac{63}{360} \times 120 = \frac{63}{3} = 21$

$32 - 21 = 11$

(3)

2.
(a) Factorise $x^2 - 64$

$(x-8)(x+8)$

(1)

(b) Factorise $4x^2 + 4x - 15$

$x \cdot -60$
$+ 4$

$4x^2 + 10x - 6x - 15$
$2x(2x+5) - 3(2x+5)$
$(2x-3)(2x+5)$

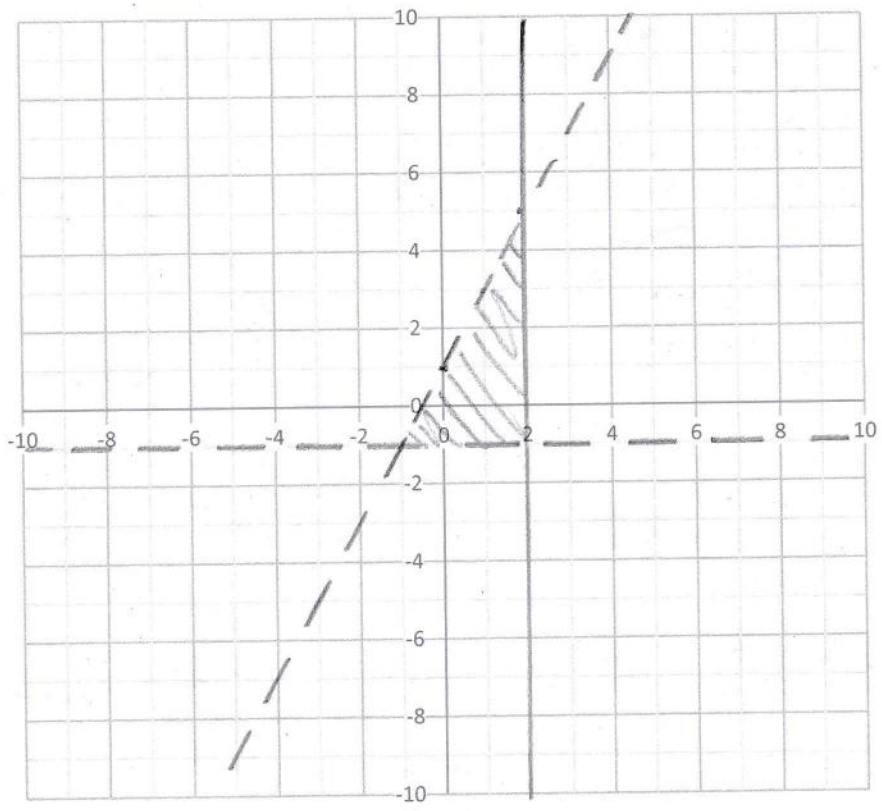
(3)

(c) Complete the square: $x^2 - 6x - 11$

$(x-3)^2 - 11 - 3^2 = (x-3)^2 - 20$

(2)

3.
On the axis below, shade in the region which satisfies the inequalities $y < 2x + 1$, $x \leq 2$ and $y > -1$.



(4)

4.
f and g are functions.

$f(x) = 2x^2 + 1$ $g(x) = 3x - 5$

(a) Find gg(x).

$gg(x) = g(g(x)) = g(3x-5) = 3(3x-5) - 5$
$= 9x - 15 - 5$
$= 9x - 20$

(2)

(b) Find $f^{-1}(x)$.

$y = 2x^2 + 1$
$y - 1 = 2x^2$
$\frac{y-1}{2} = x^2$
$\sqrt{\frac{y-1}{2}} = x$

$f^{-1}(x) = \sqrt{\frac{x-1}{2}}$

(3)