
1

$$3kx^2 + (k+8)x + 3 = 0$$

has two distinct real roots.

[4]

①

[3]

[illegible]

[3]

[illegible]

3

1

Solve the equation $|2x - 3| = |5x + 2|$.

[3]

(b) Hence solve the equation $|2 \sec \theta - 3| = |5 \sec \theta + 2|$ for $\pi < \theta < 2\pi$. Give your answer correct to 3 significant figures. [3]

[3]

7

$$p(x) = 2x^4 + kx^3 + kx^2 + 17x + 18,$$

where k is a constant. It is given that $(x+2)$ is a factor of $p(x)$.

(a) Find the value of k .

[2]

[illegible]

It is given that the equation $p(x) = 0$ has exactly two real roots, denoted by α and β , where α is an integer and β is not an integer.

(b) State the value of α and show that β satisfies the equation $x = \sqrt[3]{-2x-4.5}$.

[4]

[illegible]

(c) Show by calculation that $-1.4 < \beta < -1.0$.

[2]

This image shows a full page of white paper with ten horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and extend across the entire width of the page. There is no text or other markings on the paper.

(d) Use an iterative formula, based on the equation in part **(b)**, to find the value of β correct to 3 significant figures. Give the result of each iteration to 5 significant figures. [3]

[3]

[illegible]

- 2

(a) Show that the equation $\log_4(2x+1) = 2\log_4(3x-1) - 2$ can be written as a quadratic equation in x . [3]

[illegible]

- (b)

Hence solve the equation $\log_4(2x+1) = 2\log_4(3x-1) - 2$. [2]

This image shows a blank sheet of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no other markings or text on the page.

10

(a) Express $f(x)$ in partial fractions.

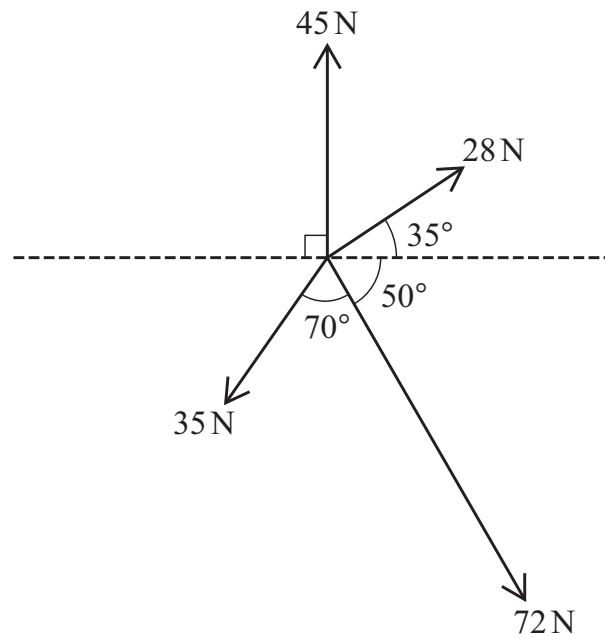
[6]

[illegible]

(b) Hence obtain the expansion of $f(x)$ in ascending powers of x , up to and including the term in x^2 . [5]

[illegible]

3



Coplanar forces of magnitudes 45 N, 28 N, 72 N and 35 N act at a point in the directions shown in the diagram.

Find, in either order, the magnitude and direction of the resultant force.

[6]

[illegible]

- 7

(a) Find the acceleration of P when $t = 2$.

[2]

[illegible]

- (b)** Find the total distance travelled by P in the first 3 seconds of its motion.

[5]

[illegible]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There is no handwriting or other markings on the paper.

[2]

3 The back-to-back stem-and-leaf diagram shows the annual salaries, in dollars, of 27 employees at each of two companies, Browns and Greens.

Browns									Greens								
(3)	9 8 4							30	6	8	(2)						
(7)	8	8	5	3	3	1	0	31	2	4	5	8	(4)				
(7)	9	7	6	4	2	2	0	32	3	6	6	7	9	(5)			
(6)	8 7 5				5	3	1	33	1	1	3	7	8	8	9	9	(8)
(3)	4 2 2						34	0	2	3	5	6	9	(6)			
(1)	7							35	3	7	(2)						

Key: 6|32|7 means \$32 600 for Browns and \$32 700 for Greens.

(a) Find the median and interquartile range for the annual salaries of employees at Browns. [3]

The annual salary of an employee at Browns is denoted by x thousand dollars and the annual salary of an employee at Greens is denoted by y thousand dollars. It is given that, for the 27 employees at each of the companies,

$\sum x = 878.3, \sum x^2 = 28\,616.09, \sum y = 896.5, \sum y^2 = 29\,815.63.$

(b) Find the mean and standard deviation of the annual salaries of these 54 employees. [5]

- 1** The random variables X and Y have independent distributions $X \sim \text{Po}(3)$ and $Y \sim \text{Po}(2)$ respectively.

(a) Find $P(2 < X < 5)$.

[2]

[illegible]

(b) Find $P(X + Y > 2)$.

[3]

[illegible]

- (c) The total of 100 random values of X and 150 random values of Y is denoted by T .

Use a suitable approximating distribution to find $P(T < 560)$.

[4]

[illegible]