

معدل التغير والدوال الخطية



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ⇨ المناهج الإماراتية ⇨ الصف التاسع ⇨ رياضيات ⇨ الفصل الأول ⇨ ملفات متنوعة ⇨ الملف

تاريخ إضافة الملف على موقع المناهج: 2026-10-10 11:01:58

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
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المزيد من مادة
رياضيات:

إعداد: طارق علي

التواصل الاجتماعي بحسب الصف التاسع



صفحة المناهج
الإماراتية على
فيسبوك

المزيد من الملفات بحسب الصف التاسع والمادة رياضيات في الفصل الأول

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تحميل تطبيق المناهج للهواتف الذكية

تطبيق المناهج على Play Google (أندرويد)

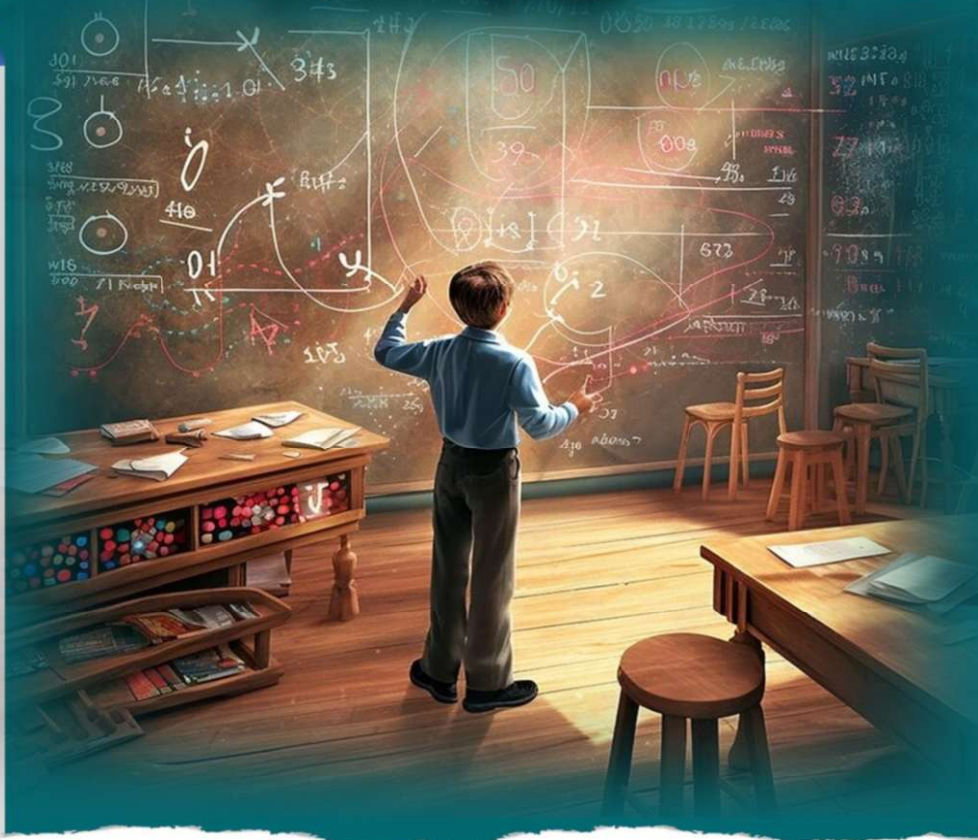
تطبيق المناهج على Store App (آبل)

الطارق

سلسلة

الرياضيات

4-2



منصة طارق أكاديمي للرياضيات

Tarek Academy

م. ف. تاسع (متقدم)

طارق

أستاذ الرياضيات



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سلسلة الطارق في الرياضيات

9

متقدم



$$\text{rate of change} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} = m \text{ slope}$$

Example 1 Find the Rate of Change

COOKING Find the rate of change of the function by using two points from the table.

Amount of Flour x	Pancakes (cups y)
x_1 2	y_1 12
x_2 4	y_2 24
6	36

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{24 - 12}{4 - 2} = \frac{12}{2}$$

$$= 6 \text{ cups / Flour}$$

Check

Find the rate of change.

? $\frac{\text{dollars}}{\text{gallons}}$

Amount of Gasoline Purchased (Gallons)	Cost (Dollars)
4.75	15.77
6	19.92
7.25	24.07
8.5	28.22

$$\text{rate} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{19.92 - 15.77}{6 - 4.75}$$

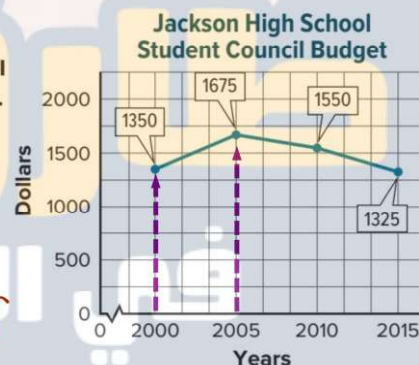
$$= 3.32 \text{ \$ / gallon.}$$

Example 2 Compare Rates of Change

STUDENT COUNCIL The Jackson High School Student Council budget varies based on the fundraising of the previous year.

Part A Find the rate of change for 2000–2005 and describe its meaning in the context of the situation.

$$\frac{1675 - 1350}{2005 - 2000} = 65 \text{ \$ / year}$$



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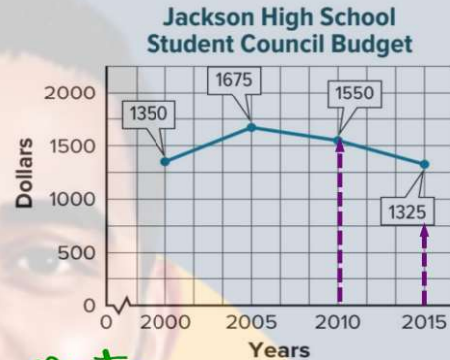
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Part B Find the rate of change for 2010–2015 and describe its meaning in the context of the situation.

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{1325 - 1550}{2015 - 2010} = -45$$



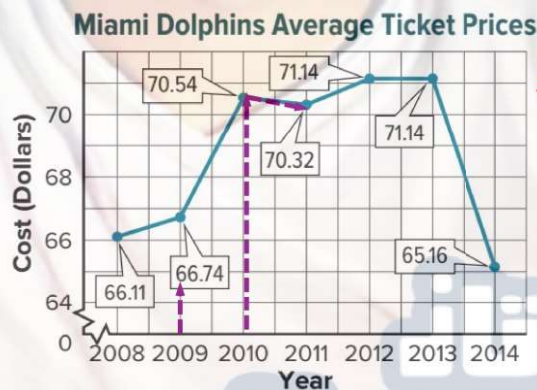
* From 2010 to 2015 rate of change decreasing by 45 \$/year

Check

TICKETS The graph shows the average ticket prices for the Miami Dolphins football team.

Part A Find the rate of change in ticket prices between 2009–2010.

$$3.8 \frac{\text{dollars}}{\text{year}}$$



$$\frac{70.54 - 66.74}{2010 - 2009} = 3.8$$

Part B The ticket prices have the greatest rate of change between _____ ?

The longer line on graph

2013 - 2014

Part C Between 2010 ? 2011 and 2013 ? 2014, the rate of change is negative.

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down



Example 3 Constant Rate of Change

Determine whether the function is linear. If it is, state the rate of change.

* if x changed by same -3 ()
and y changed by same -3 ()
So it's linear

$$* \text{rate} = \frac{\text{change of } y}{\text{change of } x} = \frac{2}{-3}$$

x	y
11	-5
8	-3
5	-1
2	1
-1	3

Example 4 Rate of Change

Determine whether the function is linear. If it is, state the rate of change.

non-linear

As y not same changed

+7 ()
+7 ()
+7 ()
+7 ()

x	y
22	-4
29	-1
36	1
43	4
50	6

Check

Copy and complete the table so that the function is linear.

linear
 x change with same
 y change with same

x	y
12	-2.25
11.5	1
11	4.25
10.5	7.5
10	10.75
9.5	14

+3.25

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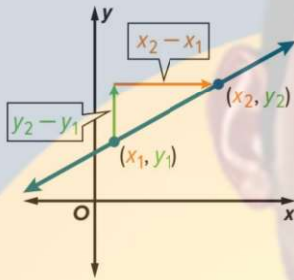
Key Concept • Slope

Words The slope of a nonvertical line is the ratio of the rise to the run.

Symbols The slope m of a nonvertical line through any two points (x_1, y_1) and (x_2, y_2) can be found as follows.

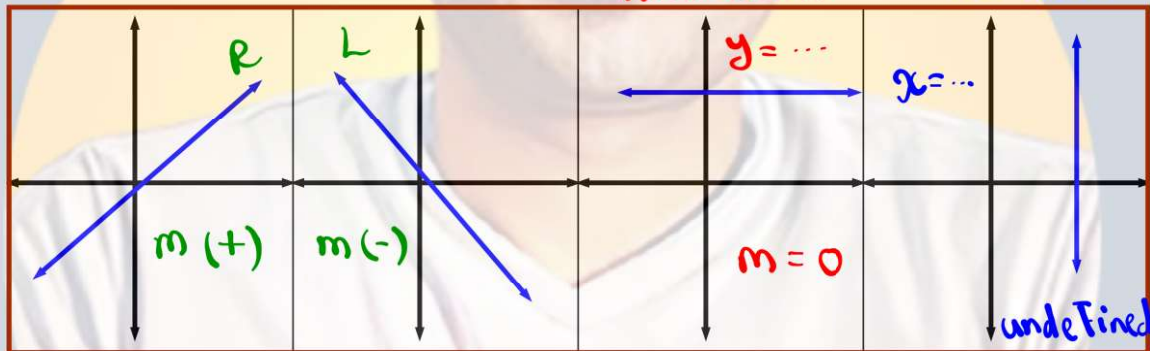
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Example



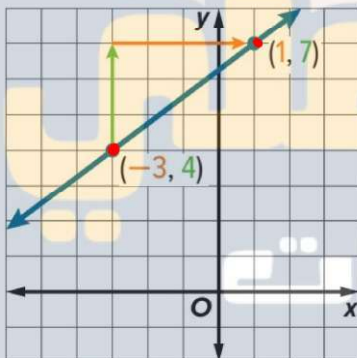
Horizontal

Vertical



Example 5 Positive Slope

Find the slope of a line that passes through $(-3, 4)$ and $(1, 7)$.



$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 4}{1 - (-3)}$$

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

→ +



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Check

Determine the slope of a line passing through the given points. If the slope is undefined, write *undefined*. Write your answer as a decimal if necessary.

$(-1, 8)$ and $(7, 10)$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 8}{7 - (-1)} = \frac{2}{8} = 0.25$$

$$= \frac{1}{4}$$

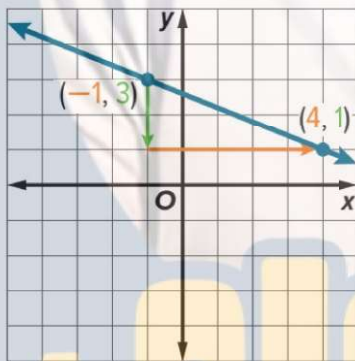
الخط

$m = \text{undefined} = \text{number}$
 $\rightarrow \text{vertical line}$ 0

Math Error

Example 6 Negative Slope

Find the slope of a line that passes through $(-1, 3)$ and $(4, 1)$.



$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 3}{4 - (-1)} = \frac{-2}{5} = -\frac{2}{5}$$

Check

Determine the slope of a line passing through the given points. If the slope is undefined, write *undefined*. Write your answer as a decimal if necessary.

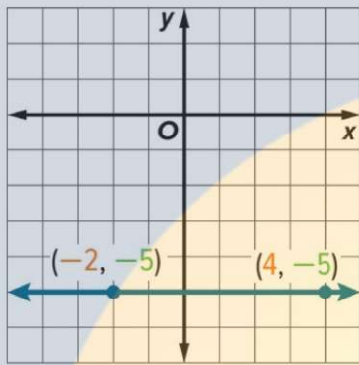
a. $(5, -4)$ and $(0, 1)$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - 1}{0 - 5} = \frac{-5}{-5} = 1$$



Example 7 Slopes of Horizontal Lines

Find the slope of a line that passes through $(-2, -5)$ and $(4, -5)$.



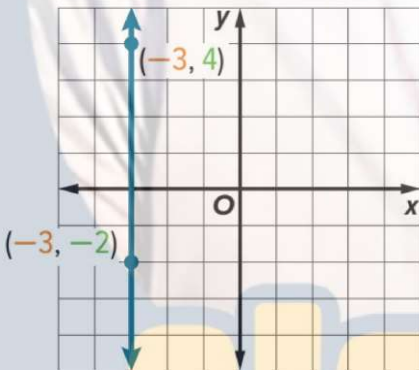
* Horizontal line $\rightarrow m = 0$

* check
$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - -5}{4 - -2}$$

$$m = 0$$

Example 8 Slopes of Vertical Lines

Find the slope of a line that passes through $(-3, 4)$ and $(-3, -2)$.



$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 4}{-3 - -3}$$

$$= \frac{-6}{0}$$

math error

$m \Rightarrow$ undefined

$\rightarrow$ Vertical line

Math ERROR

[AC] :Cancel
[◀][▶]:Goto



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Example 9 Find Coordinates Given the Slope



Find the value of r so that the line passing through $(-4, 5)$ and $(4, r)$ has a slope of $\frac{3}{4}$.

$$* m = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow \frac{3}{4} = \frac{r - 5}{4 - (-4)}$$

$$\frac{3}{4} = \frac{r - 5}{8} \quad \text{cross}$$

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

$$x =$$

$$L-R =$$

$$11$$

$$0$$

$$\frac{4(r-5)}{4} = \frac{24}{4} \rightarrow r-5 = 6$$

$$r = 6 + 5 \rightarrow \boxed{r = 11}$$

→ shift → solve → = * Choose *

Check

Find the value of r so that the line passing through $(-3, r)$ and $(7, -6)$ has a slope of $\frac{2}{5}$.

$r = ?$

$$\frac{12}{5} = \frac{-6 - r}{7 - (-3)} \Rightarrow \frac{12}{5} = \frac{-6 - r}{10}$$

$$\frac{2}{5} \times 10$$

$$24$$

$$\frac{5(-6 - r)}{5} = \frac{120}{5} \Rightarrow -6 - r = 24$$

$$\Rightarrow -6 - 24 = r$$



$$r = -6 - 24$$

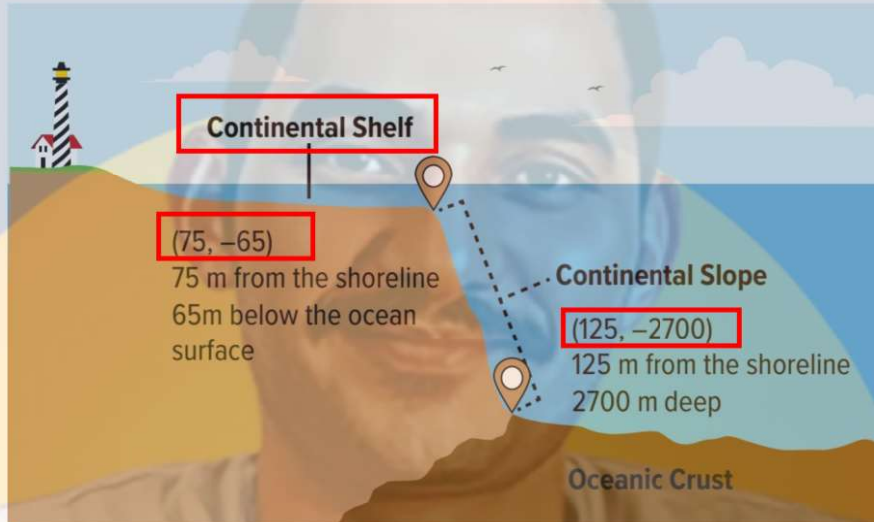


$$|r = -30|$$

Example 10 Use Slope

OCEANS

What is the slope of the continental slope at Cape Hatteras?



$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2700 - (-65)}{125 - 75}$$

$$m = -52.7$$

Find the slope of the line through each pair of points.

1) (7, 18), (7, -2)

A) -2

B) 2

C) 0

☒ D) Undefined

2) (12, 8), (-12, 20)

A) 2

☒ B) $-\frac{1}{2}$

C) -2

D) $\frac{1}{2}$

3) (7, -20), (6, -20)

A) 1

B) -1

C) Undefined

☒ D) 0

$$\frac{-20 - (-20)}{6 - 7}$$



Find the rate of change of the function by using two points from the table.

1.

x	y
5	2
10	3
15	4
20	5

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

$$\text{rate} = \frac{3-2}{10-5} = \frac{1}{5}$$

2.

x	y
1	15
2	9
3	3
4	-3

$$\text{rate} = \frac{9-15}{2-1} = -6$$

Determine whether the function is linear. If it is, state the rate of change.

7.

x	4	2	0	-2	-4
y	-1	1	3	5	7

$$\frac{-2}{-2} \quad \frac{-2}{-2} \quad \frac{-2}{-2} \quad \frac{-2}{-2}$$

* linear

$$\text{* rate} = \frac{\Delta y}{\Delta x} = \frac{2}{-2} = -1$$

8.

x	-7	-5	-3	-1	0
y	11	14	17	20	23

$$\frac{+2}{+2} \quad \frac{+2}{+2} \quad \frac{+2}{+2} \quad \frac{+1}{+1}$$

non - linear

as x not same change (not constant)

Find the value of r so the line that passes through each pair of points has the given slope.

38. $(12, 10), (-2, r), m = -4$

$$-4 = \frac{r-10}{-2-12} \Rightarrow -4 = \frac{r-10}{-14}$$

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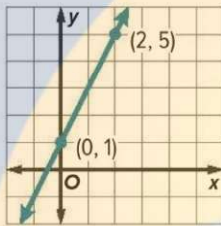


$$r - 10 = -4(-14) \Rightarrow r - 10 = 56$$

$$r = 56 + 10 \Rightarrow \boxed{r = 66}$$

STRUCTURE Find the slope of the line that passes through each pair of points.

50.

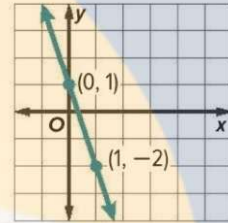


$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{5 - 1}{2 - 0} = \frac{4}{2}$$

$$\boxed{m = 2}$$

52.



$$m = \frac{-2 - 1}{1 - 0} = \frac{-3}{1}$$

$$\boxed{m = -3}$$

59. REASONING Find the value of r that gives the line passing through $(3, 2)$ and $(r, -4)$ a slope that is undefined. (H-w)

طارق علي
في الرياضيات



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سلسلة الطارق في الرياضيات منصة طارق أكاديمي

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في الرياضيات

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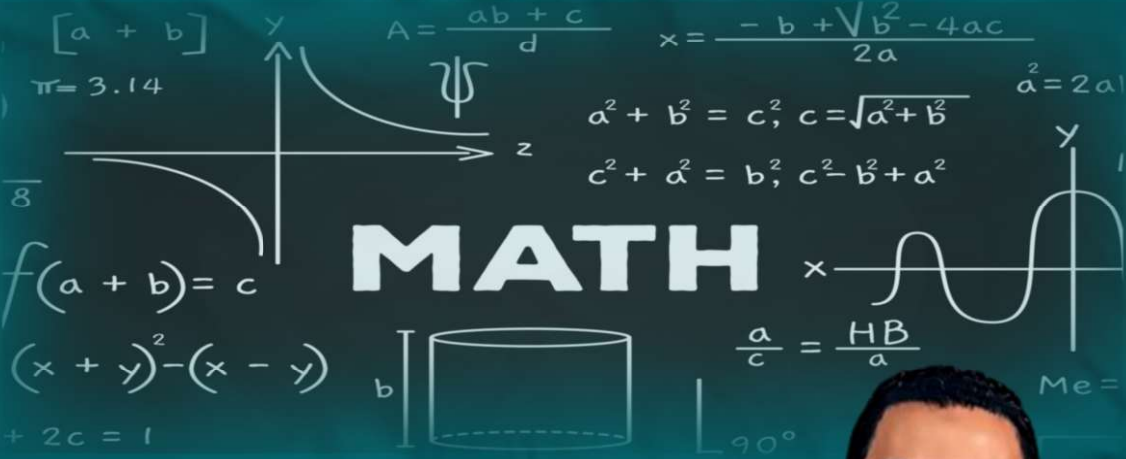
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منصة طارق أكاديمي للرياضيات

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IN Math



خاص بالمنصة



خاص بجميع الجروبات و القنوات



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