MATHEMATICS DEPARTMENT

Year 11 Methods - Test Number 2 2019

Functions & Equations

Resource Free Section

Name: _____ Teacher: _____

Marks: 23

Time Allowed: 20 minutes

Instructions: You ARE NOT permitted any notes or calculator.

The formula sheet will be provided.

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1. [2, 3, 4, 3 = 12 marks]

a) Solve the following equations:

(i) $12x^2 = 4x.$

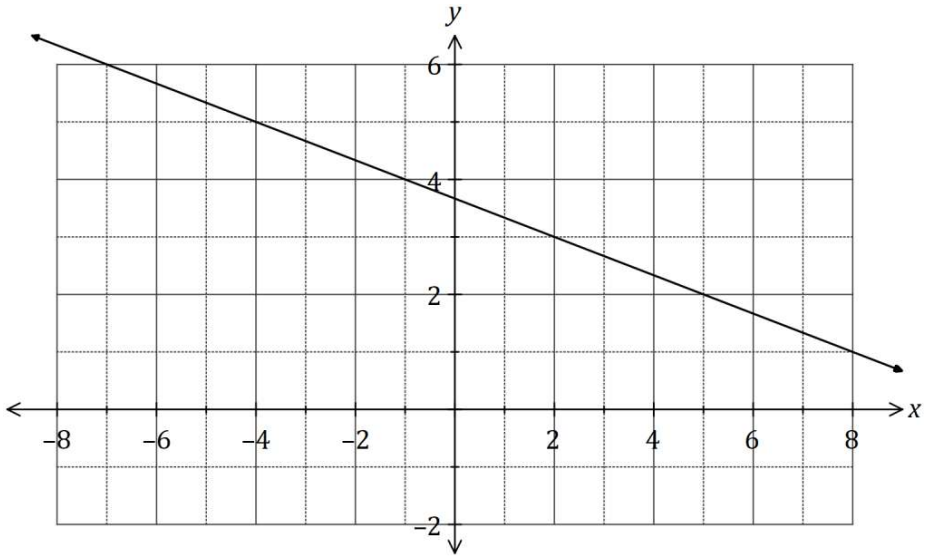
(ii) $x(x-2) = 35.$

b) One solution to the equation $x^3 + 36 = 5x^2 + 12x$ is $x = 2$. Determine all other solutions.

c) The curve $y = x^2 + 4x + 2k$ has two real and different zeroes. Find the value(s) of k.

2. [2, 3 = 5 marks]

The graph of the line L_1 is shown below.



a) Determine the equation of L_1.

Two points are located at $A(-15, 15)$ and $B(9, 27)$.

b) Line L_2 is perpendicular to L_1 and passes through the mid-point of A and B. Determine the equation of L_2.

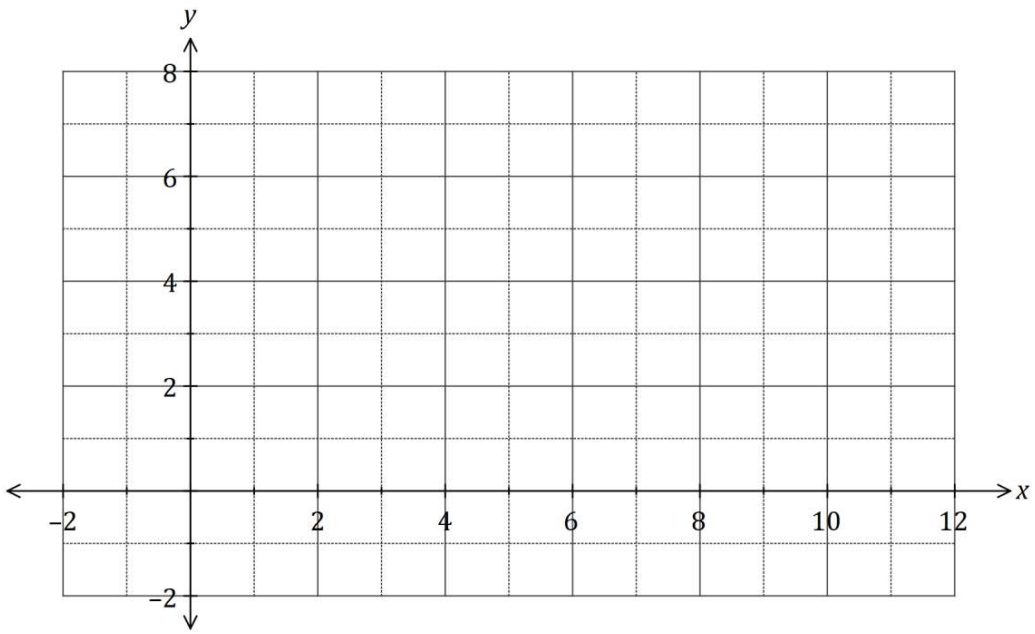
3. [1, 2, 3 = 6 marks]

A function is defined by $f(x) = \sqrt{3x}$.

a) Calculate $f(12)$.

b) State the domain and range of $f(x)$.

c) Sketch the graph of $y = f(x)$ on the axes below.



MATHEMATICS DEPARTMENT

Year 11 Methods - Test Number 2 2019 Functions & Equations

Resource Rich Section

Name: _____ Teacher: _____

Marks: 24

Time Allowed: 25 minutes

Instructions: You ARE allowed calculators but NO notes. The formula sheet will be provided.

You must show your working where appropriate to receive full marks.

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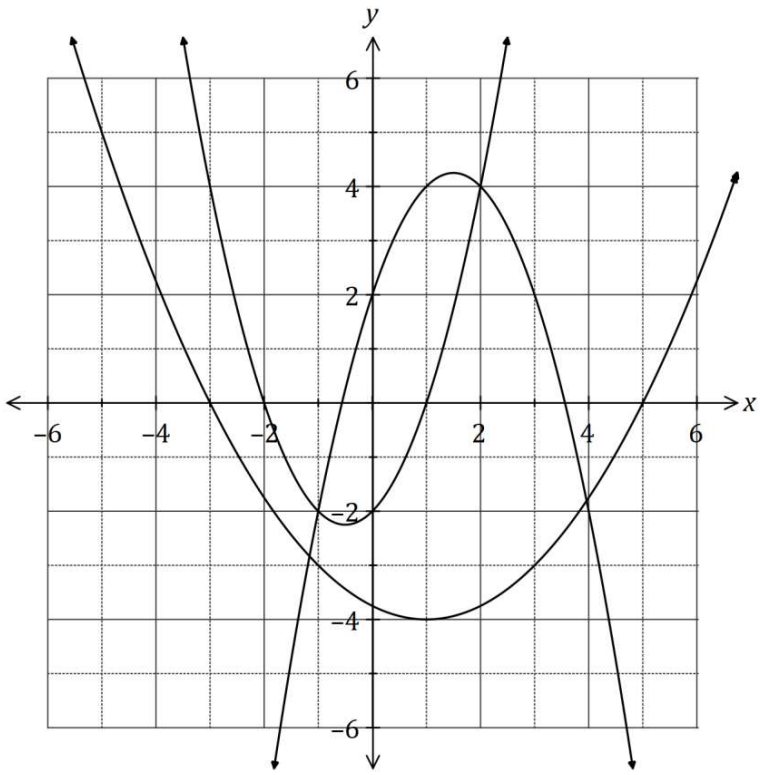
1. [4 marks]

The area of a sector is $\frac{3\pi}{10}\ cm^2$ and the arc length cut off by the sector $\frac{\pi}{5}\ cm$. Find the angle subtended at the centre of the circle and the radius of the circle.

2. [4 marks]

The graphs of $y = -x^2 + 3x + c$, $y = a(x-1)^2 - 4$ and $y = (x+b)(x+2)$ are shown below.



Determine the values of the constants a, b and c.

3. [2 marks]

Determine the equation of the axis of symmetry for the graph of $y = -2x^2 - 12x - 37$.

(2 marks)

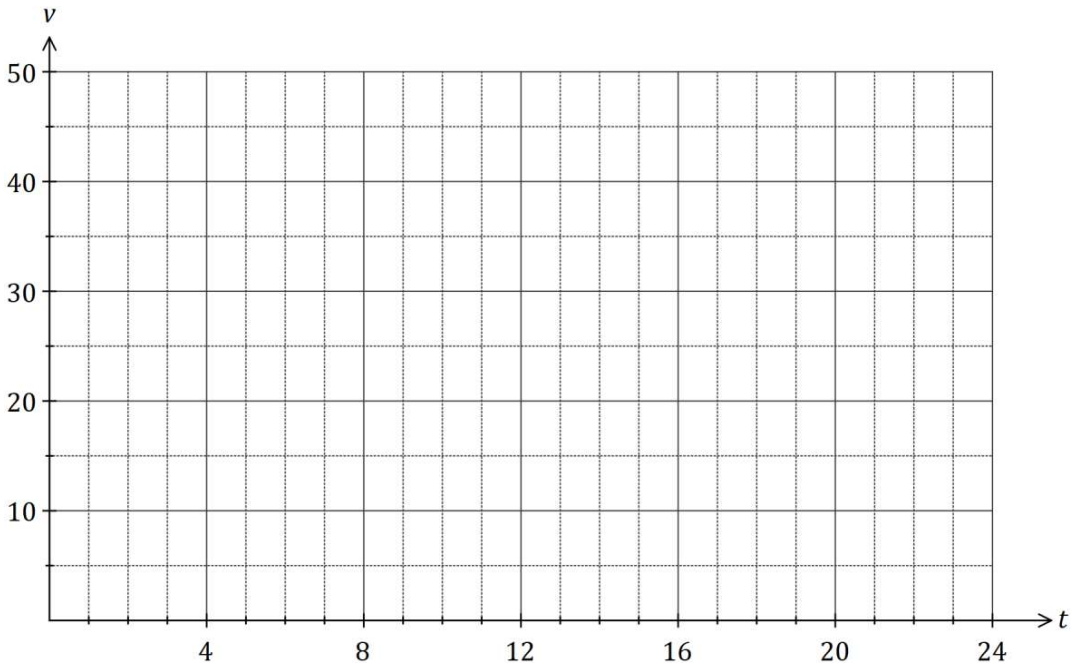
4. [1, 4, 1, 1, 2 = 9 marks]

The wind speed at a weather station, v metres per second, t hours after recording began, can be modelled by the function

$$v = 20 - 5.8t + 0.75t^2 - 0.02t^3, 0 \leq t \leq 24$$

a) Calculate the wind speed when $t = 11$.

b) Sketch the graph of wind speed against time on the axes below.



c) During the 24-hour period, determine

(i) the time at which the wind speed was greatest.

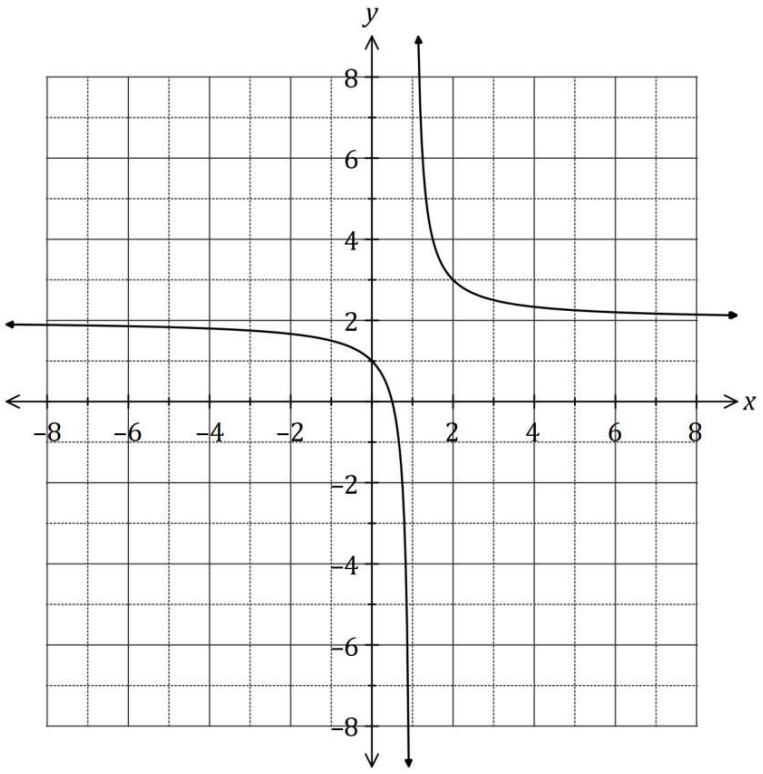
(ii) the minimum wind speed.

(iii) the length of time, in hours and minutes, that the wind speed was increasing.

5. [3, 2 = 5 marks]

Let $f(x) = \frac{2}{4-x}$ and $g(x) = \frac{1}{x+p} + q$, where p and q are constants.

The graph of $y = g(x)$ is shown below.



a) Sketch the graph of $y = f(x)$ on the axes above.

b) Determine the values of p and q.

****End of Test****