AQA Qualifications

AQA Level 2 Certificate FURTHER MATHEMATICS

Level 2 (8365)

Worksheet 8

Functions

Version 2.0

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8 Functions

Question 1 (non-calculator)

$f(x) = 2x^3 - 250$

Work out x when $f(x) = 0$ *(3 marks)*

Question 2

$f(x) = x^2 + ax - 8$

$f(-3) = 13$

Work out the value of a. *(3 marks)*

Question 3

$f(x) = x^2 + 3x - 10$

Show that $f(x + 2) = x(x + 7)$ *(3 marks)*

Question 4

Work out the range for each of these functions.

(a) $f(x) = x^2 + 6$ for all x *(1 mark)*

(b) $f(x) = 3x - 5$ $-2 \leqslant x \leqslant 6$ *(2 marks)*

(c) $f(x) = 3x^4$ $x < -2$ *(1 mark)*

Question 5

(a) $f(x) = \frac{x + 2}{x - 3}$

Give a reason why $x > 0$ is **not** a suitable domain for $f(x)$. *(1 mark)*

(b) Give a possible domain for $f(x) = \sqrt{x - 5}$ *(1 mark)*

Question 6

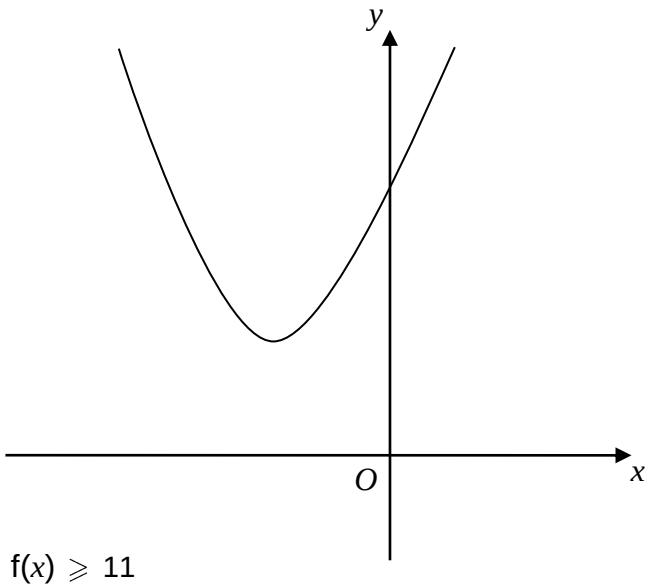
$f(x) = 3 - 2x$ $\quad a < x < b$

The range of $f(x)$ is $-5 < f(x) < 5$

Work out a and b. *(3 marks)*

Question 7

Here is a sketch of $f(x) = x^2 + 6x + a$ for all x, where a is a constant



The range of $f(x)$ is $f(x) \geqslant 11$

Work out the value of a. *(3 marks)*

Question 8

(a) Factorise $x^2 - 5x - 14$ *(2 marks)*

(b) Sketch the function $f(x) = x^2 - 5x - 14$ for all x.

Label the points of intersection with the x and y axes. *(3 marks)*

Question 9

$f(x) = -x^2$ $\quad 0 \leqslant x < 2$

-4 $\quad 2 \leqslant x < 3$

$2x - 10$ $\quad 3 \leqslant x \leqslant 5$

Draw the graph of $f(x)$ for values of x from 0 to 5 *(3 marks)*

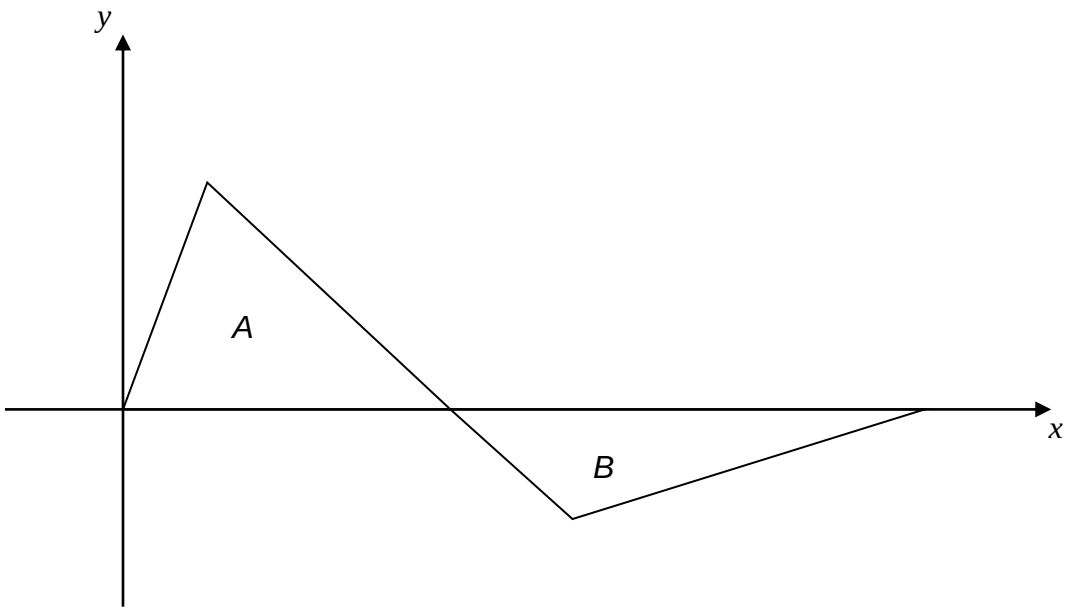
Question 10

Here is a sketch of the function f(x) for values of x from 0 to 7.

f(x) = $2x$ $\quad 0 \leqslant x < 1$

$3 - x$ $\quad 1 \leqslant x < 4$

$\frac{x-7}{3}$ $\quad 4 \leqslant x \leqslant 7$



Show that

area of triangle A : area of triangle B = 3 : 2 *(4 marks)*

Question 11

$f(x) = \frac{\sqrt{x} - a}{2}$ for $x > 0$, where a is a positive constant.

If $f^{-1}(3a) = 306.25$ work out the value of a

(4 marks)

Question 12

$f(x) = \frac{2x-1}{4}$ $\quad g(x) = \frac{5}{x+1}$

Work out fg(x)

Give your answer in the form $\frac{ax+b}{cx+d}$ where a, b, c and d are integers.

(2 marks)

Question 13

$y = f(x)$ is a function.

$\frac{dy}{dx} = (x - 5)(2x + 1)$

Work out the vales of x for which $f(x)$ is decreasing.

Give your answer as an inequality.

(2 marks)