

Introduction to Quantitative Reasoning of GRE

GRE 数学小白必看

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GRE 冲分班数学

2022 年 6 月 3 日

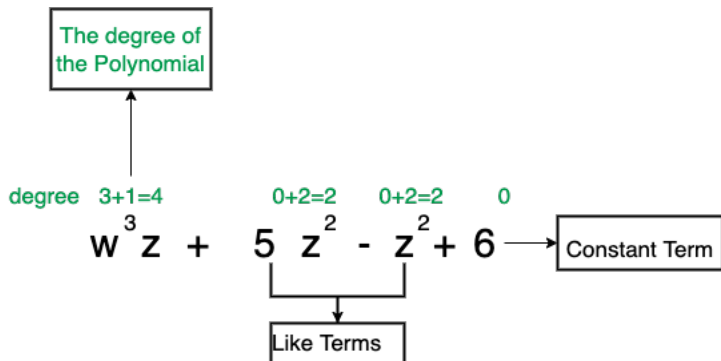
Algebra Expressions

Presentation Overview for Algebra Expressions

- ① Algebra Expressions
- ② Function and Graphs of Functions
- ③ Solving Linear Equations and Linear Inequalities
- ④ Solving Quadratic Equations
- ⑤ Applications

Terminologies of Algebra

代数专业名词



- Like Terms 同类项
- The Degree of a Polynomial 多项式的次数

A Real QR Problem!

The expression $x^4 + 2x^2y^2 + 9y^4$ is equivalent to which of the following?

☐ $(x^2 + 3y^2)^2$

☐ $(x^2 + 3y^2)(x^2 - 3y^2)$

☐ $(x^2 + 3y^2 + xy)^2$

☐ $(x^2 + 2xy + 3y^2)(x^2 - 2xy + 3y^2)$

☐ $(x^2 + 2xy - 3y^2)(x^2 - 2xy - 3y^2)$

图: 10-Sec3-19

凑中间项的系数 Answer **D**

Function and Graphs of Functions

Presentation Overview for Function and Graphs of Functions

① Algebra Expressions

② Function and Graphs of Functions

- Coordinate Geometry

- Linear Function

- Quadratic Function

- Piecewise-Defined Function

- Reflecting, Shifting and Stretching of Functions

③ Solving Linear Equations and Linear Inequalities

④ Solving Quadratic Equations

⑤ Applications

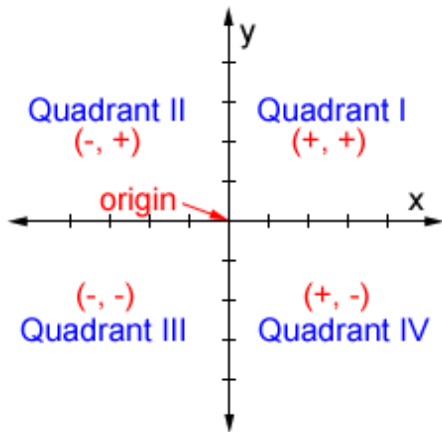
To Begin With

QR Mathematical Convention 2

When coordinate systems, such as and number lines, are shown with scales, you should read, estimate, or compare quantities by sight or by measurement, **according to the corresponding scales**.

Coordinate Geometry

象限的英文怎么说？



Linear Function

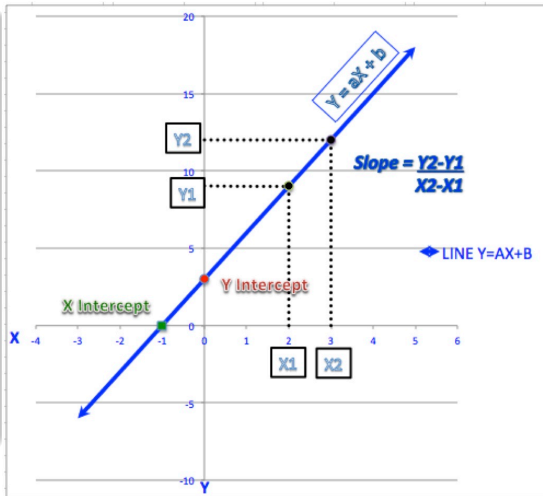
Slope and Intercepts

斜率和截距

定义

The graph of a linear equation of the form $y = mx + b$ is a straight line in the xy -plane, where m is called the **slope** of the line and b is called the **y-intercept**.

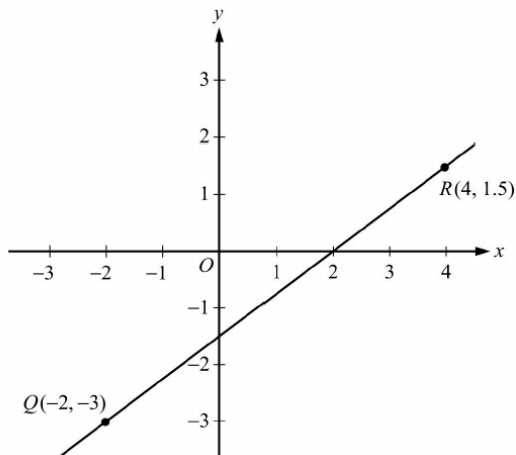
The x-intercepts of a graph are the **x-coordinates** of the points at which the graph intersects the x-axis.



Have a try!

两点确定一条直线

og-p385-2.8.1 Below shows the graph of the line through the points $Q(-2, -3)$ and $R(4, 1.5)$.



$$y = 0.75x - 1.5$$

看图 Drawn to scale

$$\text{slope} = \frac{1.5 - (-3)}{4 - (-2)} = \frac{4.5}{6} = \frac{3}{4} = 0.75$$

$$y - \text{intercept} = (-3) - 0.75 \text{ times } (-2) = -1.5$$

The Relation of Slopes for Parallel or Perpendicular

平行或垂直直线斜率关系

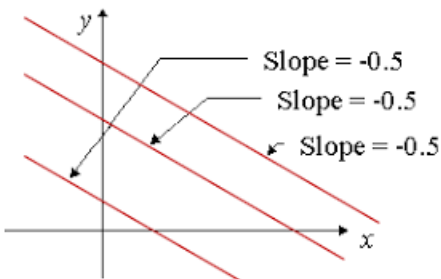


图: Two lines are parallel if their slopes are equal.

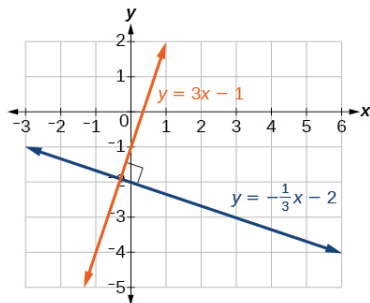
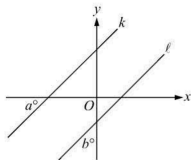


图: Two lines are perpendicular if their slopes are negative reciprocals of each other.

A Real QR Problem!



Lines k and l lie in the xy -plane and are parallel.

Quantity A

a

Quantity B

b

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

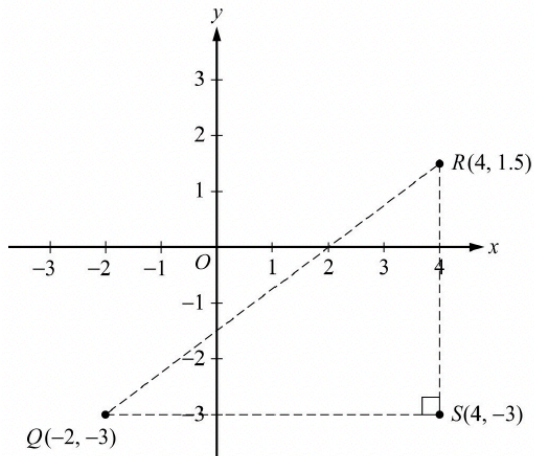
图: 6-Sec3-7

$$a^{\circ} + b^{\circ} = 90^{\circ}$$

Answer D The relationship cannot be determined from the information

Calculating the Distance Between Two Points

两点间距离



QR

$$\begin{aligned} &= \sqrt{QS^2 + RS^2} \\ &= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \\ &= \sqrt{6^2 + 4.5^2} \\ &= 7 \end{aligned}$$

Quadratic Function

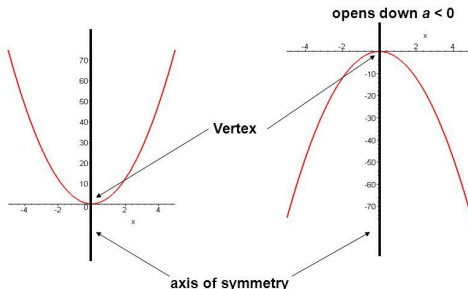
The Opening and Vertex of a Parabola

抛物线开口和顶点

定义

The graph of a quadratic equation of the form $y = ax^2 + bx + c$, where a , b , and c are constants and $a \neq 0$, is a **parabola**. The symmetric axis is $x = -\frac{2a}{b}$

- Opens up when $a > 0$



A Real QR Problem!

Which of the following could be a portion of the graph of $y = (x + 2)^2 - 5$ in the xy -plane?

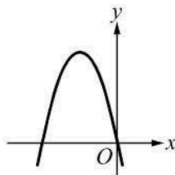
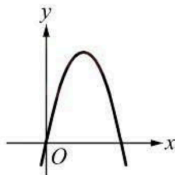
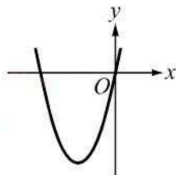
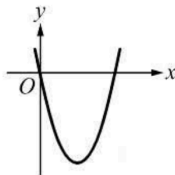
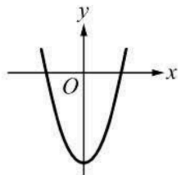


图: 6-Sec3-11

Piecewise-Defined Function

Piecewise-Defined Function

$$y = \begin{cases} -x & x \leq 0 \\ x & x \geq 0 \end{cases}$$

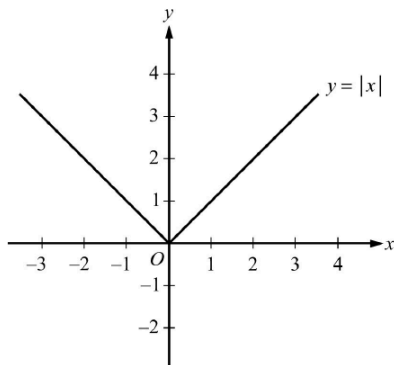


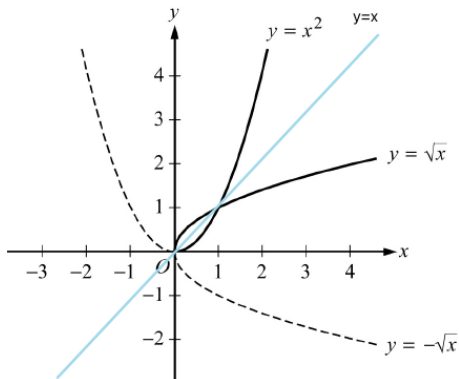
图: $y = |x|$

Reflecting, Shifting and Stretching of Functions

Reflecting Functions about $y = x$

定理 (调换 xy)

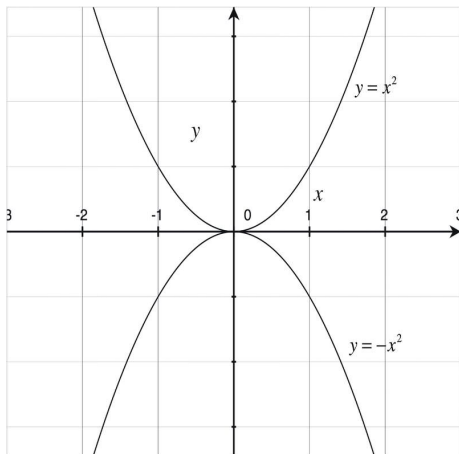
The inverse functions are the reflection of each other about $y = x$



Reflecting Functions about x — axis

定理 (函数右边加负号)

In general, for any function h , the graph of $y = -h(x)$ is the reflection of the graph of $y = h(x)$ about the x -axis.



Solving Linear Equations and Linear Inequalities

Presentation Overview for Solving Linear Equations and Linear Inequalities

- ① Algebra Expressions
- ② Function and Graphs of Functions
- ③ Solving Linear Equations and Linear Inequalities
 - Linear Equations in One Variable
 - Linear Equations in Two Variable
 - Solving Linear Inequalities
 - Graphing Linear Equations and Inequalities
- ④ Solving Quadratic Equations
- ⑤ Applications

Linear Equations in One Variable

Linear Equations in Two Variable

Solving Linear Inequalities

Graphing Linear Equations and Inequalities

Solving Quadratic Equations

Presentation Overview for Solving Quadratic Equations

① Algebra Expressions

② Function and Graphs of Functions

③ Solving Linear Equations and Linear Inequalities

④ Solving Quadratic Equations

Solving Quadratic Equations By the Quadratic Formula Or Factoring

Graphing Quadratic Equations

Graphing Circles

⑤ Applications

Solving Quadratic Equations By the Quadratic Formula Or Factoring

Graphing Quadratic Equations

Graphing Circles

Applications

Presentation Overview for Applications

- ① Algebra Expressions
- ② Function and Graphs of Functions
- ③ Solving Linear Equations and Linear Inequalities
- ④ Solving Quadratic Equations
- ⑤ Applications
 - Average, Mixture, Rate, and Work Problems
 - Interest

Average, Mixture, Rate, and Work Problems

Interest

1 Min Break

Questions? Comments?