WESLEY COLLEGE
By daring & by doing

YEAR 12 MATHEMATICS SPECIALIST
SEMESTER ONE 2017
QUESTIONS OF REVIEW 2: Functions

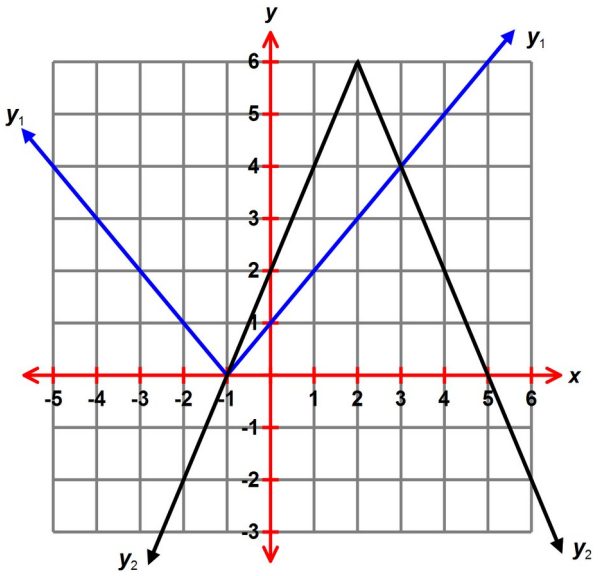
Name: _____

Wednesday 29th March Time: 40 minutes Mark /35

Calculator free.

1. [3 & 3 = 6 marks]

The graphs of y_1 and y_2 are shown on axes to the right.



(a) Use the graph to solve the following equations.

(i) $y_1 = 3$

(ii) $y_2 \geq 0$

(iii) $y_2 < y_1$

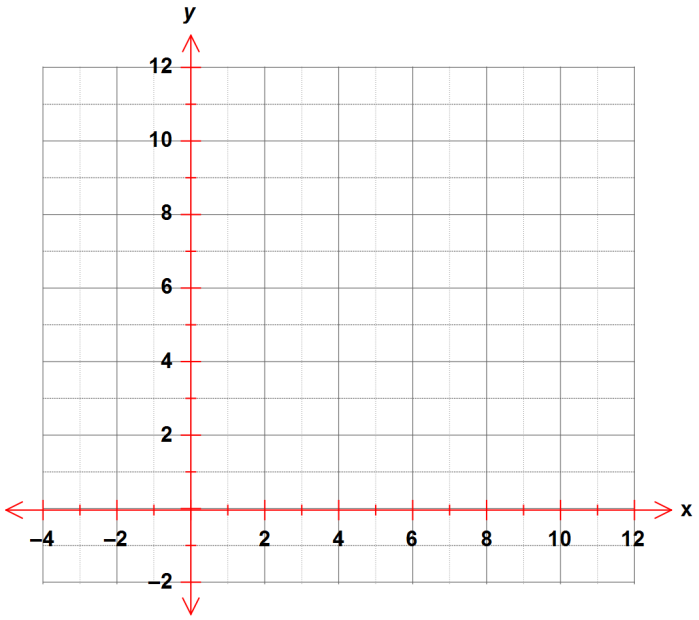
(b) State the equation for the graph of

(i) y_1

(ii) y_2

2. [5 marks]

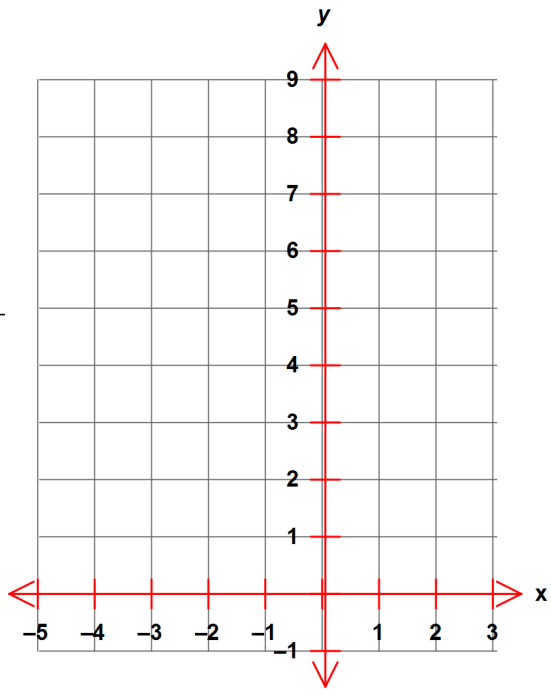
Calculate where $y = |x - 1|$ intersects $y = \frac{x}{2} + 4$.
Represent your solution on the axes provided.



3. [5 marks]

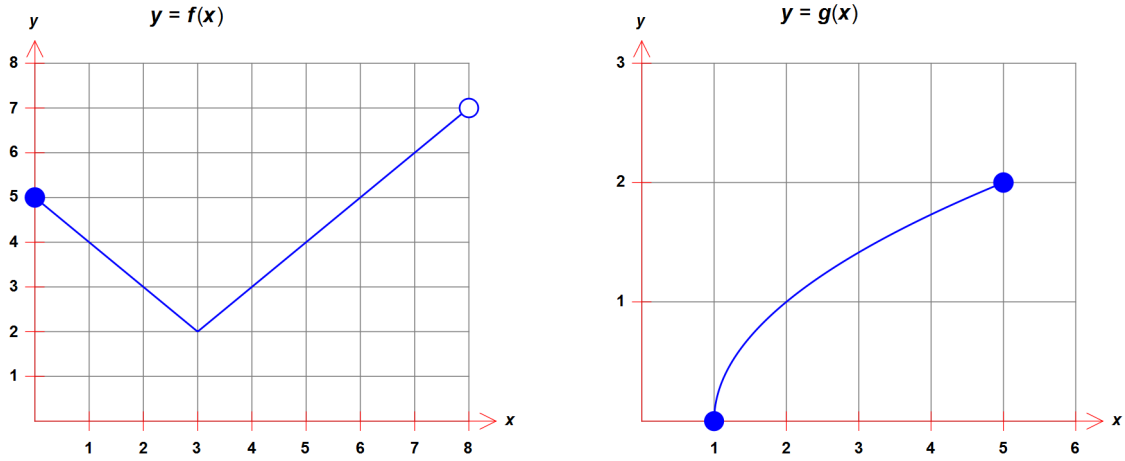
$f(x) = |x|$ and $g(x) = |x + 2|$

Determine a piecewise defined expression for the sum $f(x) + g(x)$ and sketch $y = f(x) + g(x)$ on these axes.



4. [2, 2 & 6 = 10 marks]

The graphs of $y = f(x)$ and $y = g(x)$ are shown.



(a) Does $f(x)$ possess an inverse function? Explain

(b) Find

(i) $g \circ f(3)$

(ii) $f \circ g(5)$

(c) State

(i) the domain of g

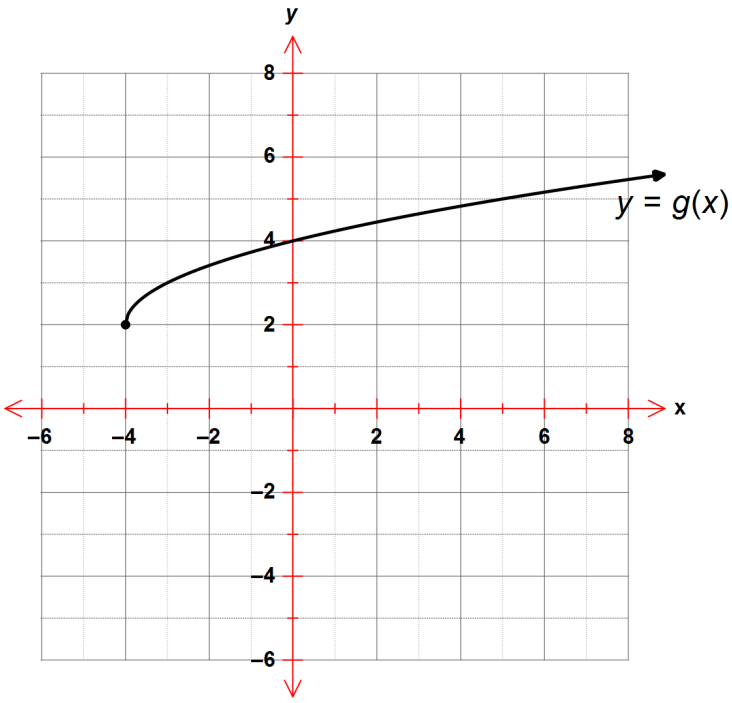
(ii) the range of f

(iii) the maximal range of $f \circ g(x)$

(iv) the maximal domain of $g \circ f(x)$

5. [2, 2, 2, 1 & 2 = 9 marks]

The axes to the right show the graph of $g(x) = \sqrt{x+4} + 2$.



(a) Find the value of $(g \circ f)(1)$ if $f(x) = 2x - 5$.

(b) **(i)** State the range of $g^{-1}(x)$

(ii) State the domain of $g^{-1}(x)$

(c) Find the defining rule for $g^{-1}(x)$ in simplest form.

(d) Is $g^{-1}(x)$ one-to-one?

(e) On the axes above, add a sketch of the graph of $y = g^{-1}(x)$ showing the coordinates of all relevant features clearly.