Penyelesaian Lengkap

Kertas 1

1 **C**

2 I Mengenal pasti dan mendefinisikan masalah
   Identifying and defining the problem

   V Membuat andaian dan mengenal pasti pemboleh ubah
   Making assumptions and identifying the variables

   VI Mengaplikasi matematik untuk menyelesaikan masalah
   Applying mathematics to solve problems

   II Menentusahkan dan mentafsir penyelesaian dalam konteks masalah berkenaan
   Verifying and interpreting solutions in the context of the problem

   III Memurnikan model matematik
   Refining the mathematical model

   IV Melaporkan dapatan
   Reporting the findings

   Jawapan/*Answer*: **D**

3 **A**

4 Graf kuadratik yang berbentuk bukit (*a* bernilai negatif) menganjak ke kanan (*b* bernilai positif) dan menganjak ke atas (*c* bernilai positif).
   The quadratic graph is in the shape of hill (a is negative), shift towards the right (b is positive) and shift upwards (c is positive).
   Jawapan/*Answer*: **C**

5 Fungsi kuadratik hiperbolik tidak wujud.
   Quadratic hyperbolic function does not exist.
   Jawapan/*Answer*: **D**

6 Kecerunan/*Gradient, $m = \dfrac{200 - 100}{10}$*
   $= 10$
   Pintasan-*y*/*y*-intercept, $c = 100$
   $s = 10t + 100$
   Jawapan/*Answer*: **B**

7 $P = 50 + 20h$
   Jawapan/*Answer*: **B**

Kertas 2

Bahagian A

1 *W*: Membuat andaian dan mengenal pasti pemboleh ubah
   Making assumptions and identifying the variables

   X: Mengaplikasi matematik untuk menyelesaikan masalah
   Applying mathematics to solve the problems

   Y: Memurnikan model matematik
   Refining the mathematical model

   Z: Melaporkan dapatan
   Reporting the findings

2 (a) Diberi prinsipal = RM10 000, kadar faedah = 3%, kekerapan pengkompaunan = 4.
   Kita perlu mencari tempoh yang diperlukan supaya jumlah simpanan melebihi RM15 000.
   Given that principal = RM10 000, interest rate = 3%, compounding frequency = 4.
   We need to find the duration needed so that the total savings exceeds RM15 000.

   (b) Andaian/*Assumption*:
   • Kadar faedah tidak berubah sepanjang tempoh perhitungan faedah
     The interest rate remains unchanged throughout the period of the interest calculation
   • Prinsipal tidak berubah
     Principal remains unchanged
   Pemboleh ubah: Faedah, kadar faedah, prinsipal, tempoh masa dalam tahun
   Variables: Interest, interest rate, principal, duration/time in years

3 (a) Andaikan *F* = jumlah caj meletak kereta,
   t = tempoh(jam)
   Let F = total parking charges, t = duration(hour)
   $F = 4 + 2(t - 2)$

   (b) *t* = 9 jam 15 minit dibundarkan ke 10 jam
      9 hours 15 minutes is rounded off to 10 hours
   $F = 4 + 2(10 - 2)$
   $= 4 + 16$
   $= 20$
   $\therefore$ RM20

Bahagian B

4 (a) *t* = 0 mewakili waktu 10.30 pagi, iaitu masa Eva meletak piza ke dalam ketuhar.
   t = 0 represents the time at 10.30 a.m., the time Eva puts the pizza into the oven.

   (b) Jika *t* cukup besar, model ini mewakili suhu akhir piza yang telah mencapai keseimbangan haba dengan suhu ketuhar, iaitu $S(t) = 160°C$.
   If t is sufficiently large, this model represents the final temperature of pizza that has achieved the heat equilibrium with the temperature of oven, S(t) = 160°C.

   (c) Apabila $t \to \infty$, suhu piza
   When $t \to \infty$, the temperature of pizza,
   $S(\infty) = 160$
   $a - b(1.063)^{-\infty} = 160$
   $a = 160$

Apabila $t = 0$, suhu piza

When $t = 0$, the temperature of pizza

$$S(0) = 25$$
$$160 - b(1.063)^{-0} = 25$$
$$b = 160 - 25$$
$$= 135$$

(d) 1105 jam/*hours* – 1030 jam/*hours* = 35 minit/*minutes*

$$S(35) = 160 - 135(1.063)^{-35}$$
$$= 144.09°C$$

(e) Guna jadual/*Use a table*

Masa/*Time*, t (minit/*minutes*)	Suhu/*Temperature*, $S(t)$ (°C)
40	148.28
50	153.64
53	154.7
54	155.02

54 minit/*minutes*

1030 jam/*hours* + 54 = 1124 jam/*hours*

Eva akan terhidu bau hangus pada pukul 11.24 pagi.

Eva will smell the burning odour at 11.24 a.m.

Bahagian C

5 (a) $C(x) = 1\,000\,000 + 5x$

(b) $C(2\,000) = RM[1\,000\,000 + 5(2\,000)]$
$$= RM1\,010\,000$$

(c) Keuntungan tercapai apabila jumlah jualan melebihi kos penghasilan

Profit is obtained when the total sales exceeds the production cost

$$18x > 1\,000\,000 + 5x$$
$$13x > 1\,000\,000$$
$$x > 76\,923.08$$

x minimum = 76 924

(d)

1 Mengenal pasti dan mendefinisikan masalah *Identifying and defining the problems*	• Cari bilangan pekerja, p dan bilangan mesin, m bagi menghasilkan 2 400 unit komponen elektronik dalam masa 8 jam. *Find the number of workers, p and the number of machines, m to produce 2 400 units of electronic components in 8 hours.* • Dalam satu jam, 150 unit komponen dihasilkan oleh sebuah mesin yang dikendalikan oleh 3 orang pekerja. *In an hour, 150 units of electronic components are produced by a machine which handled by 3 workers.*	
2 Membuat andaian dan mengenal pasti pemboleh ubah *Making assumptions and identifying the variables*	• Andaian/*Assumption*: – Kecekapan mesin adalah sama. *The efficiency of the machine is the same.* – Bilangan pekerja yang mengendalikan sebuah mesin adalah tetap. *The number of workers who handle a machine is fixed.* • Pemboleh ubah/*Variables*: – Bilangan komponen elektronik, n, bilangan pekerja, p, bilangan mesin, m, tempoh dalam jam, t *The number of electronic components, n, the number of workers, p, the number of machines, m, duration in hours, t*	

3	**Mengaplikasi matematik untuk menyelesaikan masalah** *Applying mathematics to solve problems*	$n \propto mpt$ $n = kmpt$ $k = \dfrac{n}{mpt}$ $= \dfrac{150}{1(3)(1)}$ $= 50$ $n = 50mpt$ $2\,400 = 50mp(8)$ $mp = 6$, $p = 3$ bagi setiap mesin/*for every machine* maka bilangan mesin/*therefore the number of machines*, $m = 2$ bilangan pekerja/*number of workers* = 6
4	**Menentusahkan dan mentafsir penyelesaian dalam konteks masalah berkenaan** *Verifying and interpreting solutions in the context of the problem*	Aplikasikan konsep ubahan/*Apply the concept of variation.* $n = 50mpt$, dengan mp ialah jumlah pekerja *such that mp is the number of workers* Model ini mungkin tidak memberi gambaran tepat dalam situasi dunia sebenar kerana faktor-faktor luaran yang tidak dapat dikawal seperti kecekapan mesin dan pekerja. Namun, model ini masih boleh digunakan sebagai rujukan. *This model may not have an actual picture in the real world situations because of the external factors that cannot be controlled such as efficiency of the machine and workers. Nevertheless, this model can still be used as reference.*
5	**Memurnikan model matematik** *Refining the mathematical model*	Model ini tidak perlu dimurnikan lagi pada ketika ini kerana cukup digunakan sebagai rujukan. *This model does not need to be refined for this moment as it is good enough to be used as reference.*
6	**Melaporkan dapatan** *Reporting the findings*	Laporan penuh dibuat berdasarkan struktur rangka kerja pemodelan di atas. *A full report is written based on the modelling framework structure above.*

Penyelesaian Lengkap ▶ *Praktis Progresif Matematik Tingkatan 5*   **3**
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