

JAWAPAN

**BAB
10**

Kecerunan Garis Lurus Gradient of a Straight Line

1. (a)
 - Garis PQ lebih curam berbanding dengan garis QR .
Line PQ is steeper than line QR .
 - Garis PQ condong ke kanan.
Line PQ inclines to the right.
 - Garis QR condong ke kiri.
Line QR inclines to the left.
- (b)
 - Garis ST lebih curam berbanding dengan garis TU .
Line ST is steeper than line TU .
 - Garis ST condong ke kanan.
Line ST inclines to the right.
 - Garis TU condong ke kiri.
Line TU inclines to the left.
2. (a) Jarak mencancang = 5 cm
Vertical distance
Jarak mengufuk = 3 cm
Horizontal distance
 $\text{Kecerunan } AB = \frac{5}{3}$
Gradient of AB
- (b) Jarak mencancang = 4 unit
Vertical distance
Jarak mengufuk = 3 unit
Horizontal distance
 $\text{Kecerunan } AB = \frac{4}{3}$
Gradient of AB
- (c) Jarak mencancang = 14 m
Vertical distance
Jarak mengufuk = 10 m
Horizontal distance
 $\text{Kecerunan } AB = \frac{14}{10} = \frac{7}{5}$
Gradient of AB

- (d) Jarak mencancang = 20 cm
Vertical distance
Jarak mengufuk = 12 cm
Horizontal distance
 $\text{Kecerunan } AB = \frac{20}{12} = \frac{5}{3}$
Gradient of AB
- (e) Jarak mencancang = 4 cm
Vertical distance
Jarak mengufuk = 15 cm
Horizontal distance
 $\text{Kecerunan } AB = \frac{4}{15}$
Gradient of AB
- (f) Jarak mencancang = 18 m
Vertical distance
Jarak mengufuk = 9 m
Horizontal distance
 $\text{Kecerunan } AB = \frac{18}{9} = 2$
Gradient of AB

3. (a) Kecerunan PQ / *Gradient of PQ*

$$m_{PQ} = \frac{\text{Jarak mencancang} / \text{Vertical distance}}{\text{Jarak mengufuk} / \text{Horizontal distance}}$$

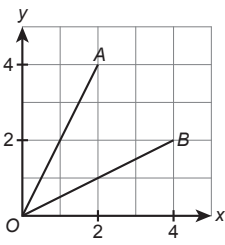
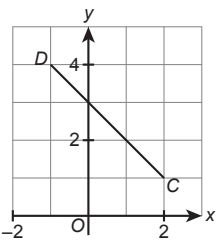
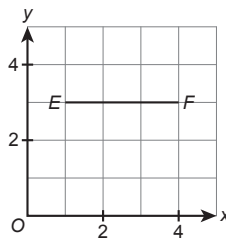
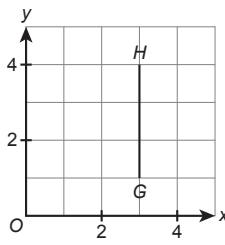
$$= \frac{y_2 - y_1}{x_2 - x_1}$$
- (b) Kecerunan PQ / *Gradient of PQ*

$$m_{PQ} = \frac{\text{Jarak mencancang} / \text{Vertical distance}}{\text{Jarak mengufuk} / \text{Horizontal distance}}$$

$$= \frac{y - 0}{0 - x}$$

$$= - \frac{\text{pintasan-y} / \text{y-intercept}}{\text{pintasan-x} / \text{x-intercept}}$$

4.

Garis lurus <i>Straight line</i>				
Kecerunan <i>Gradient</i>	$OA = \frac{4-0}{2-0} = 2$ $OB = \frac{2-0}{4-0} = \frac{1}{2}$	$DC = \frac{1-4}{2-(-1)} = -1$	$EF = \frac{3-3}{1-4} = 0$	$DC = \frac{1-4}{3-3} = \infty$
Nilai mutlak <i>Absolute value</i>	$OA = 2$ $OB = \frac{1}{2}$	1	0	–
Arah kecondongan <i>Direction of inclination</i>	Ke kanan <i>To the right</i>	Ke kiri <i>To the left</i>	Garis mengufuk <i>Horizontal line</i>	Garis mencancang <i>Vertical line</i>
Nilai kecerunan <i>Value of gradient</i>	Positif <i>Positive</i>	Negatif <i>Negative</i>	Sifar <i>Zero</i>	Tidak tertakrif <i>Undefined</i>

Berdasarkan jadual di atas:
Based on the above table:

- Garis lurus OA menghampiri keadaan mencancang berbanding dengan garis lurus OB. Oleh itu, nilai kecerunan garis lurus OA lebih besar daripada garis lurus OB.
Straight line OA is nearer to vertical position compared to straight line OB. Thus, the value of gradient of straight line OA is greater than straight line OB.
- Semakin besar nilai mutlak kecerunan, semakin curam garis lurus.
The greater the absolute value of gradient, the steeper the straight line.
- Garis lurus EF adalah selari dengan paksi-x, maka kecerunannya ialah sifar.
Straight line EF is parallel to the x-axis, thus the gradient is zero.
- Garis lurus DC adalah selari dengan paksi-y, maka kecerunannya ialah tidak tertakrif.
Straight line DC is parallel to the y-axis, thus the gradient is undefined.
- Susun kecerunan garis lurus mengikut tertib menaik:
Arrange the gradients of the straight lines in ascending order:

EF
,
DC
,
OB
,
OA

5. (a) $m_{TU} = \frac{-1 - (-2)}{-2 - 4}$
 $= -\frac{1}{6}$

(b) $m_{RS} = \frac{0 - 2}{4 - 5}$
 $= \frac{-2}{-1}$
 $= 2$

(c) $m_{CD} = \frac{0 - 6}{2 - (-1)}$
 $= -\frac{6}{3}$
 $= -2$

(d) $m_{AB} = \frac{9 - (-12)}{-4 - 3}$
 $= \frac{21}{-7}$
 $= -3$

(e) $m_{TU} = -\frac{8}{6}$
 $= -\frac{4}{3}$

(f) $m_{GH} = -\frac{(-18)}{(-12)}$
 $= -\frac{3}{2}$

$$(g) m_{EF} = -\frac{(-3)}{(-6)} \\ = -\frac{1}{2}$$

$$(h) m_{KL} = -\frac{(-18)}{24} \\ = \frac{3}{4}$$

6. (a) $m_{DE} = 3$

$$\frac{y_2 - y_1}{x_2 - x_1} = 3$$

$$\frac{6 - 2}{t - (-1)} = 3$$

$$3(t + 1) = 4$$

$$3t + 3 = 4$$

$$3t = 1$$

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

$$(b) -\frac{\text{Pintasan-}y / y\text{-intercept}}{-5} = \frac{7}{5}$$

$$\text{Pintasan-}y / y\text{-intercept} = \frac{7}{5} \times 5 \\ = 7$$

Maka / Hence, $J(0, 7)$.

$$(c) \frac{y}{6} = \frac{4}{3} \quad \left\{ \begin{array}{l} \text{Kecerunan / Gradient} \\ \text{Jarak mencancang} \\ \text{Vertical distance} \\ = \frac{\text{Jarak mencancang}}{\text{Jarak mengufuk}} \\ \text{Horizontal distance} \end{array} \right.$$

$$3y = 24$$

$$y = \frac{24}{3}$$

$$= 8$$

Guna teorem Pythagoras,

Use Pythagoras theorem,

$$x^2 = y^2 + 6^2$$

$$x = \sqrt{8^2 + 6^2}$$

$$= \sqrt{100}$$

$$= 10$$

(d) (i) Kecerunan P

Gradient of P

$$= \frac{40}{40}$$

$$= 1$$

Kecerunan Q

Gradient of Q

$$= \frac{40}{80}$$

$$= 0.5$$

Kecerunan R

Gradient of R

$$= \frac{25}{100}$$

$$= 0.25$$

(ii) Kecerunan garis-garis lurus dalam graf di atas mewakili laju kenderaan P, Q dan R yang diukur dalam unit km per minut.

The gradients of the straight lines in the graph above represent the speed of vehicles P, Q and R which is measured in unit of km per minute.

(iii) Kenderaan P paling awal akan sampai ke bandar B.

Vehicle P will reach town B the earliest.

Masa diambil / Time taken

$$= \frac{110}{1}$$

$$\begin{array}{l} \text{Masa diambil / Time taken} \\ = \frac{\text{Jarak dilalui / Distance travelled}}{\text{Laju / Speed}} \end{array}$$

$$= 110 \text{ minut / 110 minutes}$$

$$= 1 \text{ jam } 50 \text{ minut / 1 hour } 50 \text{ minutes}$$

Kenderaan P akan sampai bandar B pada 9:50 a.m.

Vehicle P will reach town B at 9:50 a.m.

(e) (i) Katakan jarak mengufuk papan itu ialah x. / Let the horizontal distance of the board be x.

$$\begin{array}{l} \text{Kecerunan, } m \\ \text{Gradient, } m \end{array} = \frac{\text{Jarak mencancang} \\ \text{Vertical distance}}{\text{Jarak mengufuk} \\ \text{Horizontal distance}}$$

$$1.5 = \frac{2.4}{x}$$

$$x = \frac{2.4}{1.5}$$

$$= 1.6 \text{ m}$$

(ii) Pekerja itu boleh memendekkan jarak mengufuk papan itu pada lantai supaya kecerunan papan tersebut lebih tinggi. Apabila nilai kecerunan lebih tinggi, papan itu menjadi lebih curam. Maka, kotak-kotak itu dapat diluncurkan dengan lebih laju.

The workers can shorten the horizontal distance of the board on the floor so that the gradient of the board is higher. When the value of the gradient is higher, the board will become steeper. Thus, the boxes can be slid faster.

Power PT3

Bahagian A

1. Kecerunan / Gradient

$$A: \frac{4}{3} = 1.33$$

$$B: \frac{115}{80} = \frac{23}{16} = 1.44$$

$$C: \frac{8}{6} = 1.33$$

$$D: \frac{150}{30} = 5$$

Jawapan / Answer: D

2. Kecerunan RS

Gradient of RS

$$= \frac{12}{4} = 3$$

Jawapan / Answer: **B**

3. Kecerunan PQ

Gradient of PQ

$$= \frac{-5 - (-3)}{-2 - 4}$$

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

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

Jawapan / Answer: **A**

4. Kecerunan bukit

Gradient of the hill

$$= \frac{80 - 20}{60 \div 2}$$

$$= \frac{60}{30}$$

$$= 2$$

Jawapan / Answer: **A**

Bahagian B

5. Jarak mencancang = PR = 4 cm

Vertical distance

Jarak mengufuk = RQ = 3 cm

Horizontal distance

- | | |
|--------------------|---------------------------------|
| 6. (i) Positif | <input type="text" value="GF"/> |
| <i>Positive</i> | |
| (ii) Negatif | <input type="text" value="CD"/> |
| <i>Negative</i> | |
| (iii) Sifar | <input type="text" value="AB"/> |
| <i>Zero</i> | |
| (iv) Tak tertakrif | <input type="text" value="ED"/> |
| <i>Undefined</i> | |

Bahagian C

7. (a) (i) Kecerunan KL

Gradient KL

$$= \frac{2 - (-5)}{7 - 3}$$

$$= \frac{7}{4}$$

$$(ii) q = \frac{2 + (-5)}{2}$$

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

$$(b) RQ^2 = 5^2 - 4^2$$

$$= 25 - 16$$

$$RQ = \sqrt{9}$$

$$RQ = 3 \text{ m}$$

Kecerunan PQ / *Gradient of PQ*

$$= \frac{\text{Jarak mencancang / Vertical distance}}{\text{Jarak mengufuk / Horizontal distance}}$$

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

(c) Kecerunan AC / *Gradient of AC*

$$\frac{q - 4}{11 - 1} = -\frac{1}{2}$$

$$q - 4 = -\frac{1}{2} \times 10$$

$$q - 4 = -5$$

$$q = -1$$

Kecerunan AB / *Gradient of AB*

$$\frac{0 - 4}{p - 1} = -\frac{1}{2}$$

$$\frac{-4}{p - 1} = -\frac{1}{2}$$

$$p - 1 = 8$$

$$p = 9$$

Power KBAT

1. Jarak di antara hujung jongkang-jongket dengan

tiang / *Distance between the end of the see-saw and the pole*

$$= 4.5 \div 2$$

$$= 2.25 \text{ m}$$

Katakan tinggi tiang = y

Let the height of the pole

$$\text{Kecerunan / Gradient, } \frac{y}{2.25} = \frac{4}{9}$$

$$9y = 9$$

$$y = 1$$

Maka, tinggi tiang di tengah papan jongkang-jongket itu ialah 1 m.

Thus, the height of the pole at the centre of the see-saw is 1 m.

2. (a) Kecerunan / Gradient = $\frac{1}{3}$

$$\frac{2x}{3x + 1} = \frac{1}{3}$$

$$6x = 3x + 1$$

$$6x - 3x = 1$$

$$3x = 1$$

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

$$= 0.33$$

$$(b) RS = 2(0.33)$$

$$= 0.66 \text{ m}$$

$$TS = 3(0.33) + 1$$

$$= 1.99 \text{ m}$$

Panjang papan condong

Length of the sloping board

$$= \sqrt{(0.66)^2 + (1.99)^2}$$

$$= 2.1 \text{ m}$$