JABATAN PENDIDIKAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MALAYSIA NEGERI SELANGOR

MODUL PINTAS (MP)
TINGKATAN 5, 2017

3472/1

ADDITIONAL MATHEMATICS
Kertas 1
September

2 jam

Dua jam

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

1. *Tulis* **nombor kad pengenalan**, **angka giliran**, **nama** *dan* **tingkatan** *anda pada petak yang disediakan.*
2. *Kertas peperiksaan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas peperiksaan ini.*

Untuk Kegunaan Pemeriksa		
Kod Pemeriksa :		
Soalan	Markah Penuh	Markah Diperoleh
1	2	
2	2	
3	3	
4	4	
5	3	
6	3	
7	4	
8	4	
9	3	
10	3	
11	3	
12	3	
13	3	
14	3	
15	3	
16	4	
17	3	
18	3	
19	4	
20	3	
21	4	
22	3	
23	4	
24	3	
25	3	
Jumlah	80	

Kertas peperiksaan ini mengandungi 31 halaman bercetak dan 1 halaman tidak bercetak.

  [Lihat halaman sebelah

For Examiner's Use

Answer **all** questions.
Jawab **semua** *soalan.*

1 A set of five numbers has a mean of 8.
Satu set lima nombor mempunyai min 8.

When a number, k, is added to this set, the new mean is 7·5.
Find the value of k. [2 *marks*]

Apabila satu nombor, k, *ditambah ke dalam set nombor ini, min baru ialah* 7·5.
Cari nilai k. [2 *markah*]

Answer / *Jawapan*:

1
2

  [Lihat halaman sebelah

For Examiner's Use

2 A village consists of 12 000 residents. It is found that 7 800 of the residents are adults. Find the standard deviation of adults in the village. [2 *marks*]

Sebuah kampung mempunyai 12 000 *penduduk. Didapati bahawa* 7 800 *orang daripada penduduk ialah orang dewasa.*
Cari sisihan piawai bagi orang dewasa di kampung itu. [2 *markah*]

Answer / *Jawapan*:

2

2

For Examiner's Use

3 Given the word "PRIVATE".
Diberikan perkataan "PRIVATE".

Find
Cari

(*a*) the number of ways of arranging all the letters,
bilangan cara untuk menyusun semua abjad,

(*b*) the number of ways of arranging all the letters so that the letter A and E are side by side.
bilangan cara untuk menyusun semua abjad itu supaya abjad A *dan* E *berada sebelah-menyebelah.*

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

3

3

  [Lihat halaman sebelah

4 Bag X contains 4 balls numbered 3, 4, 5 and 6. Bag Y contains 3 balls numbered 4, 5 and 7. A ball is removed randomly from each bag.

Beg X mengandungi 4 *biji bola bernombor* 3, 4, 5 *dan* 6. *Beg Y mengandungi* 3 *biji bola bernombor* 4, 5 *dan* 7. *Sebiji bola dikeluarkan secara rawak dari setiap beg.*

Find the probability that both balls

Cari kebarangkalian bahawa kedua-dua bola itu

(*a*) are of the same number,

adalah nombor yang sama,

(*b*) have a total of not more than 10.

mempunyai jumlah tidak lebih daripada 10.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

4

4

For Examiner's Use

5 Given that $\int_{-2}^{m} (2x - 5)\mathrm{d}x = 10$, where $m > 0$, find the value of m. [3 *marks*]

Diberi bahawa $\int_{-2}^{m} (2x - 5)\mathrm{d}x = 10$, di mana $m > 0$, cari nilai bagi m. [3 *markah*]

Answer / *Jawapan*:

5

3

  [Lihat halaman sebelah

6 To secure the job that Eric applied for, he needs to sit for four tests with a mean score of at least 75. The scores for the earlier three tests are 65, 75 and 70.

What is the minimum score for the fourth test so that Eric can secure the job?

[3 *marks*]

Untuk memastikan Eric mendapat pekerjaan yang dipohon, dia perlu mengambil empat ujian dengan skor min sekurang-kurangnya 75. Skor bagi tiga ujian yang lebih awal ialah 65, 75 dan 70.

Berapakah skor minimum bagi ujian keempat supaya Eric berjaya mendapatkan pekerjaan itu?

[3 *markah*]

Answer / *Jawapan*:

6

3

For Examiner's Use

7 Due to the high living cost, Kenny has planted several types of vegetables for his own consumption on an empty rectangular plot of land beside his house. He wants to fence the land which has the measurement of $12x$ m and $(4 - x)$ m.

Find the length, in m, of the fence he has to buy when the area of the land is maximum. [4 *marks*]

Akibat daripada peningkatan kos sara hidup, Kenny telah menanam beberapa jenis sayur untuk kegunaan sendiri di kawasan lapang berbentuk segi empat tepat di sebelah rumahnya. Dia ingin memagar kawasan itu yang berukuran $12x$ m *dan* $(4 - x)$ m.

Cari panjang, dalam m, *pagar yang perlu dia beli apabila luas kawasan itu adalah maksimum.* [4 *markah*]

Answer / *Jawapan*:

7

4

  [Lihat halaman sebelah

For Examiner's Use

8 Diagram 8 shows a straight line PQ with the equation $-\frac{x}{12} - \frac{y}{3k} = 1$.

Rajah 8 menunjukkan satu garis lurus PQ yang mempunyai persamaan $-\frac{x}{12} - \frac{y}{3k} = 1$.

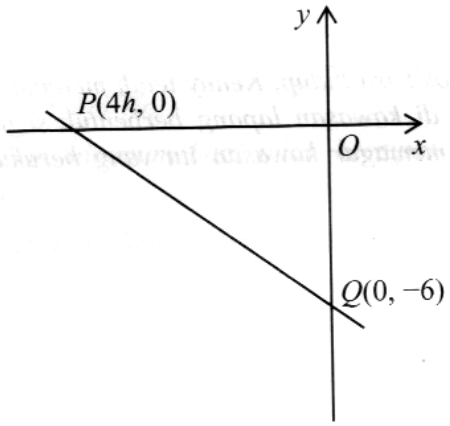


Diagram 8
Rajah 8

Determine the value of
Tentukan nilai

(*a*) h,

(*b*) k.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

8
4

For Examiner's Use

9 Given the points (–3, 1), (k, 3) and (0, –1) are collinear.
Find the value of k. [3 *marks*]

Diberi titik-titik (–3, 1), (k, 3) *dan* (0, –1) *adalah segaris.*
Cari nilai k. [3 *markah*]

Answer / *Jawapan*:

9
3

  [Lihat halaman sebelah

10 Given vector $\underset{\sim}{a} = \begin{pmatrix} 6 \\ -5 \end{pmatrix}$ and vector $\underset{\sim}{b} = \begin{pmatrix} -2 \\ 8 \end{pmatrix}$. If $\underset{\sim}{a} + \underset{\sim}{b} = \begin{pmatrix} 2p \\ q-6 \end{pmatrix}$, where p and q are constants, find the value of p and of q. [3 *marks*]

Diberi vektor $\underset{\sim}{a} = \begin{pmatrix} 6 \\ -5 \end{pmatrix}$ *dan vektor* $\underset{\sim}{b} = \begin{pmatrix} -2 \\ 8 \end{pmatrix}$. *Jika* $\underset{\sim}{a} + \underset{\sim}{b} = \begin{pmatrix} 2p \\ q-6 \end{pmatrix}$, *dengan keadaan p dan q ialah pemalar, cari nilai p dan nilai q.* [3 *markah*]

Answer / *Jawapan*:

10

3

For Examiner's Use

11 Given the functions $g : x \to \frac{2x-8}{3}$ and $h : x \to x + 6$, find

Diberi fungsi $g : x \to \frac{2x-8}{3}$ *dan* $h : x \to x + 6$, *cari*

(*a*) $g^{-1}(x)$,

(*b*) the value of x such that $g^{-1}(x) = h(x)$.
nilai x dengan keadaan $g^{-1}(x) = h(x)$.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

11
3

  [Lihat halaman sebelah

12 Given $f(x) \rightarrow x + 10$, find

Diberi $f(x) \rightarrow x + 10$, *cari*

(*a*) $f(4)$,

(*b*) the value of x such that $\frac{1}{2} f^{-1}(x) = f(4)$.

nilai x *dengan keadaan* $\frac{1}{2} f^{-1}(x) = f(4)$.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

12

3

For Examiner's Use

13 The information given refers to the functions f and g.

Maklumat yang diberi adalah berkaitan dengan fungsi f dan g.

$$f : x \rightarrow 8x + 5$$
$$g : x \rightarrow 7 - 4x$$

Find $fg^{-1}(x)$.

Cari $fg^{-1}(x)$.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

13

3

  [Lihat halaman sebelah

14 Solve the equation

Selesaikan persamaan

$$1 + \log_3 x = \log_3 (x + 6)$$

[3 *marks*]
[3 *markah*]

Answer /*Jawapan*:

14

3

For Examiner's Use

15 Solve the equation

Selesaikan persamaan

$$3^{2x} - 3^{2x-2} = 24$$

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

15

3

[Lihat halaman sebelah

16 The variables x and y are related by equation $y = \left(\frac{k}{x^b}\right)^2$, where b and k are constants.

Diagram 16 shows the straight line graph obtained by plotting $\log_{10} y$ against $\log_{10} x$.

Pembolehubah x dan y dihubungkan dengan persamaan $y = \left(\frac{k}{x^b}\right)^2$, *dengan keadaan b dan k ialah pemalar.*

Rajah 16 *menunjukkan graf garis lurus yang diperoleh dengan memplot* $\log_{10} y$ *melawan* $\log_{10} x$.

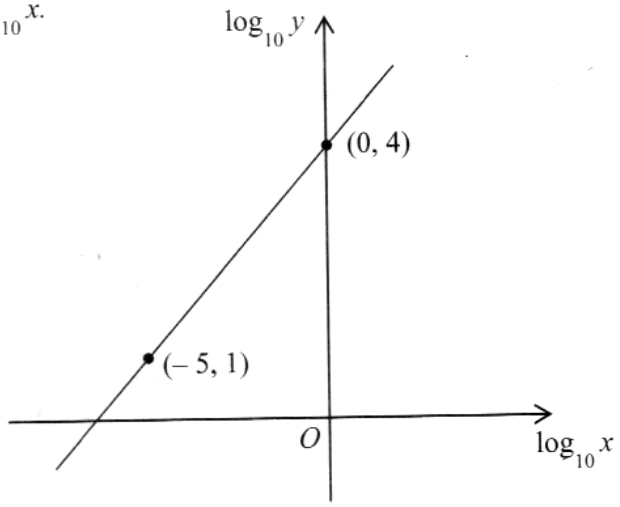


Diagram 16
Rajah 16

Find the value of k and of b.
Cari nilai k dan nilai b.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

16

4

For Examiner's Use

17 Given α and β are the roots of the equation $2x^2 + 3x - 5 = 0$, where $\alpha > \beta$, find the value of $\alpha - \beta$. [3 *marks*]

Diberi α *dan* β *ialah punca-punca persamaan* $2x^2 + 3x - 5 = 0$, *dengan keadaan* $\alpha > \beta$, *cari nilai bagi* $\alpha - \beta$. [3 *markah*]

Answer / *Jawapan*:

17

3

  [Lihat halaman sebelah

18 Find the range of values of x for $x(2x + 5) < 12$. [3 *marks*]

Cari julat nilai-nilai x bagi $x(2x + 5) < 12$. [3 *markah*]

Answer / *Jawapan*:

18

3

For Examiner's Use

19 Diagram 19 shows a circle with centre *O*.
Rajah 19 *menunjukkan bulatan dengan pusat O.*

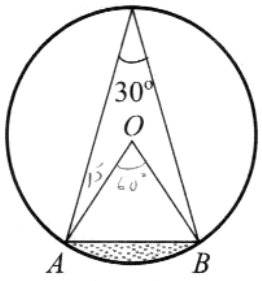


Diagram 19
Rajah 19

Given the radius of the circle is 15 cm.
Diberi jejari bulatan itu ialah 15 cm.

[Use / *Guna* $\pi = 3{\cdot}142$]

Find
Cari

(*a*) area of sector *OAB*,
luas sektor OAB,

(*b*) the area of the shaded segment.
luas tembereng berlorek.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

19

4

[Lihat halaman sebelah

20 Given that $\sin \theta = q$, where q is a constant and $90° < \theta < 270°$.

Diberi bahawa $\sin \theta = q$, *di mana q ialah satu pemalar dan* $90° < \theta < 270°$.

Find in terms of q,

Cari dalam sebutan q,

(*a*) $\tan \theta$,

(*b*) $\cos 2\theta$.
kos 2θ.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

20

3

For Examiner's Use

21 The probability that a student is a school prefect is 0·3.
Five students are chosen at random.

Kebarangkalian bahawa seorang murid ialah pengawas sekolah ialah 0·3.
Lima orang murid telah dipilih secara rawak.

Find the probability that

Cari kebarangkalian bahawa

(*a*) none of them is a school prefect,
tiada seorang pun di antara mereka adalah pengawas sekolah,

(*b*) only two of them is a school prefect.
hanya dua daripada mereka adalah pengawas sekolah.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

21

4

  [Lihat halaman sebelah

22 Diagram 22 shows a standard normal distribution graph.

Rajah 22 menunjukkan satu graf taburan normal piawai.

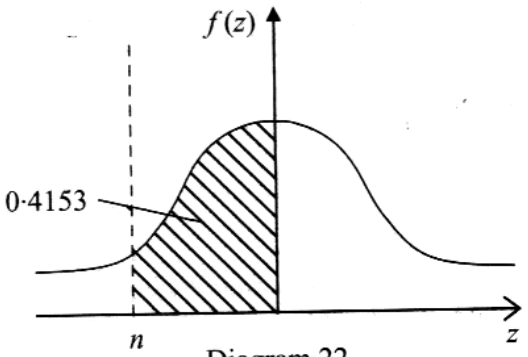


Diagram 22

Rajah 22

The probability presented by the area of the shaded region is 0·4153.

Kebarangkalian yang diwakili oleh luas kawasan berlorek ialah 0·4153.

(*a*) Find the value of n,

Cari nilai n,

(*b*) X is continuous random variable which normally distributed with a mean of 85 and a standard deviation of 5.

Find the value of X when the z-score is n.

X ialah pembolehubah rawak selanjar yang tertabur secara normal dengan min 85 *dan sisihan piawai* 5.

Cari nilai X apabila skor-z ialah n.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

22

3

For Examiner's Use

23 Find the least number of terms of the geometric progressions 5, 6, 7·2, … which must be taken for the total to exceed 100. [4 *marks*]

Cari bilangan sebutan terendah bagi janjang geometri 5, 6, 7·2, … *yang mesti diambil supaya hasil tambahnya melebihi* 100. [4 *markah*]

Answer / *Jawapan*:

23

4

  [Lihat halaman sebelah

For Examiner's Use

24 Two variables, x and y are related by the equation $y = x + \frac{1}{x}$.
Find the approximate change in the value of y when x changes from 2 to 2·05.
[3 *marks*]

Dua pembolehubah x *dan* y *dihubungkan oleh persamaan* $y = x + \frac{1}{x}$.
Cari perubahan kecil bagi nilai y *apabila* x *berubah daripada* 2 *kepada* 2·05.
[3 *markah*]

Answer / *Jawapan*:

24
3

For Examiner's Use

25 Find the value of constant k for which $\frac{d}{dx}\left(\frac{3x+4}{x-2}\right) = \frac{k}{(x-2)^2}$. [3 *marks*]

Cari pemalar k dengan keadaan $\frac{d}{dx}\left(\frac{3x+4}{x-2}\right) = \frac{k}{(x-2)^2}$. [3 *markah*]

Answer / *Jawapan*:

25

3

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

  [Lihat halaman sebelah

1.

$\bar{x} = \frac{\Sigma x}{N}$

$8 = \frac{40}{5}$

$40 = 40$

$\frac{40+k}{6} = 7.5$

$40 + k = 7.5 \times 6$

$40 + k = 45$

$k = 45 - 40$

$k = 5$

2.

$\sigma = 52.25$

n = Residute = 12000

Adult = 7800

$p = P(\text{adult}) = \frac{7800}{12000}$

$p = 0.65$

$q = 0.35$

$\sigma = \sqrt{npq}$

$= \sqrt{12000(0.65)(0.35)}$

$= \sqrt{2730}$

$= 52.25$

3. (a) P R I V A T E

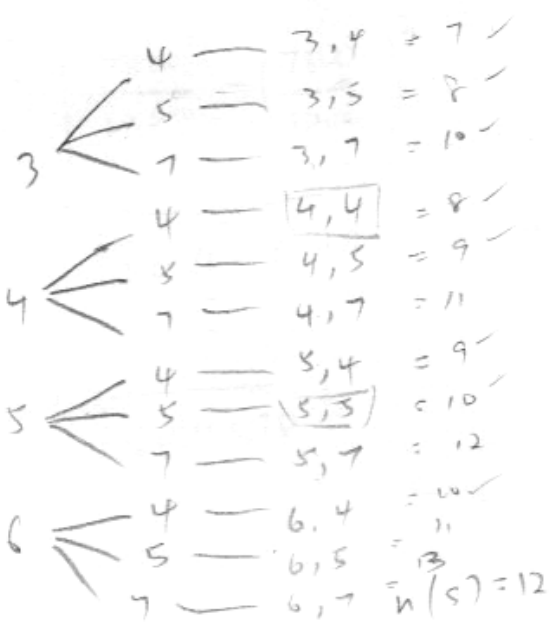
$= 7!$

$= 5040$

(b) 1440

4.

(a)



$P = (\text{same number}) = \frac{2}{12}$

$= \frac{1}{6}$

(b)

$P = (\text{total} \leq 10) = \frac{8}{12}$

$= \frac{2}{3}$

5.

$$\int_{-2}^{M} (2x-5)\,dx = 10$$

$$\left[\frac{2x^2}{2} - 5x\right]_{-2}^{M} = 10$$

$$\left[x^2 - 5x\right]_{-2}^{M} = 10$$

$$M^2 - 5M - (-2)^2 - 5(-2) = 10$$

$$M^2 - 5M - 4 - 10 - 10 = 0$$

$$M^2 - 5M - 24 = 0$$

$(M \quad +3)$
$(M \quad -8)$

$$(M+3)(M-8) = 0$$

$M+3=0$ $\qquad$ $M-8=0$

$M = -3$ $\qquad$ $M = 8$

rejected

$\therefore M = 8$

6.

$$\frac{65+75+70+x}{4} \leq 75$$

$$210 + x = 300$$

$$x < 300 - 210$$

$$x = 90$$

∴ the minimum score 4th test is 90

7.

$y = (4-x)12x$

$y = 48x - 12x^2$

$\frac{dy}{dx} = 48 - 24x$

$\frac{dy}{dx} = 0$

$48 - 24x = 0$

$-24x = -48$

$x = \frac{-48}{-24}$

$x = 2$

Perimeter $= [12(2) + (4-2)]$

$= (24 + 2)2$

$= 52$ m

8.

(a) $M = -\frac{3k}{12}$

$= -\frac{-6}{4h}$

Comparing $-\frac{3k}{12} = \frac{6}{4h}$

$-\frac{3(2)}{12} = \frac{6}{4h}$

$-\frac{1}{2} = \frac{6}{4h}$

$4h = 6 \times (-2)$

$h = -12/4$

$h = -3$

(b) $-3k = -6$

$k = 2$

9.

$$m = \frac{1-(-1)}{-3-0}$$

$$= -\frac{2}{3}$$

$$y = mx + c$$

$$-1 = -\frac{2}{3}(0) + c$$

$$-1 = c$$

Equation of collinear : $y = -\frac{2}{3}x - 1$

$$y = -\frac{2}{3}x - 1$$

$$3 = -\frac{2}{3}k - 1$$

$$4 = -\frac{2}{3}k$$

$$4 \times \left(-\frac{3}{2}\right) = k$$

$$k = -6$$

10.

$$\underset{\sim}{a}+\underset{\sim}{b} = \begin{pmatrix} 6+(-2) \\ -5+(8) \end{pmatrix}$$

$$= \begin{pmatrix} 4 \\ 3 \end{pmatrix}$$

Comparing:

$$\begin{pmatrix} 4 \\ 3 \end{pmatrix} = \begin{pmatrix} 2p \\ q-6 \end{pmatrix}$$

$4 = 2p$

$2 = p$

$3 = q-6$

$9 = q$

11.

(a) $g(x) = \frac{2x-8}{3}$

$g^{-1}(x) = \frac{3x+8}{2}$

Let $y = \frac{2x-8}{3}$

$3y = 2x - 8$

$3y + 8 = 2x$

$\frac{3y+8}{2} = x$

(b)

$g^{-1}(x) = h(x)$

$\frac{3x+8}{2} = x + 6$

$3x + 8 = 2x + 12$

$3x - 2x = 12 - 8$

$x = 4$

12.

(a)

$f(x) = x + 10$

$f(4) = 4 + 10$

$= 14$

(b)

$f(x) = x + 10$

Let :

$y = x + 10$

$y - 10 = x$

$\therefore f^{-1}(x) = x - 10$

$\frac{1}{2} f^{-1}(x) = f(4)$

$\frac{1}{2}(x - 10) = 14$

$x - 10 = 28$

$x = 38$

13.

$g(x) = 7 - 4x$

Let

$y = 7 - 4x$

$4x = 7 - y$

$x = \frac{7-y}{4}$

$g^{-1}(x) = \frac{7-x}{4}$

$fg^{-1}(x) = f[g^{-1}(x)]$

$= f\left(\frac{7-x}{4}\right)$

$= 2\left(\frac{7-x}{4}\right) + 5$

$= 14 - 2x + 5$

$fg^{-1}(x) = 19 - 2x$

14.

$$1 + \log_3 x = \log_3 (x+6)$$

$$\log_3 3 + \log_3 x = \log_3 (x+6)$$

$$\log_3 3x = \log_3 (x+6)$$

$$3x = x+6$$

$$2x = 6$$

$$x = 3$$

15.

$$3^{2x} - 3^{2x-2} = 24$$

$$3^{2x} - \frac{3^{2x}}{3^2} = 24$$

$$3^{2x} - \frac{3^{2x}}{9} = 24$$

$$3^{2x}\left(1 - \frac{1}{9}\right) = 24$$

$$3^{2x}\left(\frac{8}{9}\right) = 24$$

$$3^{2x} = 24\left(\frac{9}{8}\right)^3$$

$$3^{2x} = 27$$

$$3^{2x} = 3^3$$

$$2x = 3$$

$$x = \frac{3}{2}$$

16.

$$y = \left(\frac{k}{x^b}\right)^2$$

$$\log_{10} y = \log_{10}\left(\frac{k}{x^b}\right)^2$$

$$= 2\left[\log_{10}\frac{k}{x^b}\right]$$

$$= 2\left[\log_{10} k - \log_{10} x^b\right]$$

$$\log_{10} y = 2\left[\log_{10} k - b\log_{10} x\right]$$

$$= 2\log_{10} k - 2b\log_{10} x$$

$$\log_{10} y = -2b\log_{10} x + 2\log_{10} k$$

$$Y = MX + C$$

$$k = 2\log_{10} k = 4$$

$$\log_{10} k = 2$$

$$k = \log_{10}^{-1} 2$$

$$k = 100$$

$$M = \frac{4-1}{0-5} = -\frac{3}{5}$$

$$-2b = -\frac{3}{5}$$

$$b = -\frac{3}{5} \times \frac{1}{2}$$

$$b = -\frac{3}{10}$$

17.

$$2x^2 + 3x - 5 = 0$$

$$(2x+5)(x-1) = 0$$

$$x = -\frac{5}{2} \qquad x = 1$$

$$\alpha > \beta$$

$$\alpha = 1, \quad \beta = -\frac{5}{2}$$

$$\alpha - \beta$$

$$= 1 - \left(-\frac{5}{2}\right)$$

$$= \frac{7}{2}$$

18.

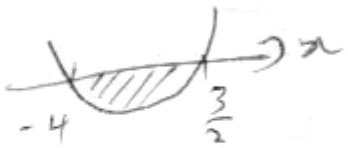
$x(2x+5) < 12$

$2x^2 + 5x - 12 < 0$

$(2x - 3)(x+4) = 0$

$2x - 3 < 0 \qquad x + 4 < 0$

$x < \frac{3}{2} \qquad x < -4$



∴ range of value of x =

$-4 < x < \frac{3}{2}$

19.

(a) $60° \times \frac{\pi}{180}$

$= 60° \times \frac{3.142}{180°}$

$= 1.047$ rad

Area $\angle OAB = \frac{1}{2} r^2 \theta$

$= \frac{1}{2}(15)^2(1.047)$

$= 117.79\ cm^2$

(b) $\frac{1}{2} r^2 \theta - \frac{1}{2} r^2 \sin \theta$

$= 117.79 - \frac{1}{2}(15)^2 \sin 60°$

$= 117.79 - 97.43$

$= 20.36\ cm^2$

20.

(a) $\frac{-q}{\sqrt{1-q^2}}$

(b) $1 - 2q^2$

21.

(a) $(P = 0) = {}^nC_r\, p^r q^{n-r}$

$= {}^5C_0\, (0.3)^0 (0.7)^5$

$= 0.1681$

(b) $(P = 2) = {}^nC_r\, p^r q^{n-r}$

$= {}^5C_2\, (0.3)^2 (0.7)^3$

$= 0.3087$

22.	(a) $n_1 = -1.374$ (b) $x = 78.13$
23.	$n = 9$
24.	$y = x + \frac{1}{x}$ $y = \left[x + \frac{1}{x}\right]_{2}^{2.05}$ $= \left(2.05 + \frac{1}{2.05}\right) - \left(2 + \frac{1}{2}\right)$ $= 2.5315 - 2.5$ $y = 0.0315$
25.	$k = -10$