

Tiga sebutan pertama suatu jangjang aritmetik ialah $p, 8$ dan q .

[2 markah/marks]

Cari nilai $p+q$.

Ty BS A.P.

The first three terms of an arithmetic progression are $p, 8$ and q .

Find the value of $p+q$.

A.P.

$$\begin{aligned}d &= T_2 - T_1 \\ &= T_3 - T_2\end{aligned}$$

$$8 - p = q - 8$$

$$8 + 8 = q + p$$

$$\therefore p + q = 16$$

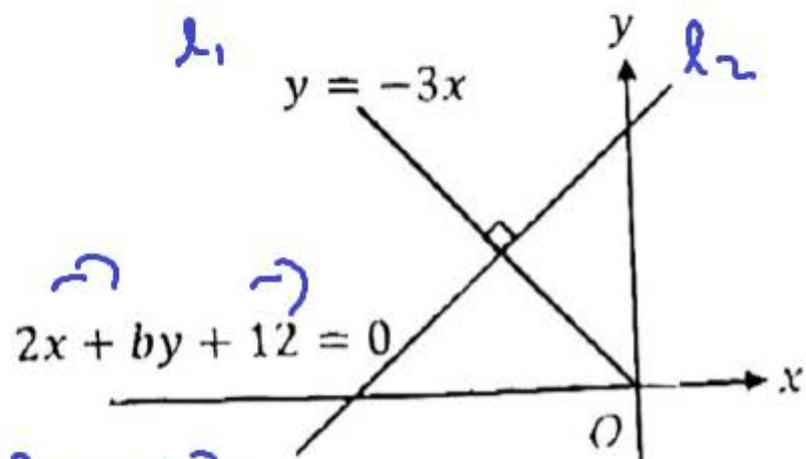
- 2 Rajah 1 menunjukkan dua garis lurus.
Diagram 1 shows two straight lines.

T 4 B 7

$$* b = -6$$

$$m_2 = -\frac{2}{-6}$$

$$= \frac{1}{3}$$



$$by = -2x - 12$$

$$y = -\frac{2}{b}x - \frac{12}{b}$$

Cari nilai b .

Find the value of b .

Rajah 1 / Diagram 1

[3 markah/marks]

$$m_1 = -3$$

$$m_2 = -\frac{2}{b}$$

$$m_1 \times m_2 = -1 \quad (\perp)$$

$$-3 \cdot \left(-\frac{2}{b}\right) = -1$$

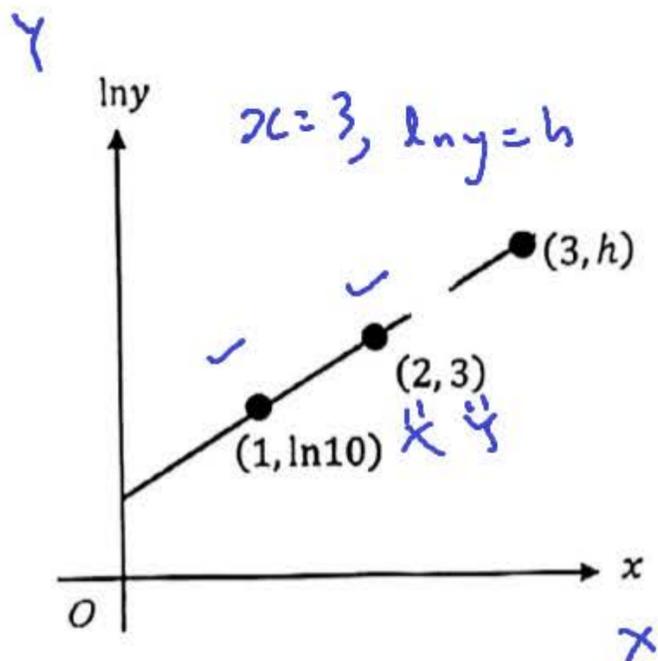
$$6 = -b$$

$$b = -6 \quad \#$$

3 Rajah 2 menunjukkan graf garis lurus lny melawan x yang melalui titik-titik (1, ln 10), (2, 3) dan (3, h).

T4
B6

Diagram 2 shows the graph of a straight line lny against x which passes through points (1, ln 10), (2, 3) and (3, h).



$$m = \frac{3 - \ln 10}{2 - 1} = (3 - \ln 10)$$

$$Y = (3 - \ln 10)x + c$$

$$3 = (3 - \ln 10)(2) + c$$

$$3 = 6 - 2 \ln 10 + c$$

$$c = 2 \ln 10 - 3$$

$$Y = (3 - \ln 10)x + 2 \ln 10 - 3$$

$$\ln y = (3 - \ln 10)x + 2 \ln 10 - 3$$

Diberi bahawa pemboleh ubah x dan y dihubungkan oleh persamaan $y = ka^x$. Cari nilai a, nilai k dan nilai h. Berikan jawapan anda kepada integer terdekat.

Given that the variables x and y are connected by the equation $y = ka^x$. Find the value of a, of k and of h. Give your answer to the nearest integer.

[4 markah/marks]

$$y = ka^x$$

$$\ln y = \ln(ka^x)$$

$$\ln y = \ln k + x \ln a$$

$$\ln y = (\ln a)x + \ln k$$

$$Y = mX + c$$

$$y = 5(2^x)$$

$$\ln y = (\ln 2)x + \ln 5$$

$$h = (\ln 2)(3) + \ln 5$$

$$= 3.689$$

$$\approx 4$$

$$\ln a = (3 - \ln 10)$$

$$a = e^{3 - \ln 10}$$

$$= 2$$

$$\ln k = 2 \ln 10 - 3$$

$$k = e^{2 \ln 10 - 3}$$

$$= 5$$

$$e^{3 - \ln(10)}$$

2.008553692

$$e^{2 \ln(10) - 3}$$

4.978706837

$$3 \ln(2) + \ln(5)$$

3.688879454

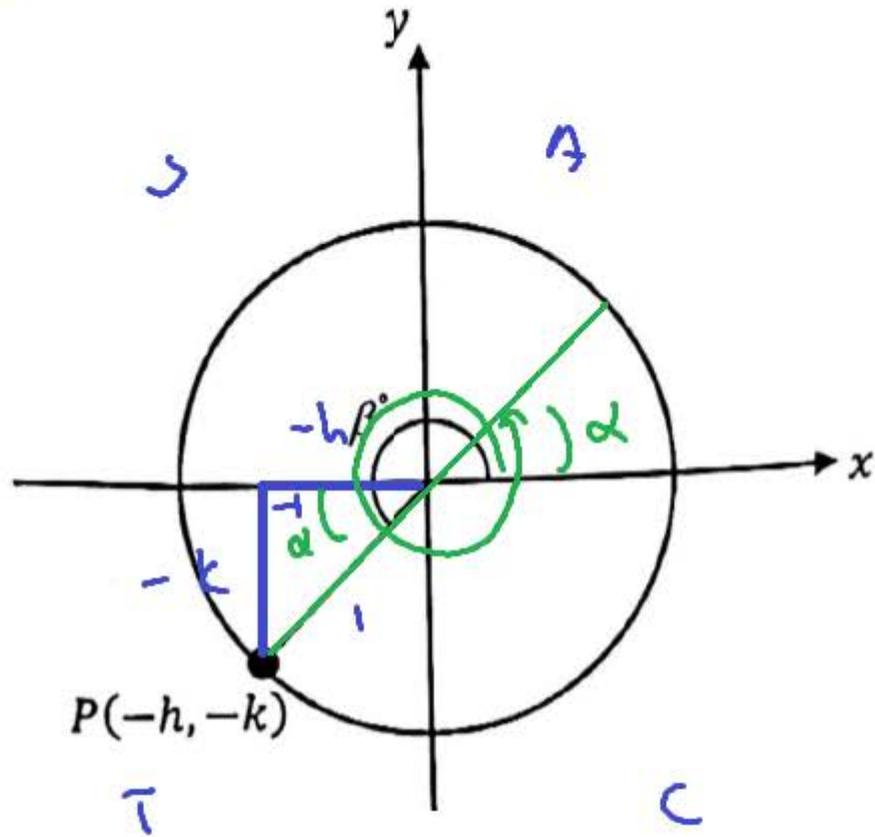
$$x=3, \ln y=h$$

4 Rajah 3 menunjukkan titik P yang terletak pada lilitan sebuah (bulatan unit) $r = 1$

T5
B6

Diagram 3 shows point P lies on the circumference of a (unit circle.)

$\tan(180^\circ)$	▲
	0



$$(i) \quad \tan \beta = \frac{-k}{-h} = \frac{k}{h}$$

$$(ii) \quad \tan(180^\circ + \beta) = \frac{\tan 180^\circ + \tan \beta}{1 - \tan 180^\circ \tan \beta}$$

$$= \frac{\frac{k}{h}}{1 - 0} = \frac{k}{h}$$

$$\cot(180^\circ + \beta) = \frac{1}{\tan(180^\circ + \beta)}$$

$$= \frac{1 \times h}{\frac{k}{h} \times h}$$

$$= \frac{h}{k}$$

Ungkapkan dalam sebutan h dan / atau k bagi

Express in terms of h and / or k of

(a) $\tan \beta$,

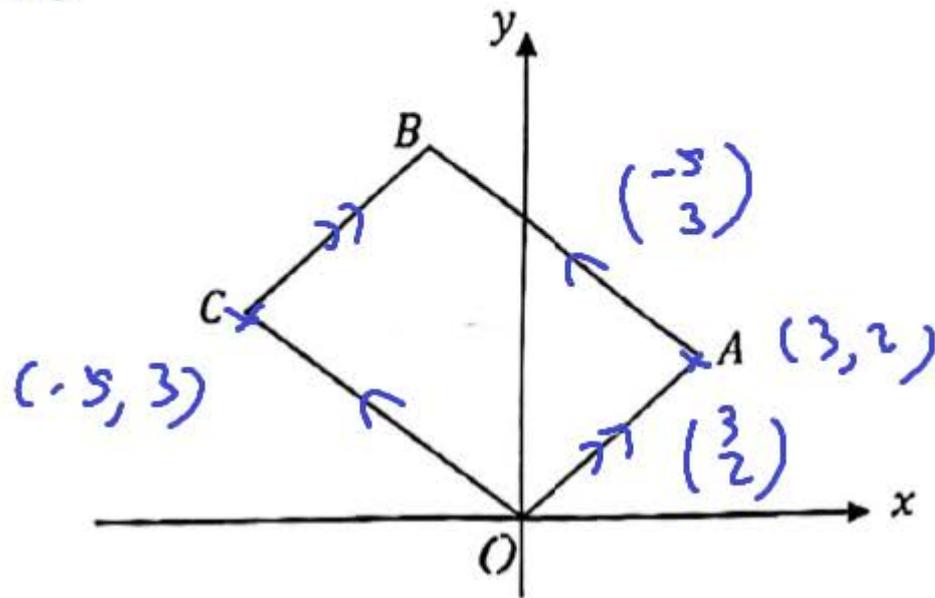
(b) $\cot(180^\circ + \beta)$.

$\cot(180^\circ + \beta)$.

[2 markah/mark]

5 Rajah 4 menunjukkan sebuah segi empat selari OABC dilukis pada suatu satah Cartesan.

74
88
Diagram 4 shows a parallelogram OABC drawn on a Cartesian plane.



$$\begin{aligned} (a) \quad \vec{AC} &= \vec{AB} + \vec{BC} \\ &= \begin{pmatrix} -5 \\ 3 \end{pmatrix} + \begin{pmatrix} -3 \\ -2 \end{pmatrix} \\ &= \begin{pmatrix} -8 \\ 1 \end{pmatrix} \\ &= -8\mathbf{i} + \mathbf{j} \end{aligned}$$

$$\begin{aligned} (b) \quad |\vec{AC}| &= \sqrt{(-8)^2 + 1^2} \\ &= \sqrt{65} \end{aligned}$$

Diberi bahawa vektor $\vec{OA} = 3\mathbf{i} + 2\mathbf{j}$ dan $\vec{AB} = -5\mathbf{i} + 3\mathbf{j}$.

Cari

It is given that vector $\vec{OA} = 3\mathbf{i} + 2\mathbf{j}$ and $\vec{AB} = -5\mathbf{i} + 3\mathbf{j}$.

Find

(a) \vec{AC} ,

[2 markah/marks]

(b) vektor unit pada arah \vec{AC} .

the unit vector in the direction \vec{AC} .

[2 markah/marks]

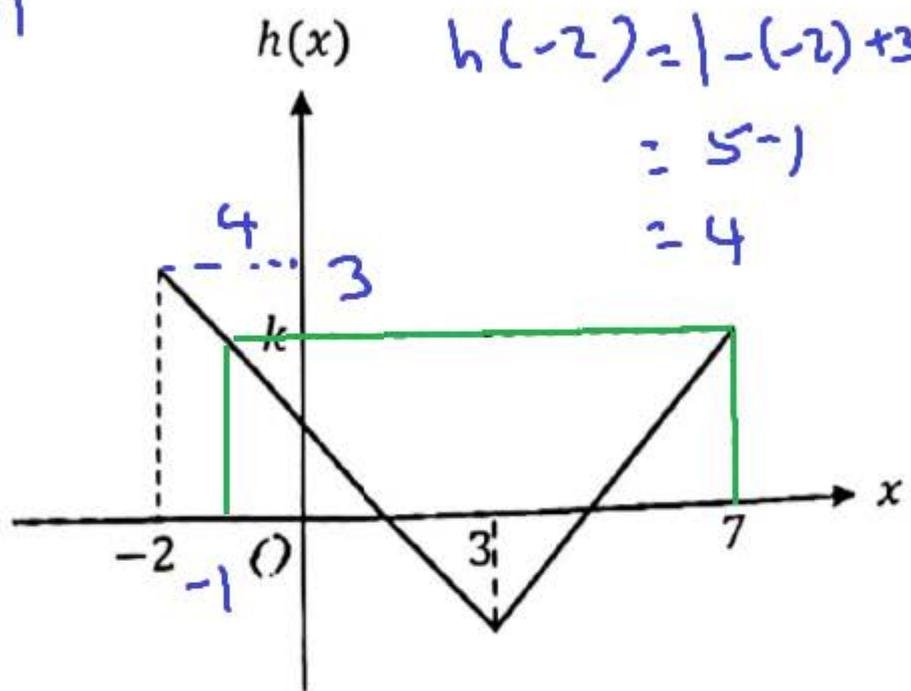
$\frac{1}{\sqrt{65}}$ vektor unit pada arah \vec{AC} .

$$\begin{aligned} &= \frac{1}{\sqrt{65}} (-8\mathbf{i} + \mathbf{j}) \\ &= -\frac{8\sqrt{65}}{65}\mathbf{i} + \frac{\sqrt{65}}{65}\mathbf{j} \end{aligned}$$

- 6 (a) Rajah 5 menunjukkan graf bagi fungsi $h(x) = |-x+3|-1$ untuk domain $-2 \leq x \leq 7$.
 [LIHAT HALAMAN SEBELAH]

Diagram 5 shows the graph of the function $h(x) = |-x+3|-1$ for domain $-2 \leq x \leq 7$.

14
31



$$h(-2) = | -(-2) + 3 | - 1$$

$$= 5 - 1$$

$$= 4$$

$$h(7) = k$$

$$h(x) = 3$$

$$| -7 + 3 | - 1 = k$$

$$| -x + 3 | - 1 = 3$$

$$k = 4 - 1$$

$$= 3$$

$$| -x + 3 | = 4$$

$$-x + 3 = \pm 4$$

$$-x + 3 = 4$$

$$-x + 3 = -4$$

$$3 - 4 = x$$

$$3 + 4 = x$$

$$x = -1$$

$x = 7$
(rejected)

Cari nilai objek yang satu lagi bagi k .
 Find the value of the other object of k .

[2 markah/marks]

(b) Diberi bahawa fungsi $h: x \rightarrow 3x+1$ dan $kh: x \rightarrow 9x^2+6x+5$, cari

[4 markah/marks]

T4
B1
Given that the functions $h: x \rightarrow 3x+1$ and $kh: x \rightarrow 9x^2+6x+5$, find

- (i) nilai m jika $h^{-1}(m-1)=3$,
nilai m jika $h^{-1}(m-1)=3$,

(ii) $k(x+1)$. \rightarrow
 $h^{-1}(m-1)=3$

(i) $m-1 = h(3)$
 $m = 3(3)+1 + 1$
 $= 11$

check

$$\begin{aligned}kh(x) &= k(3x+1) \\ &= (3x+1)^2 + 4 \\ &= 9x^2 + 6x + 1 + 4 \\ &= 9x^2 + 6x + 5\end{aligned}$$

(ii) $k(3x+1) = 9x^2 + 6x + 5$

let $u = 3x+1$ then $x = \frac{u-1}{3}$

$$\begin{aligned}k(u) &= 9\left(\frac{u-1}{3}\right)^2 + 6\left(\frac{u-1}{3}\right) + 5 \\ &= 9\left(\frac{u^2-2u+1}{9}\right) + 2u-2+5 \\ &= u^2 + 4\end{aligned}$$

$$k(u) = u^2 + 4$$

$$k(x) = x^2 + 4$$

$$\begin{aligned}k(x+1) &= (x+1)^2 + 4 \\ &= x^2 + 2x + 1 + 4 \\ &= x^2 + 2x + 5\end{aligned}$$

(i) $h^{-1}(m-1)=3$ $h: x \rightarrow 3x+1$

let $h(y) = x$ then $h^{-1}(x) = y$

$$3y+1 = x$$

$$3y = x-1$$

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

$$\therefore h^{-1}(x) = \frac{x-1}{3}$$

$$h^{-1}(m-1) = 3$$

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

$$m-2 = 9$$

$$m = 11 \quad \checkmark$$

(ii) $h: x \rightarrow 3x+1$ dan $kh: x \rightarrow 9x^2+6x+5$

$$k(x) = kh(h^{-1}(x))$$

$$= kh\left(\frac{x-1}{3}\right)$$

$$= 9\left(\frac{x-1}{3}\right)^2 + 6\left(\frac{x-1}{3}\right) + 5$$

$$= 9\left(\frac{x^2-2x+1}{9}\right) + 2x-2+5$$

$$k(x) = x^2 + 4 \quad \checkmark$$

7 (a) Rajah 6 menunjukkan lengkung $y = \frac{p}{(3x-1)^2}$. Garis lurus $y = -mx + 8$ ialah

TS
B2

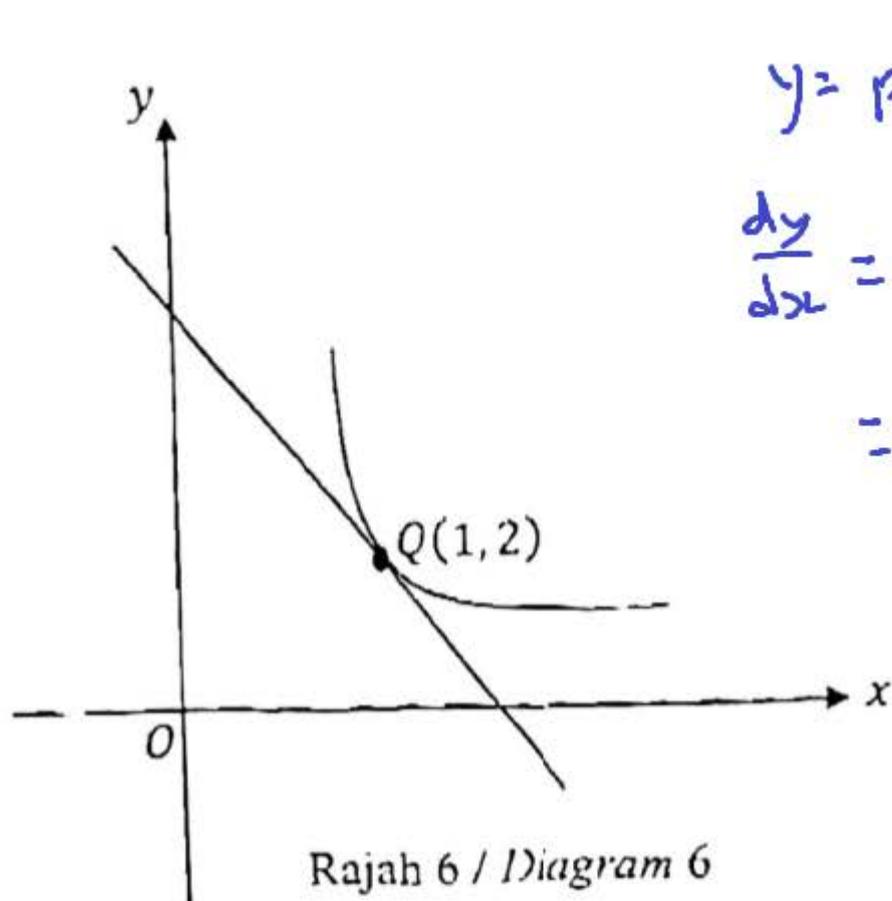
tangen kepada lengkung pada $Q(1, 2)$.

$\frac{dy}{dx}$

Diagram 6 shows the curve $y = \frac{p}{(3x-1)^2}$. The straight line $y = -mx + 8$ is

tangent to the curve at $Q(1, 2)$.

$$y = -mx + 8$$



$$y = p(3x-1)^{-2}$$

$$\frac{dy}{dx} = -2p(3x-1)^{-3} (3)$$

$$= \frac{-6p}{(3x-1)^3}$$

$$\left. \frac{dy}{dx} \right|_{x=1} = \frac{-6p}{(3-1)^3}$$

$$= \frac{-6p}{8}$$

$$= \frac{-3p}{4}$$

$$m_T = -m$$

$$+ \frac{3p}{4} = +m$$

$$p = \frac{4m}{3} \neq$$

Ungkapkan p dalam sebutan m .

Express p in terms of m .

[3 markah/marks]

(b) Diberi fungsi kuadratik $f(x) = x^2 + 2rx + 3r - 2$, dengan keadaan r ialah pemalar,

T4
32 adalah positif apabila $h < r < k$. $a=1, b=2r, c=3r-2$

Cari nilai h dan nilai k .

Given the quadratic function $f(x) = x^2 + 2rx + 3r - 2$, where r is a constant, is always positive when $h < r < k$.

Find the value of h and of k .

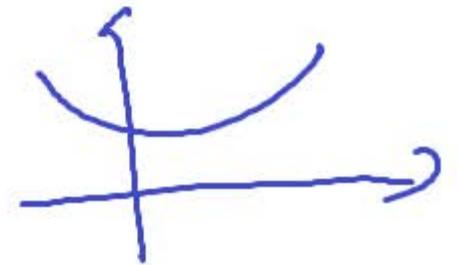
[3 markah/marks]

$$b^2 - 4ac = (2r)^2 - 4(1)(3r - 2)$$

$$= 4r^2 - 12r + 8$$

always positive
(no real roots)

$$b^2 - 4ac < 0$$



$$4r^2 - 12r + 8 < 0$$

$$r^2 - 3r + 2 < 0$$

$$(r - 1)(r - 2) < 0$$

$$\text{C.v. } r=1, r=2$$

$$1 < r < 2$$



- (c) Diberi bahawa persamaan kuadratik $ax^2 - 5bx + 4a = 0$, dengan keadaan a dan b ialah pemalar, mempunyai dua punca yang sama. $b^2 - 4ac = 0$

14
B2

Cari $a : b$.

It is given that the $ax^2 - 5bx + 4a = 0$, where a and b are constants, has two equal roots.

Find $a : b$.

$$a = a, \quad b = -5b, \quad c = 4a$$

[2 markah/marks]

$$(-5b)^2 - 4a(4a) = 0$$

$$25b^2 = 16a^2$$

$$\frac{25}{16} = \frac{a^2}{b^2}$$

$$\left(\frac{5}{4}\right)^2 = \left(\frac{a}{b}\right)^2$$

$$a : b = 5 : 4$$

≠

A.P.

8 Sebutan pertama dan sebutan keenam bagi janjang aritmetik ialah masing-masing 3 dan

74 33. Jika sebutan ketiga dan sebutan kelapan aritmetik ialah sebutan kedua dan ketiga bagi
85 suatu janjang geometri, cari hasil tambah sepuluh sebutan pertama janjang geometri itu.

A.P. *The first term and the sixth term of an arithmetic progression are 3 and 33 respectively. If the third term and the eighth term of the arithmetic are the second and the third term of a geometric progression, find the sum of the first ten terms of the geometric progression.*

[7 markah/marks]

A.P.: $a=3, T_6=33, T_n = a + (n-1)d$

$$33 = 3 + (6-1)(d)$$

$$30 = 5d$$

$$d = \frac{30}{5} = 6$$

$$T_3 = 3 + (3-1)(6) = 15$$

$$T_8 = 3 + (8-1)(6) = 45$$

G.P.: $a, 15, 45, \dots, r = \frac{45}{15} = 3$

$T_2, T_n = ar^{n-1}$

$$T_2 = 15$$

$$15 = a(3)^{2-1}$$

$$a = \frac{15}{3} = 5$$

$\therefore a=5, r=3$

$$S_{10} = \frac{5(3^{10}-1)}{3-1}$$

$$= 147620$$

$\frac{5(3^{10}-1)}{2}$
147620

9 (a) Diberi bahawa $3^a = 27^b = \sqrt[5]{3^{3c}}$, cari $a:b:c$.

T4
B4

Given that $3^a = 27^b = \sqrt[5]{3^{3c}}$, find $a:b:c$.

$$3^a = 3^{3b} = 3^{\frac{3c}{5}}$$

$$a = 3b = \frac{3c}{5}$$

$$a = 3b$$

$$\frac{a}{b} = \frac{3}{1}$$

$$a:b = 3:1$$

$$a = \frac{3c}{5}$$

$$\frac{a}{c} = \frac{3}{5}$$

$$a:c = 3:5$$

[2 markah/marks]

a	b	c
3	1	
3		5
3	1	5

$$a:b:c = 3:1:5$$

(b) Selesaikan $x^5 e^{-3 \ln x} + 4x = 21$.

[3 markah/marks]

74 BY Solve $x^5 e^{-3 \ln x} + 4x = 21$.

$$e^{\ln x} = x$$

$$e^{-3 \ln x} = e^{\ln x^{-3}} = x^{-3}$$

$$x^5 e^{-3 \ln x} + 4x = 21$$

$$x^5 (x^{-3}) + 4x - 21 = 0$$

$$x^2 + 4x - 21 = 0$$

$$(x - 3)(x + 7) = 0$$

$$x = 3$$

$$x = -7$$

(rejection, $x > 0$)

check:

$$3^5 e^{-3 \ln(3)} + 4 \times 3$$

$$x=3 \quad LHS = 21 = RHS$$

Math ERROR

[AC] :Cancel

[◀][▶]:Goto

$$x = -7$$

(c) Permudahkan $\log_2(2x+1) - 5\log_4 x^2 + 4\log_2 x$.

[2 markah/marks]

14
B4

Simplify $\log_2(2x+1) - 5\log_4 x^2 + 4\log_2 x$.

$$\log_2(2x+1) - 5\log_4 x^2 + 4\log_2 x$$

$$= \log_2(2x+1) - 5(2)\log_4 x + 4\log_2 x$$

$$= \log_2(2x+1) - 5\left(\frac{\log_2 x}{2}\right) + 4\log_2 x$$

$$= \log_2(2x+1) - \log_2 x^5 + \log_2 x^4$$

$$= \log_2 \frac{(2x+1)x^4}{x^5}$$

$$= \log_2 \frac{2x+1}{x}$$

$$\begin{aligned} \log_4 x &= \frac{\log_2 x}{\log_2 4} \\ &= \frac{\log_2 x}{\log_2 2^2} \\ &= \frac{\log_2 x}{2} \end{aligned}$$

10 (a) Diberi $y = (x - 1)^4$. Jika x bertambah sebanyak 0.2% apabila $x = 3$, cari
 TS
 BZ
 Given $y = (x - 1)^4$. If x increases by 0.2% when $x = 3$, find

- (i) δy ,
 (ii) peratus perubahan dalam y .
 percentage of change in y .

[4 markah/marks]

(i) $x = 3$, $\delta x = 3 \times \frac{0.2}{100}$
 $\delta x = 0.006$
 $x + \delta x = 3 + 0.006 = 3.006$

$$\frac{\delta y}{\delta x} \approx \frac{dy}{dx}$$

$$\begin{aligned} \delta y &\approx \frac{dy}{dx} \cdot \delta x \\ &= 32(0.006) \\ &= \underline{0.192} \end{aligned}$$

$$\frac{dy}{dx} = 4(x-1)^3$$

$$\begin{aligned} \frac{dy}{dx} \Big|_{x=3} &= 4(3-1)^3 \\ &= 32 \end{aligned}$$

32×0.006
0.192

(ii) $x = 3$, $y = (3-1)^4$
 $= 16$

% perubahan y
 $= \frac{0.192}{16} \times 100\%$
 $= 1.2\%$

new $y = (3.006 - 1)^4$

$$= 2.006^4$$

16.19286573

$\frac{0.192}{16} \times 100$
1.2

(b) Tunjukkan bahawa titik $(0,1)$ pada lengkung $y = x^4 - 4x^3 + 1$ adalah suatu

[2 markah/marks]

Titik lengkok balas. $\bar{x}=0$

Show that point $(0,1)$ on the curve $y = x^4 - 4x^3 + 1$ is a (point of inflection) $\Rightarrow \frac{d^2y}{dx^2} = 0$

$$\frac{dy}{dx} = 4x^3 - 12x^2$$

$$\frac{d^2y}{dx^2} = 12x^2 - 24x$$

$$\left. \frac{dy}{dx} \right|_{x=0} = 4(0) - 12(0) = 0$$

$$\left. \frac{d^2y}{dx^2} \right|_{x=0} = 12(0) - 24(0) = 0$$

$\therefore (0,1)$ ialah Titik lengkok balas.

$$\frac{dy}{dx} = 0 \rightarrow \frac{d^2y}{dx^2} = \begin{matrix} +ve & \text{min} \\ -ve & \text{max} \end{matrix}$$

$F_6 = 0$ Titik lengkok balas.

10 (c) Suatu lengkung mempunyai fungsi kecerunan $kx - 6$, dengan keadaan k ialah pemalar. Diberi titik minimum bagi lengkung itu ialah $(3, -5)$, cari nilai k .

75
33

Seterusnya, cari pintasan- y bagi lengkung itu.

A curve has a gradient function $kx - 6$, where k is a constant. Given that the minimum point of the curve is $(3, -5)$, find the value of k .

Hence, find the y -intercept of the curve.

[3 markah/marks]

$$\frac{dy}{dx} = 2x - 6$$

$$y = \int (2x - 6) dx$$

$$= \frac{2x^2}{2} - 6x + c$$

x y
" "
, (3, -5)

$$-5 = 3^2 - 6(3) + c$$

$$c = -5 - 9 + 18 = 4$$

$$\therefore y = x^2 - 6x + 4$$

y_i , sub $x=0$, $y = 0 - 0 + 4$
 $y_i = 4$

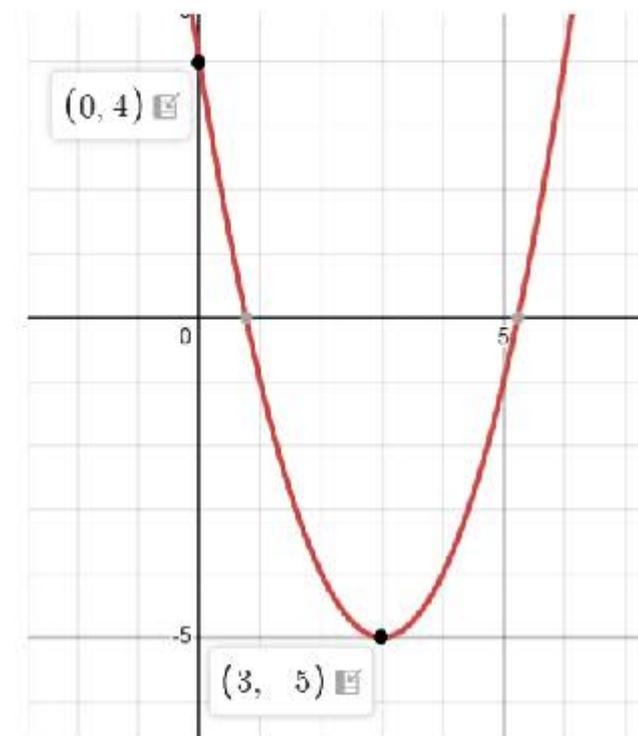
$$\frac{dy}{dx} = kx - 6$$

$$\left. \frac{dy}{dx} \right|_{x=3} = 0$$

$$k(3) - 6 = 0$$

$$3k = 6$$

$$k = 2$$



(0, 4)

- 11 (a) 80% daripada murid SMK Kenanga berminat dalam subjek Matematik. Satu sampel yang terdiri daripada n murid diambil secara rawak dari sekolah tersebut. Jika kebarangkalian bahawa semua murid itu berminat dalam subjek Matematik ialah 0.1342, cari nilai n .

TS
35

80% of pupils in a SMK Kenanga are interested in Mathematics. A sample of n pupils are randomly selected from the school.

If the probability that all the pupils selected are interested in Mathematics is 0.1342, find the value of n .

[3 markah/marks]

$$p = 0.8, \quad n, \quad X \sim B(n, 0.8)$$

$$q = 1 - 0.8 = 0.2$$

$$P(X=n) = 0.1342$$

$${}^n C_n = 1$$

$${}^n C_n \cdot 0.8^n \cdot 0.2^0 = 0.1342$$

$$0.2^0 = 1$$

$$0.8^n = 0.1342$$

$$n \ln 0.8 = \ln 0.1342$$

$$n = \frac{\ln(0.1342)}{\ln(0.8)}$$

9.000591963

(b) Syarikat BCL sedang mencari 4 orang pekerja baharu dalam kalangan 7 orang calon yang menghadiri temuduga. Polisi syarikat tersebut tidak membenarkan suami dan isteri bekerja bersama. Diberi bahawa terdapat sepasang suami isteri dalam kalangan calon.

TS
B4

Company BCL is looking for 4 new employees among 7 candidates attending the interview. The company's policy does not allow husband and wife to work together. Given there is a couple of husband and wife amongst the candidates.

(i) Diberi bahawa bilangan cara berbeza memilih r orang pekerja baharu adalah sama dengan bilangan cara berbeza memilih $(r+3)$ orang pekerja baharu. Cari nilai r .

It is given that the number of different ways of choosing r new employees is equal to the number of different ways choosing $(r+3)$ new employees. Find the value of r .

(ii) Cari bilangan cara yang berbeza untuk memilih pekerja baharu.
Find the number of different ways to select the new employees.

[4 markah/marks]

$${}^7C_r = {}^7C_{r-3}$$

$$\frac{7!}{r!(7-r)!} = \frac{7!}{(r-3)!(7-(r-3))!}$$

$7-r+3 = 10-r$

$$\frac{(10-r)!}{(7-r)!} = \frac{r!}{(r-3)!}$$

$$\frac{(10-r)(9-r)(8-r)(7-r)!}{(7-r)!} = \frac{r(r-1)(r-2)(r-3)!}{(r-3)!}$$

7C_0 1	7C_1 7	7C_2 21	7C_3 35
7C_7 1	7C_6 7	7C_5 21	7C_4 35

$r + r + 3 = 7$
 $2r = 4$
 $r = 2$

b) ${}^7C_4 =$ 7C_4
35

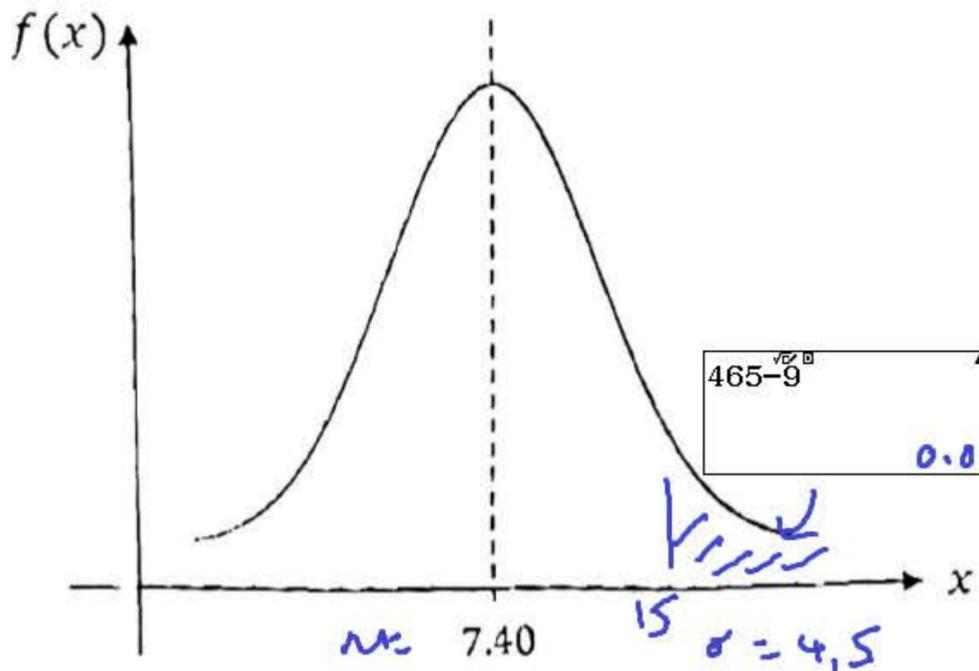
both suami & isteri selected

$7-2=5$
 $4-2=2$

${}^5C_2 =$ 5C_2
10

cara yang berbeza untuk memilih pekerja baharu. = $35 - 10$
= 25

- 12 Rajah 7 menunjukkan sebuah graf taburan wang saku harian pelajar di sebuah sekolah. Wang saku harian bertabur secara normal dengan sisihan piawai RM4.50. σ
 75 Diagram 7 shows a distribution graph of the daily pocket money of students in a school.
 35 The daily pocket money is normally distributed with a standard deviation of RM4.50.



$$x \sim N(7.4, 4.5^2)$$

$$p = P(x > 15)$$

$$= P\left(z > \frac{15 - 7.4}{4.5}\right)$$

$$= P(z > 1.689)$$

$$= 0.0456$$

$$\frac{15 - 7.4}{4.5}$$

$$1.688888889$$

$$68 \div 0.0456$$

$$1491.22807$$

$$n(0.0456) = 68$$

$$n = \frac{68}{0.0456} = 1491$$

Sekolah tersebut mempunyai satu peraturan yang melarang pelajar membawa duit lebih daripada RM15.00 ke sekolah. Jika bilangan pelajar yang melanggar peraturan ini pada mana-mana hari persekolahan ialah secara kasar 68, cari jumlah pelajar di sekolah itu.

$$np = n = ?$$

The school has a rule that prohibits students from bringing more than RM15.00 to the school. If the number of students breaking this rule on any school day is roughly 68, determine the number of students in this school.

[4 markah/marks]

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											TOLAK								
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	4	8	12	16	20	24	28	32	36
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	4	8	12	16	20	24	28	32	36
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859	4	8	12	15	19	23	27	31	35
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483	4	7	11	15	19	22	26	30	34
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121	4	7	11	14	18	22	25	29	32
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776	3	7	10	14	17	20	24	27	31
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451	3	7	10	13	16	19	23	26	29
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148	3	6	9	12	15	18	21	24	27
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867	3	5	8	11	14	16	19	22	25
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611	3	5	8	10	13	15	18	20	23
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379	2	5	7	9	12	14	16	19	21
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170	2	4	6	8	10	12	14	16	18
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985	2	4	6	7	9	11	13	15	17
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823	2	3	5	6	8	10	11	13	14
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681	1	3	4	6	7	8	10	11	13
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559	1	2	4	5	6	7	8	10	11
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455	1	2	3	4	5	6	7	8	9
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367	1	2	3	4	4	5	6	7	8
1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294	1	1	2	3	4	4	5	6	6
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233	1	1	2	2	3	4	4	5	5

13 (a) Diberi $(7 + \sqrt{2}) - \left(\frac{10}{\sqrt{2}+3}\right)^2 = a + b\sqrt{2}$. Cari nilai a dan b .

74
84

Given $(7 + \sqrt{2}) - \left(\frac{10}{\sqrt{2}+3}\right)^2 = a + b\sqrt{2}$. Find the values of a and b .

[3 markah/marks]

$7 + \sqrt{2} - \left(\frac{10}{\sqrt{2}+3}\right)^2$
3.282134734

$649\sqrt{2} - 757$
49
3.282134734

$$\begin{aligned} \left(\frac{10}{\sqrt{2}+3}\right)^2 &= \frac{100}{2 + 6\sqrt{2} + 9} \\ &= \frac{100(11 - 6\sqrt{2})}{(11 + 6\sqrt{2})(11 - 6\sqrt{2})} \\ &= \frac{100(11 - 6\sqrt{2})}{121 - 36(2)} \\ &= \frac{100(11 - 6\sqrt{2})}{49} \end{aligned}$$

$\left(\frac{1}{\sqrt{2}+3}\right)^2$
$\frac{11 - 6\sqrt{2}}{49}$

$$\begin{aligned} (7 + \sqrt{2}) - \left(\frac{10}{\sqrt{2}+3}\right)^2 &= 7 + \sqrt{2} - \frac{100(11 - 6\sqrt{2})}{49} \\ &= 7 - \frac{1100}{49} + \sqrt{2} + \frac{600}{49}\sqrt{2} \\ &= \boxed{7 - \frac{1100}{49}} + \boxed{1 + \frac{600}{49}}\sqrt{2} \\ &= -\frac{757}{49} + \frac{649}{49}\sqrt{2} \end{aligned}$$

13
74
84

(b) Diberi $\frac{27^{h+2}}{81^{3k-2}} = 9$, ungkapkan h dalam sebutan k .

Given $\frac{27^{h+2}}{81^{3k-2}} = 9$, express h in terms of k .

[2 markah/marks]

$$\begin{aligned} (3^3)^{h+2} &= 3^2 (3^4)^{3k-2} \\ 3^{3h+6} &= 3^{2+12k-8} \\ 3h+6 &= 12k-6 \end{aligned}$$

3 $9 = 3^2$ $27 = 3^3$ $81 = 3^4$

$$3h = 12k - 12$$

$$h = 4k - 4$$

13
74
84

(c) Diberi persamaan $27^{\log_3 p} = (q + 1)^3$ dengan keadaan $p > 0$.

Unjukkan q dalam sebutan p .

Given the equation $27^{\log_3 p} = (q + 1)^3$ where $p > 0$.

Express q in terms of p .

$$a^{\log_a x} = x$$

[3 markah/marks]

$$\begin{aligned} 27^{\log_3 p} &= (3^3)^{\log_3 p} \\ &= 3^{\log_3 p^3} \\ &= p^3 \end{aligned}$$

$$p^3 = (q + 1)^3$$

$$p > 0$$

$$p = q + 1$$

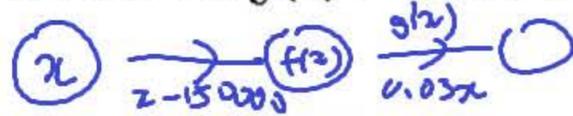
$$q = p - 1$$

†

14 Puan Sara merupakan ejen jualan di sebuah syarikat pembangunan hartanah. Setiap bulan, dia menerima gaji asas sebanyak RM2 500 dan komisen 3% daripada jumlah jualan yang melebihi RM150 000. Diberi $f(x) = x - 150\,000$ dan $g(x) = 0.03x$, di mana x mewakili jumlah jualan bagi setiap bulan.

Puan Sara works in a real estate development company. Every month, she receives a basic salary of RM2 500 and a 3% commission on sales exceeding RM150 000.

Given $f(x) = x - 150\,000$ dan $g(x) = 0.03x$, where x represents her sales of the month.



(a) Tulis satu fungsi gubahan mewakili pendapatan bulanan Puan Sara yang diperoleh daripada jualan.

Write a composite function that represents the monthly income of Puan Sara from the sales.

[2 markah/marks]

(b) Jika Puan Sara berjaya mencapai jualan sebanyak RM275 000 pada bulan Disember 2024, cari jumlah pendapatannya pada bulan tersebut.

If Puan Sara achieved the sales of RM275 000 on December 2024, find her total income in that month.

[3 markah/marks]

(c) Jika Puan Sara ingin mendapat jumlah pendapatan bulanan sekurang-kurangnya RM10 000, apakah jumlah minimum yang dia perlu capai dalam jualan setiap bulan?

If Puan Sara intends to have a total monthly income of at least RM10 000, what is the minimum sales that she has to achieve every month?

[3 markah/marks]

$$\begin{aligned} \text{(a)} \quad gf(x) &= g(x - 150\,000) \\ &= 0.03(x - 150\,000) \\ &= 0.03x - 4500, \quad x > 150\,000 \end{aligned}$$

$$\begin{array}{r} 275000 \times 0.03 \\ \hline 8250 \end{array}$$

$$\begin{aligned} \text{(b)} \quad & \text{RM275 000} \quad gf(275\,000) = 0.03(275\,000) - 4500 \\ & \begin{array}{r} 275000 - 150000 \\ \hline 125000 \end{array} \quad \begin{array}{r} (275000 - 150000) \times 0.03 \\ \hline 3750 \end{array} \\ & \begin{array}{r} 275000 \times 0.03 - 4500 \\ \hline 3750 \end{array} \end{aligned}$$

$$\begin{aligned} \text{jumlah pendapatan} &= 2500 + 3750 \\ &= 6250 \end{aligned}$$

$$\text{(iii)} \quad (0.03x - 4500) + 2500 \geq 10\,000$$

$$0.03x \geq 10\,000 + 4500 - 2500$$

$$0.03x \geq 12\,000$$

$$x \geq \frac{12000}{0.03}$$

$$x \geq 400\,000$$

$$\begin{array}{r} (400000 - 150000) \times 0.03 \\ \hline 7500 \end{array}$$

$$\begin{array}{r} \text{Ans} + 2500 \\ \hline 10000 \end{array}$$

15 (a) Lengkapkan Jadual 1 di bawah bagi persamaan $y = 1 - 3 \cos x$.

36 Complete the following Table 1 for the equation $y = 1 - 3 \cos x$.

x	0°	45°	90°	135°	180°	225°	270°	315°	360°
y	-2	-1.21	1	3.121	4	3.121	1	-1.121	-2

Jadual 1 / Jadual 1

[1 markah/mark]

(b) (i) Berdasarkan jadual di (a) dengan menggunakan skala 2 cm kepada 45° pada paksi-x dan 2 cm kepada 1 unit pada paksi-y, lukis graf $y = 1 - 3 \cos x$ untuk $0^\circ \leq x \leq 360^\circ$.

Based on the table in (a) by using a scale of 2 cm to 45° on the x-axis and 2 cm to 1 unit on the y-axis, draw the graph of $y = 1 - 3 \cos x$ for $0^\circ \leq x \leq 360^\circ$.

(ii) Seterusnya, tentukan penyelesaian bagi persamaan $3 \cos x + 3 = \frac{x}{90^\circ}$ untuk $0^\circ \leq x \leq 360^\circ$.

Hence, determine the solutions to the equation $3 \cos x + 3 = \frac{x}{90^\circ}$ untuk

$0^\circ \leq x \leq 360^\circ$.

[7 markah/ marks]

$$y = 1 - 3 \cos x$$

$$3 \cos x + 3 = \frac{x}{90^\circ}$$

$$3 - \frac{x}{90^\circ} = -3 \cos x$$

$$1 - 3 \cos x = 4 - \frac{x}{90^\circ}$$

$$y = 4 - \frac{x}{90^\circ}$$

$$x = 0^\circ,$$

$$y = 4 - \frac{0}{90} = 4$$

$$x = 360^\circ$$

$$y = 4 - \frac{360}{90} = 0$$

$$135 - 2 \times 4.5 = 126$$

$$275 + 4.5 = 279.5$$

$$3 \cos(x) + 3 - \frac{x}{90} = 0$$

$$x = 122.9893911$$

$$L-R = 0$$

$$3 \cos(x) + 3 - \frac{x}{90} = 0$$

$$x = 270$$

$$L-R = 0$$

\therefore solutions are 126° and 279.5°

