New York State
EDUCATION DEPARTMENT
Knowledge ❯ Skill ❯ Opportunity

New York State Testing Program
Grade 8
Mathematics Test
Chinese (Traditional)

Released Questions

2021

New York State administered the Mathematics Tests in May 2021 and is now making the questions from Session 1 of these tests available for review and use. Only Session 1 was required in 2021.

New York State Testing Program
Grades 3–8 Mathematics

Released Questions from 2021 Tests

Background

In 2013, New York State (NYS) began administering tests designed to assess student performance in accordance with the instructional shifts and rigor demanded by the new New York State P–12 Learning Standards in Mathematics. To help in this transition to new assessments, the New York State Education Department (NYSED) has been releasing an increasing number of test questions from the tests that were administered to students across the State in the spring. This year, SED is again releasing 2021 NYS Grades 3–8 English Language Arts and Mathematics test materials for review, discussion, and use.

In February 2021, with the ongoing COVID-19 pandemic still forcing restrictions on all educational and learning activities statewide, NYSED submitted two federal waiver requests related to state assessment and accountability requirements. The waiver requests addressed the unique circumstances caused by the pandemic that have resulted in many students receiving some or all of their instruction remotely.

Later that month, the United States Department of Education (USDE) informed states that it would not grant a blanket waiver for state assessments. However, the USDE agreed to uncouple state assessments from the Every Student Succeeds Act (ESSA) accountability requirements so that test results will be used solely as a measure of student learning. Additionally, it was decided that NYSED would administer only Session 1 of the Grades 3–8 ELA and Mathematics Tests for the Spring 2021 administration and that the tests would include previously administered questions.

The decision to use previously administered test questions in this extraordinary year was based on guidance from nationally recognized experts in the assessment field and was recommended in a [publication](#) from the Council of Chief State School Officers to state education departments. Reusing test questions provided the benefit of having established scale scores and stable item parameters. Using previously administered test questions also ensured that it will be possible to develop new test forms for 2022 and beyond. Although it was not the driver of the decision, the reuse of previously administered test questions provided an opportunity for cost savings during these unique circumstances where the instructional models used by schools varied throughout the State.

For 2021, the entire Session 1 booklet is being released as this is all that students were required to take. Additionally, NYSED is providing a map that details what learning standards each released question measures, and the correct response to each question. These released materials will help students, families, educators, and the public better understand the tests and NYSED's expectations for students.

Understanding Math Questions

Multiple-Choice Questions

Multiple-choice questions are designed to assess the New York State P–12 Learning Standards for Mathematics. Mathematics multiple-choice questions will be used mainly to assess standard algorithms and conceptual standards. Multiple-choice questions incorporate both the grade-level standards and the "Standards for Mathematical Practices." Many questions are framed within the context of real-world applications or require students to complete multiple steps. Likewise, many of these questions are linked to more than one standard, drawing on the simultaneous application of multiple skills and concepts.

New York State P–12 Learning Standards Alignment

The alignment to the New York State P–12 Learning Standards for Mathematics is intended to identify the primary analytic skills necessary to successfully answer each question. The released questions do not represent the full spectrum of the standards assessed on the State tests, nor do they represent the full spectrum of how the standards should be taught and assessed in the classroom. It should not be assumed that a particular standard will be measured by an identical question in future assessments. Specific criteria for writing test questions, as well as additional assessment information, are available at http://www.engageny.org/common-core-assessments.

姓名：

Chinese (Traditional) Edition
Grade 8
Mathematics Test
Session 1
v202

紐約州考試計劃
數學考試
第 1 卷

8 年級

v202

Released Questions

8年級數學參考資料

換算

1英寸 = 2.54釐米　　　1公里 = 0.62英里　　　1杯 = 8液盎司
1米 = 39.37英寸　　　1磅 = 16盎司　　　1品脫 = 2杯
1英里 = 5,280英尺　　　1磅 = 0.454千克　　　1夸脫 = 2品脫
1英里 = 1,760碼　　　1千克 = 2.2磅　　　1加侖 = 4夸脫
1英里 = 1.609公里　　　1噸 = 2,000磅　　　1加侖 = 3.785升
　　　　　　　　　　　　　　　　　　　　1升 = 0.264加侖
　　　　　　　　　　　　　　　　　　　　1升 = 1,000立方釐米

公式

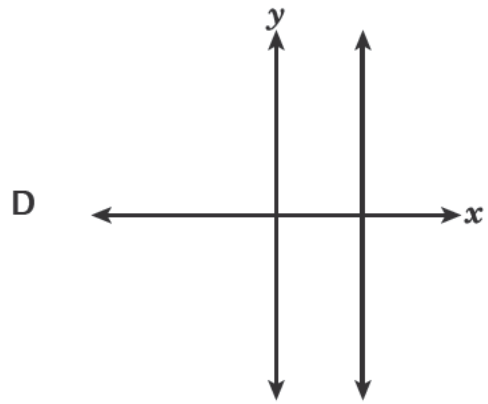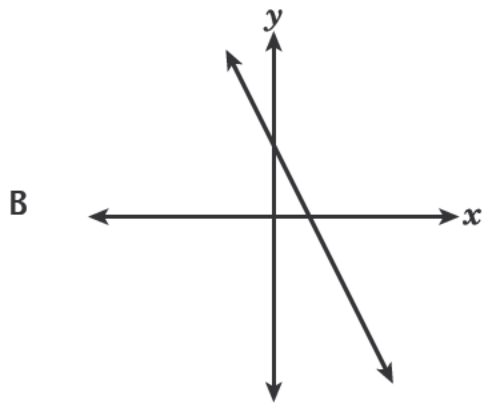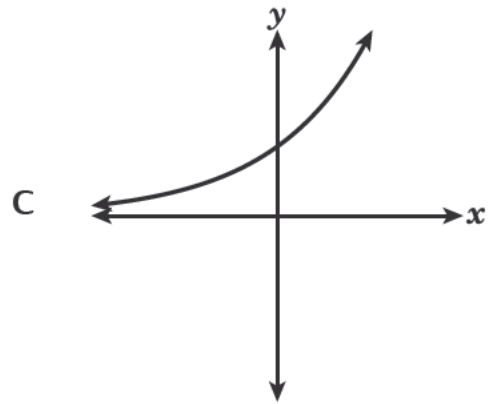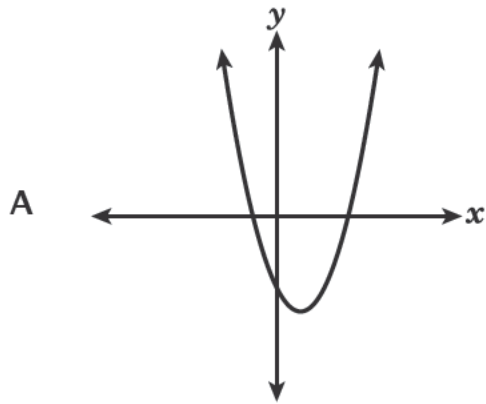|	
三角形	$A = \dfrac{1}{2}bh$
平行四邊形	$A = bh$
圓形	$A = \pi r^2$
圓形	$C = \pi d$ 或 $C = 2\pi r$
稜柱	$V = Bh$
圓柱體	$V = \pi r^2 h$
球體	$V = \dfrac{4}{3}\pi r^3$
圓錐體	$V = \dfrac{1}{3}\pi r^2 h$
勾股定理	$a^2 + b^2 = c^2$
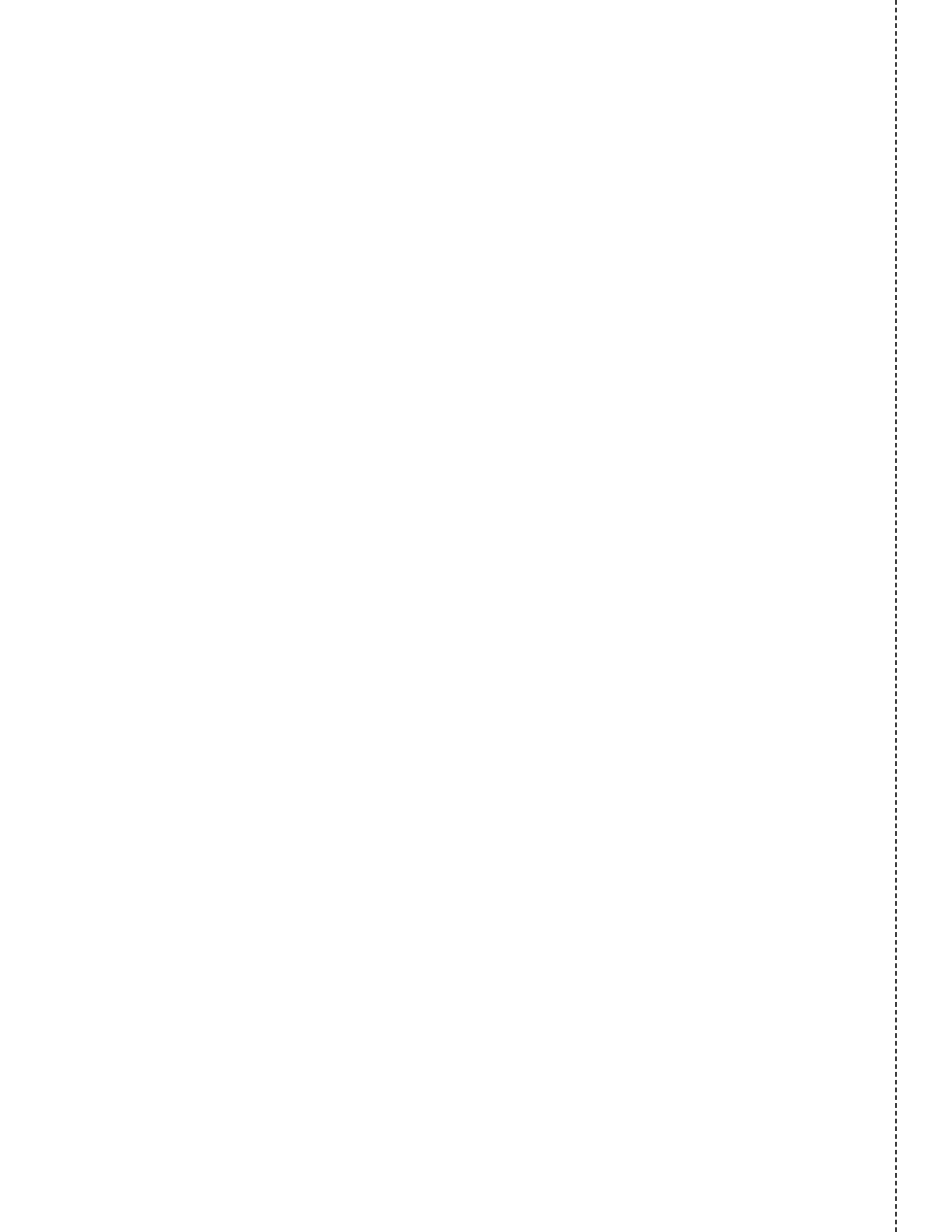
考試建議

以下建議可協助你獲得好成績：

- 在作出選擇之前，請仔細閱讀每一試題，好好思考後再作答。

- 本次考試提供數學工具（一把尺子、一個量角器和一個計算器）和一張參考資料供你使用。你可以自行決定使用各個工具和參考資料的時機。考試當中只要你覺得使用數學工具和參考資料能協助你解答就可以使用。

1 哪個圖表示 x 的線性函數？

A

C

B

D

2 請問以下所示表達式的值是多少？

$$\frac{1.6 \times 10^5}{0.2 \times 10^2}$$

A 0.8×10^3

B 8×10^3

C 0.8×10^7

D 8×10^7

3 在工廠，製造不同數量牙刷的成本如下表所示。

牙刷的成本

牙刷的數量	3	6	9	12
成本（美元）	$4.50	$9.00	$13.50	$18.00

線性函數根據製作的牙刷數量對成本進行建模。請問以下有關該函數變化率的陳述中哪個是正確的？

A 每多製作一把牙刷，成本增加 $1.50。

B 每多製作一把牙刷，成本增加 $4.50。

C 每多製作三把牙刷，成本增加 $9.00。

D 每多製作三把牙刷，成本增加 $18.00。

4 一家公司生產兩種不同大小的冰淇淋甜筒。小甜筒高 **3.5** 英寸，直徑是 **3** 英寸。大甜筒高 **5.1** 英寸，直徑是 **4.5** 英寸。大甜筒比小甜筒的體積大約大多少（近似到十分之一立方英寸）？

A 18.8

B 56.4

C 75.2

D 225.5

continued

5 克里斯和山姆鏟雪掙錢，如下所述。

- 克里斯賺取的金額可以用方程式 $y = 8.25x$ 來建模，其中 y 是 x 小時後賺取的總金額，以美元計算。

- 下表顯示了山姆賺取的總金額 y（以美元計算）和工作總時間 x（以小時計算）之間的關係。

山姆的收益

x	4	6	8
y	30	45	60

哪個陳述正確地比較了克里斯和山姆鏟雪掙錢的比率？

A　山姆每小時比克里斯多掙 $0.75。

B　克里斯每小時比山姆多掙 $0.75。

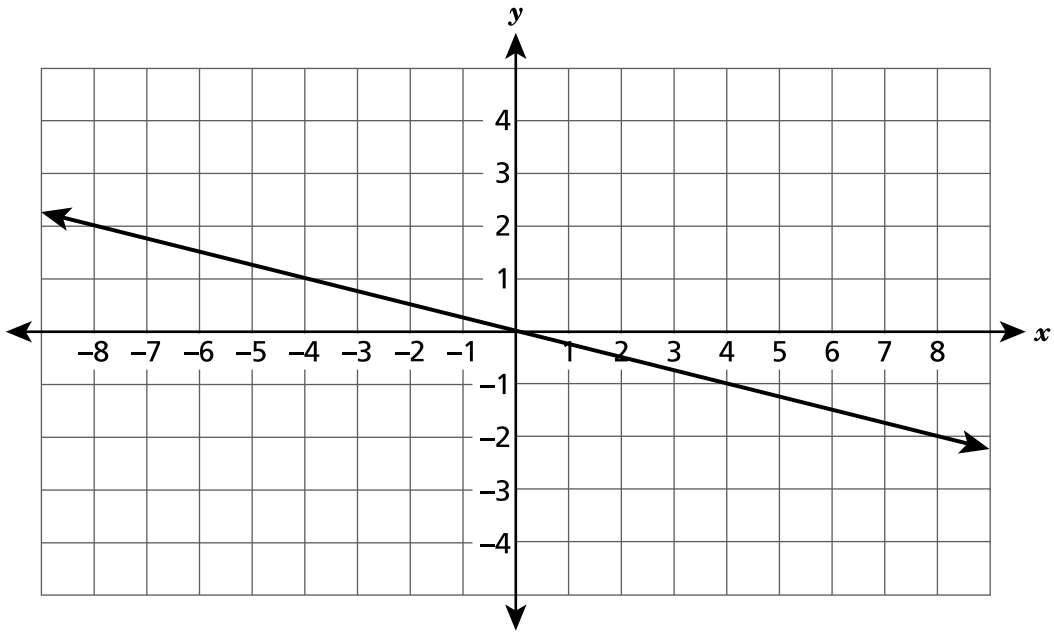**C**　山姆每小時比克里斯多掙 $0.25。

D　克里斯每小時比山姆多掙 $0.25。

6 哪個方程代表的 x 的函數**不是**線性的？

A　$y = 4(x + 3)$

B　$y = 4^2 + 3x$

C　$y = 4x + 3x^2$

D　$y = \dfrac{4 + x}{3}$

繼續

7 哪個方程式代表下面座標平面上顯示的線段？

A $y = 4x$

B $y = -4x$

C $y = \dfrac{1}{4}x$

D $y = -\dfrac{1}{4}x$

8 地球和火星之間的最近距離大約是 3.39×10^7 英里。離開地球最快的火箭以大約平均每小時 3.6×10^4 英里的速度飛行。按照這個速度，哪個表達式可以用來確定火箭飛行那段距離所需的大致小時數？

A $(3.39 \times 10^7) - (3.6 \times 10^4)$

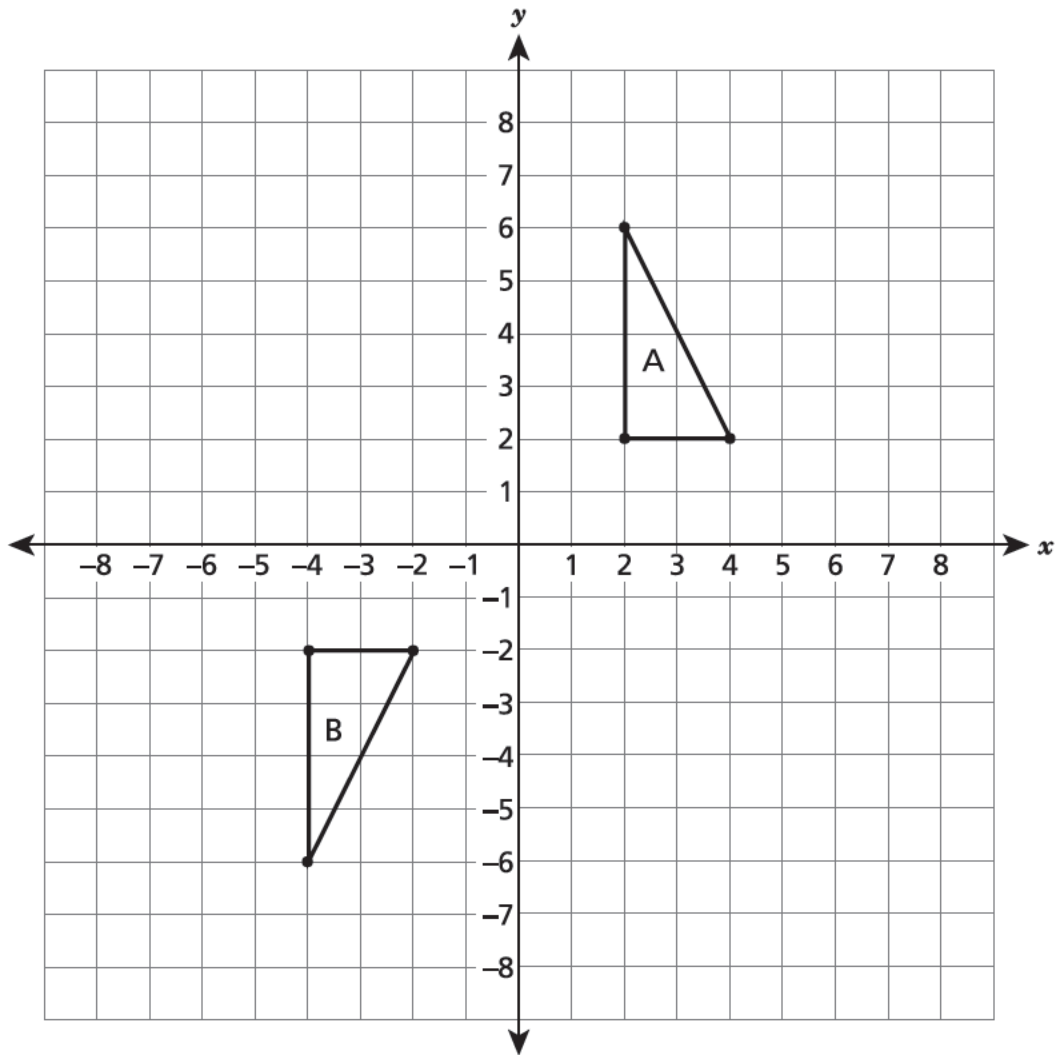**B** $(3.6 \times 10^4) - (3.39 \times 10^7)$

C $(3.39 \times 10^7) \div (3.6 \times 10^4)$

D $(3.6 \times 10^4) \div (3.39 \times 10^7)$

在下面的座標平面上繪製了三角形 A 和三角形 B 的圖形。

哪個變換序列將三角形 A 映射到其全等圖像，即三角形 B 上？

A　　沿 x 軸反射，然後沿 y 軸反射

B　　向下平移 8 個單位，然後沿 y 軸反射

C　　沿 x 軸反射，然後向左平移 6 個單位

D　　圍繞原點順時針旋轉 $90°$，然後向左平移 6 個單位

10 請問哪個方程組沒有解？

A $\begin{cases} 3x + 4y = 5 \\ 6x + 8y = 10 \end{cases}$

B $\begin{cases} 7x - 2y = 9 \\ 7x - 2y = 13 \end{cases}$
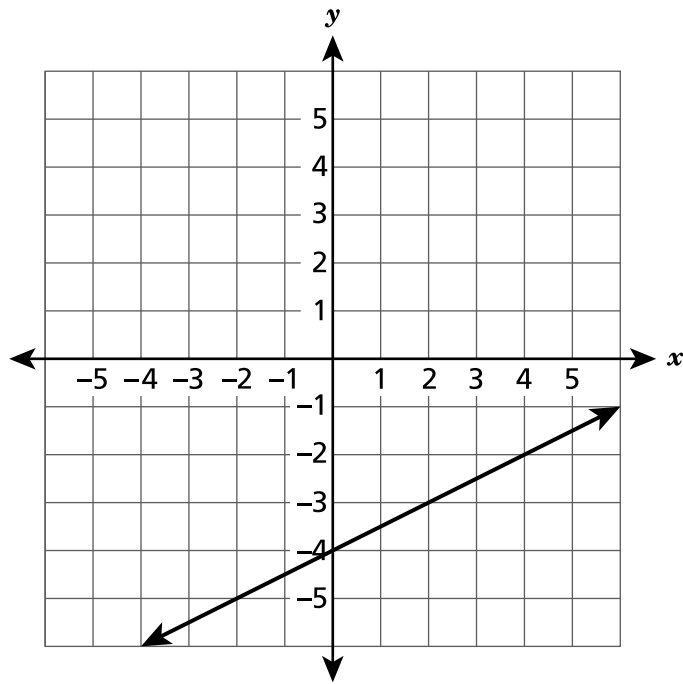
C $\begin{cases} 2x - y = -11 \\ -2x + y = 11 \end{cases}$

D $\begin{cases} 3x + 6y = 1 \\ x + y = 0 \end{cases}$

下方的座標平面上畫了一條直線。

線段 $y = -x + 2$ 將繪製在同樣的座標平面中以建立方程組。該方程組的解是什麼？

A $(-2, 4)$

B $(0, -4)$

C $(2, -4)$

D $(4, -2)$

12 線性函數 K 通過點 $(-3, 7)$ 和 $(3, 3)$。函數 K 的變化率是什麼？
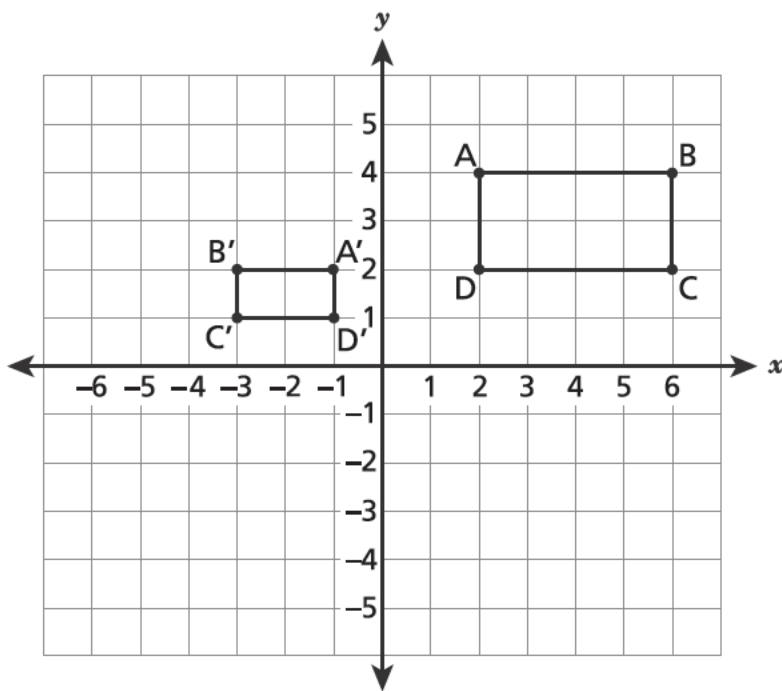
A $\quad -\dfrac{3}{2}$

B $\quad -\dfrac{2}{3}$

C $\quad \dfrac{3}{2}$

D $\quad \dfrac{2}{3}$

13 矩形 A′B′C′D′ 與矩形 ABCD 相似，如下面的座標平面所示。

哪個變換序列將矩形 ABCD 映射到矩形 A′B′C′D′？

A 向左平移 8 個單位，然後按比例因數 $\frac{1}{2}$ 擴大（擴大的中心為原點）

B 沿著 y 軸反射，然後按照比例因數 $\frac{1}{2}$ 擴大（擴大的中心為原點）

C 按照比例因數 $\frac{1}{2}$ 擴大（擴大的中心為原點），然後圍繞原點逆時針旋轉 90°

D 圍繞原點逆時針旋轉 90°，然後按照比例因數 $\frac{1}{2}$ 擴大（擴大的中心為原點）

14 帕蒂有一個矩形棱柱形狀的花盒，內部尺寸長為 15 英寸，寬為 8 英寸，高為 6 英寸。帕蒂將用

土填滿 $\dfrac{3}{4}$ 花盒。請問花盒裡有多少立方英寸的土？

A   387

B   516

C   540

D   720

15 在座標平面上，線段的圖通過原點和點 $(10, 14)$。請問該直線的方程式是什麼？

A $y = \dfrac{5}{7}x$

B $y = \dfrac{7}{5}x$

C $y = x + \dfrac{5}{7}$

D $y = x + \dfrac{7}{5}$

16 關於下面所示方程式的解的哪個陳述是正確的？

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

A   無解。

B   只有一個解，$x = -1$。

C   只有一個解，$x = -9$。

D   有無數個解。

17 進行了一項研究，以確定某種品牌摩托車的使用時間 x（以年計算）與其價值（以美元計算）之間的關係y。方程式 $y = -750x + 8,500$ 最恰當地對該數據進行了建模。根據這個方程式，使用了 5 年的摩托車估計價值是多少？

A $3,750

B $4,750

C $7,750

D $12,250

18 哪個陳述**最能**描述散點圖中的數據，其中 y 值隨著 x 值的增加而減小？

A   數據最好由縱線建模。

B   數據最好由橫線建模。

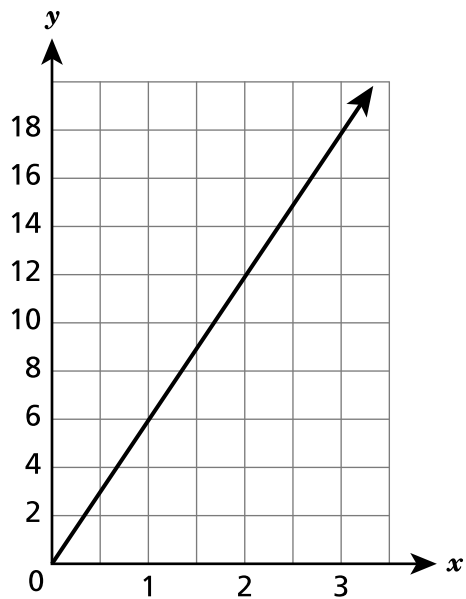C   數據最好由具有正斜率的線段建模。

D   數據最好由具有負斜率的線段建模。

19 哪種比例關係的變化率最大？

A $y = 7x$

C

x	y
0	0
2	8
4	16
6	24

B x的值每增加4，y 的值增加12。

D

20 一個花瓶的形狀是圓柱體，其直徑為 5 英寸，高為 7 英寸。請問以下哪個方程式可用來計算花瓶的容積（以立方英寸為單位）？

A $V = \pi(5)^2(7)$

B $V = \pi(7)^2(5)$

C $V = \pi(7)^2(2.5)$

D $V = \pi(2.5)^2(7)$

繼續

第 1 卷

21 水星距離太陽大約 3.6×10^7 英里，木星距離太陽大約 4.8×10^8 英里。木星比水星距離太陽大約遠多少倍？

    A   1.3

    B   7.5

    C   13.3

    D   17.3

22 哪個表達式等於 $\left(5^{-2}\right)^5 \times 5^4$？

    A 5^{12}

    B 5^7

    C $\dfrac{1}{5^6}$

    D $\dfrac{1}{5^{40}}$

23 線性函數 M 和 P 如下所示。

<div style="text-align:center">

函數 M

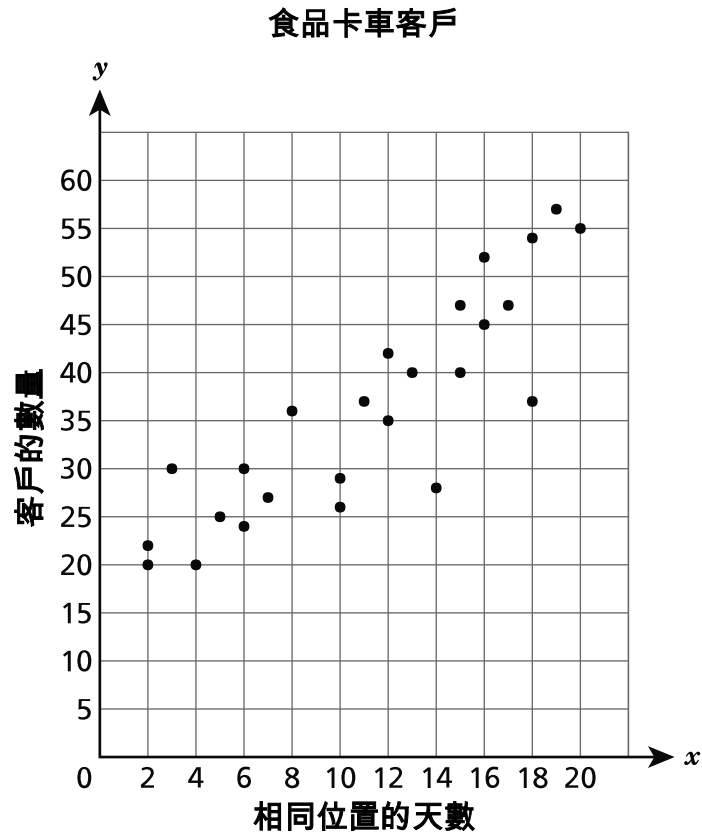| x	y
−2	−9
0	1
2	11
4	21

</div>

函數 P

$y = 7x + 9$

在比較變化率時，關於函數 M 和函數 P 的哪個陳述是正確的？

A   它們的變化率相差 2。

B   它們的變化率相差 4。

C   函數 M 比函數 P 的變化率大。

D   函數 M 和函數 P 的變化率一樣。
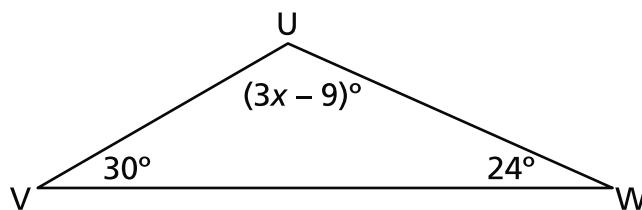
24 下面的散點圖顯示了每天前往食品卡車的平均客戶數量，具體取決於食品卡車停留在同一位置的天數。

食品卡車客戶

相同位置的天數

哪個陳述**最能**說明食品卡車在同一地點的天數與每天前往食品卡車的客戶數量之間的關係？

A 無關聯。

B 存在非線性關聯。

C 存在一個正線性關聯。

D 存在一個負線性關聯。

25 三角形 UVW 中的角度測量值如下圖所示。

請問 *x* 的值是多少?

A 21

B 39

C 45

D 126

26 函數的圖顯示在下面的座標平面上。
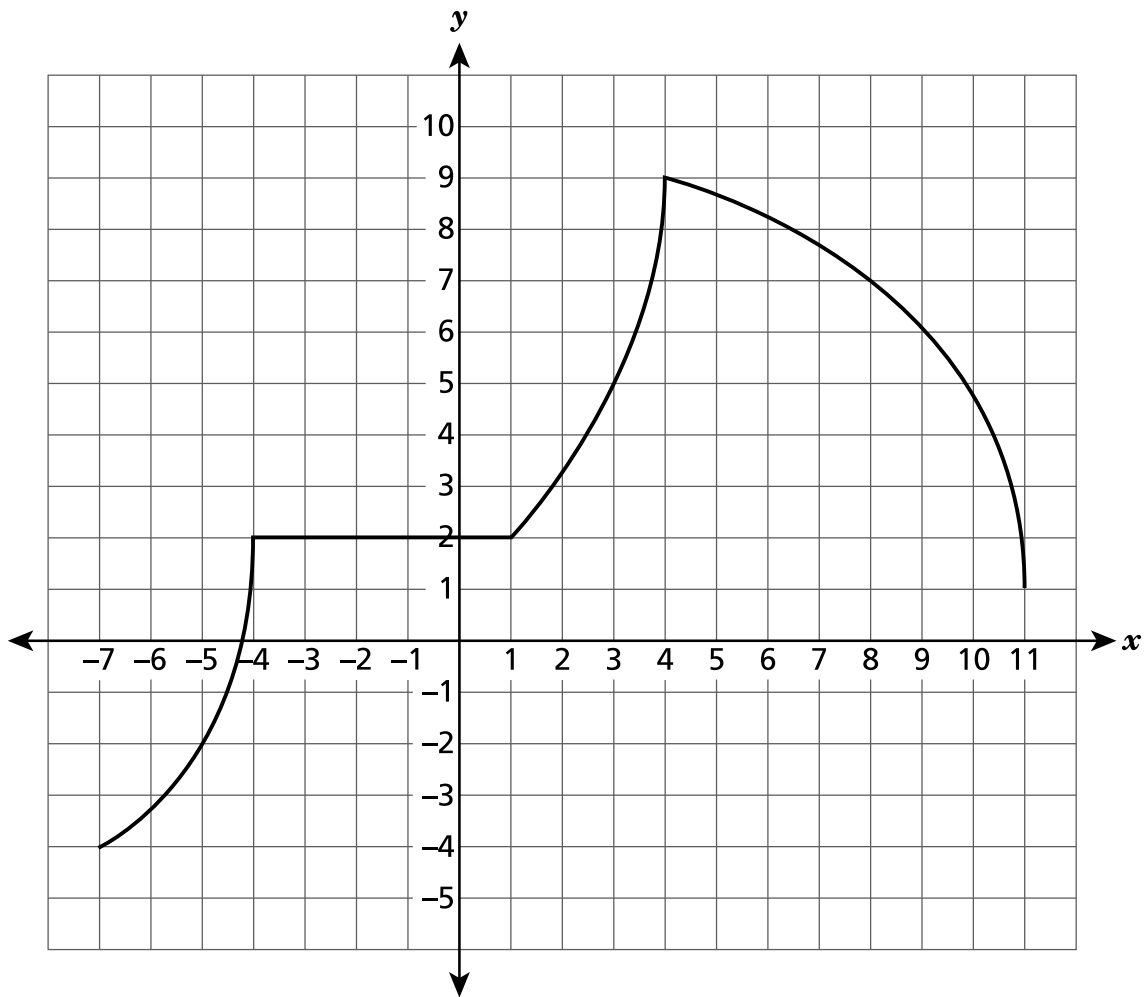
哪個陳述正確地描述了在指定間隔內的函數？

A 函數在 $x = -7$ 和 $x = -4$ 之間遞減且非線性。

B 函數在 $x = -4$ 和 $x = 1$ 之間遞增且呈線性。

C 函數在 $x = 1$ 和 $x = 4$ 之間遞增且呈線性。

D 函數在 $x = 4$ 和 $x = 11$ 之間遞減且非線性。

8 年級
數學考試
第 1 卷
v202

Grade 8
Mathematics Test
Session 1
v202

THE STATE EDUCATION DEPARTMENT
THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234
2021 Mathematics Tests Map to the Standards
Grade 8 Released Questions

Question	Type	Key	Points	Standard	Cluster	Subscore	Secondary Standard(s)
Session 1							
1	Multiple Choice	B	1	CCSS.Math.Content.8.F.A.3	Functions	Functions	
2	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.4	Expressions and Equations	Expressions and Equations	
3	Multiple Choice	A	1	CCSS.Math.Content.8.F.B.4	Functions	Functions	
4	Multiple Choice	A	1	CCSS.Math.Content.8.G.C.9	Geometry	Geometry	
5	Multiple Choice	B	1	CCSS.Math.Content.8.EE.B.5	Expressions and Equations	Expressions and Equations	
6	Multiple Choice	C	1	CCSS.Math.Content.8.F.A.3	Functions	Functions	
7	Multiple Choice	D	1	CCSS.Math.Content.8.EE.B.6	Expressions and Equations	Expressions and Equations	
8	Multiple Choice	C	1	CCSS.Math.Content.8.EE.A.4	Expressions and Equations	Expressions and Equations	
9	Multiple Choice	C	1	CCSS.Math.Content.8.G.A.2	Geometry	Geometry	
10	Multiple Choice	B	1	CCSS.Math.Content.8.EE.C.8b	Expressions and Equations	Expressions and Equations	
11	Multiple Choice	D	1	CCSS.Math.Content.8.EE.C.8b	Expressions and Equations	Expressions and Equations	
12	Multiple Choice	B	1	CCSS.Math.Content.8.F.B.4	Functions	Functions	
13	Multiple Choice	B	1	CCSS.Math.Content.8.G.A.4	Geometry	Geometry	
14	Multiple Choice	C	1	CCSS.Math.Content.7.G.B.6	Geometry	Geometry	
15	Multiple Choice	B	1	CCSS.Math.Content.8.EE.B.6	Expressions and Equations	Expressions and Equations	
16	Multiple Choice	C	1	CCSS.Math.Content.8.EE.C.7a	Expressions and Equations	Expressions and Equations	
17	Multiple Choice	B	1	CCSS.Math.Content.8.SP.A.3	Statistics and Probability		
18	Multiple Choice	D	1	CCSS.Math.Content.8.SP.A.2	Statistics and Probability		
19	Multiple Choice	A	1	CCSS.Math.Content.8.EE.B.5	Expressions and Equations	Expressions and Equations	
20	Multiple Choice	D	1	CCSS.Math.Content.8.G.C.9	Geometry	Geometry	
21	Multiple Choice	C	1	CCSS.Math.Content.8.EE.A.3	Expressions and Equations	Expressions and Equations	
22	Multiple Choice	C	1	CCSS.Math.Content.8.EE.A.1	Expressions and Equations	Expressions and Equations	
23	Multiple Choice	A	1	CCSS.Math.Content.8.F.A.2	Functions	Functions	
24	Multiple Choice	C	1	CCSS.Math.Content.8.SP.A.1	Statistics and Probability		
25	Multiple Choice	C	1	CCSS.Math.Content.8.G.A.5	Geometry	Geometry	
26	Multiple Choice	D	1	CCSS.Math.Content.8.F.B.5	Functions	Functions	

This item map is intended to identify the primary analytic skills necessary to successfully answer each question. However, some questions measure proficiencies described in multiple standards, including a balanced combination of procedural and conceptual understanding.