## Air Review(Day 1)            Name:_____

## PART A:Solving Equations

$$\boxed{\text{Rules to Remember}}$$

1. $\underline{\text{P}}$arenthesis $\underline{\text{E}}$xponent $\underline{\text{M}}$ultiplication $\underline{\text{D}}$ivision $\underline{\text{A}}$ddition $\underline{\text{S}}$ubtraction

$$5 + 6^2 - (2+8)/5$$

$5 + 6^2 - 10/5$

$5 + 36 - 10/5$

$5 + 36 - 2$

$41 - 2$

$\boxed{39}$

# 2. Exponent Rules

★ $x^a \cdot x^b = x^{a+b}$

★ $\dfrac{x^a}{x^b} = x^{a-b}$

★ $(x^a)^b = x^{ab}$

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$$x^4 \cdot x^{15}$$

$X^{19}$

$$\dfrac{x^{15}}{x^3}$$

$X^{12}$

$$\left(x^{14}\right)^2$$

$X^{28}$

$$(4^1 m^2)^5$$

$$4^5 m^{10}$$

# 3. $F$irst $O$utside $I$nside $L$ast

$$(4m + 7)(2m - 3)$$

$$8m^2 - 12m + 14m - 21$$

$$8m^2 + 2m - 21$$
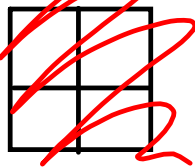
# 4. Adding/Multiplying Terms

Ex. $4x^3 + 4x^3$

$8x^3$

$4x^3 \cdot 4x^3$

$4 \cdot 4 \, x^3 \cdot x^3 \qquad 16x^6$

## 5. Factor

$ax^2 + bx + c = 0$

Box Method                    Grouping Method    (ac)

$x^2 + 10x + \boxed{16}$    $(x+2)(x+8)$

$1 \cdot 16$
$2 \cdot 8$
$4 \cdot 4$

$2x^2 - 30x + 72$    $2(x^2 - 15x + 36)$
$2(x-3)(x-12)$

$36$
$1 \cdot 36$
$2 \cdot 18$
$-3 \cdot 12$

$8x + 10xy + 12y + 15y^2$

$2x(4+5y) + 3y(4+5y)$

$(4+5y)(2x+3y)$

$2x^2 + 5x + 3$

$\frac{6}{\ }$
$1 \cdot 6$
$2 \cdot 3$

$2x^2 + 2x + 3x + 3$                    $ax^2 + bx + c$

$2x(x+1) + 3(x+1)$

$(x+1)(2x+3)$

# 6. Quadratic Formula

$ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Solve for x:   $3x^2 + 8x + 11 = 10$

$$\underline{-10 \quad -10}$$

$$3x^2 + 8x + 1 = 0$$

$a = 3$

$b = 8$

$c = 1$

$$x = \frac{-8 \pm \sqrt{\overset{64-12}{64 - 4 \cdot 3 \cdot 1}}}{6}$$

$$x = \frac{-8 \pm \sqrt{52}}{6}$$

$$-8 + \sqrt{52} = \div 6$$

$$-8 - \sqrt{52} = \div 6$$

The equation shown is used to find the force of gravity, $F$, between two objects, where

- $G$ is the gravitational constant,

- $m_1$ and $m_2$ are the masses of the two objects, and

- $r$ is the distance between the two objects.

$$F = \frac{Gm_1 m_2}{r^2}$$

Which equation correctly shows the distance between the two objects?

(A)  $r = \dfrac{\sqrt{F}}{Gm_1 m_2}$

(B)  $r = \dfrac{\sqrt{Gm_1 m_2}}{F}$

(C)  $r = \sqrt{\dfrac{F}{Gm_1 m_2}}$

●  $r = \sqrt{\dfrac{Gm_1 m_2}{F}}$

$$r^2 F = \frac{Gm_1 m_2}{r^2} r^2$$

$$\frac{r^2 F}{F} = \frac{Gm_1 m_2}{F}$$

$$\sqrt{r^2} = \sqrt{\frac{Gm_1 m_2}{F}}$$

$$r = \sqrt{\frac{Gm_1 m_2}{F}}$$

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An equation is shown.

$$3x + \frac{4}{5} = 7 - 2x$$

$$\longrightarrow \quad 15x + 4 = 35 - 10x$$

What is the solution to the equation?

$$+10x \qquad\qquad +10x$$

$$\overline{\qquad\qquad\qquad}$$

$$25x + 4 = 35$$

$$-4 \quad -4$$

$$x = \boxed{\ 31/25\ }$$

$$\frac{25x}{25} = \frac{31}{25}$$

$$x = 31/25$$

An expression is shown.

$(2x - 3) + [4x(3x + 2)]$

Which expression is equivalent to the given expression?

(A)  $9x - 1$

(B)  $14x + 5$

(C)  $12x^2 + 2x - 1$

(D)  $12x^2 + 10x - 3$

*(handwritten)*  $2x - 3 + 12x^2 + 8x$

$12x^2 + 10x - 3$

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Select all of the expressions that are equivalent to $16^{\frac{5}{2}}$.

☐ $4^5$

☐ $8^5$

☐ $\sqrt{16^5}$

☐ $\sqrt[5]{16^2}$

☐ $(16^2)(16^{\frac{1}{2}})$

☐ $(16^5)(16^{\frac{1}{2}})$

*(handwritten)*

→ inside
→ outside

$(4^2)^{\frac{5}{2}}$

$4^5$
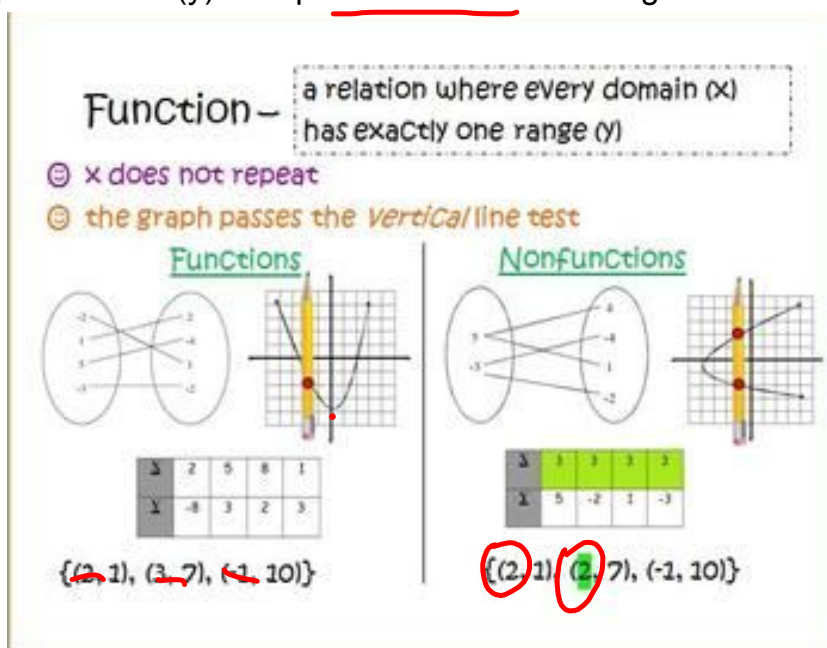
$\sqrt[2]{16^5}$

$\sqrt{16^5}$

$16^{2.5} = 16^{5/2}$

$16^{5.5} = 16^{11/2}$

# PART B: Functions/Lines

## Definition: A function is an equation which shows the relationship between the input x and the output y and where there is exactly one output for each input.
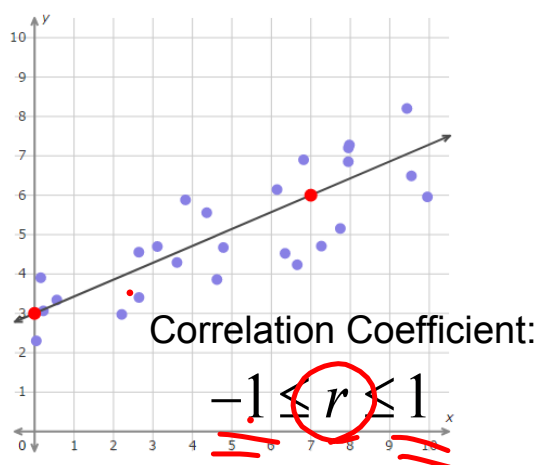
Input variable (x) = Independent variable = Domain

Output variable (y) = Dependent variable = Range

# Line of best fit: A line on a graph showing the general direction that a group of points seem to be heading
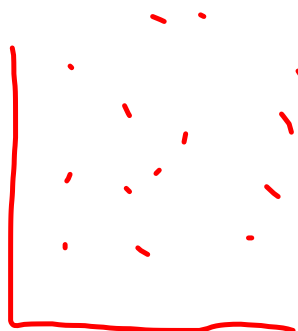
Desmos! $y_1 \sim mx_1 + b$

Correlation Coefficient:

$$-1 \leq r \leq 1$$

$r = -.96$

$r = .92$

| x | y |
|---|---|
| 0 | -5 |
| 1 | 2 |
| 2 | 8 |
| 3 | 25 |
| 4 | 77 |

$y=mx+b$    slope-int

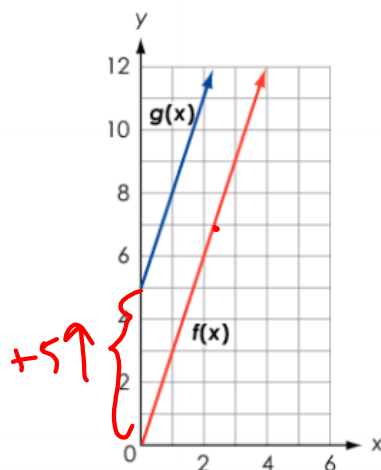$Ax + By = C$    Standard

$y - y_1 = m(x - x_1)$

point-slope

Find the equation of the line that goes through (5,7) and has a slope of -3.  Use slope intercept form.

m

What is the slope and y-intercept of
2 x + 8 y = 20

Find the equation of the line that goes through (3, -7) and (8, 2). Use point slope form.

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

The graphs of two functions, $f(x)$ and $g(x)$, where $g(x) = f(x) + h$, are shown.

*(handwritten)* +5↑

Graph labeled g(x) and f(x) with y-axis from 0 to 12 and x-axis marked at 2, 4, 6.

Based on the graph, what is the value of $h$?

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Henry places $x$ marbles into an empty bucket. Each marble has the same weight.

The weight, in ounces, of the bucket and marbles can be calculated using the expression shown.

$3x + 8$

What does the term 8 represent in this expression?

Ⓐ   the weight of each marble

**Ⓑ**   the weight of the empty bucket

Ⓒ   the number of marbles in the bucket

Ⓓ   the total weight of the bucket and marbles

*(handwritten)*
$3x + 8$
weight of marble → $3x$
empty Bucket ← $8$
#marbles → $x$

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Ryan works for a delivery service. The function $f(n)$ is used to calculate his daily pay, in dollars, on a day when he makes $n$ deliveries.

$f(n) = 7n + 96$

Use the function to complete the table shown.

| Number of Deliveries | Daily Pay (dollars) |
|---|---|
| 0 | 96 |
| 5 | 131 |
| 7 | 145 |

*(handwritten)*

$7(0)+96$
$0+96$
$96$

$7(5)+96$
$35+96$
$131$

$145 = 7n + 96$
$\phantom{145} -96 \quad -96$
$49 = 7n$
$\dfrac{49}{7} = \dfrac{7n}{7}$
$n = 7$

Some values for a function are shown in the table.

| x | f(x) |
|---|------|
| 0 | 0 |
| 2 | 25 |
| 3 | 50 |

Which statement best describes the function?

Ⓐ   It is linear because $f(x)$ increases by a constant amount compared to $x$.

Ⓑ   It is linear because $f(x)$ increases by a constant percentage compared to $x$.

Ⓒ   It is not linear because $f(x)$ does not increase by a constant amount compared to $x$.

Ⓓ   It is not linear because $f(x)$ does not increase by a constant percentage compared to $x$.

Which graph represents a function whose domain is the set of non-negative real numbers?
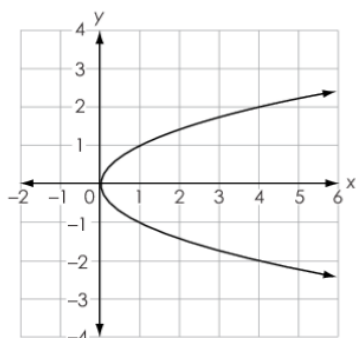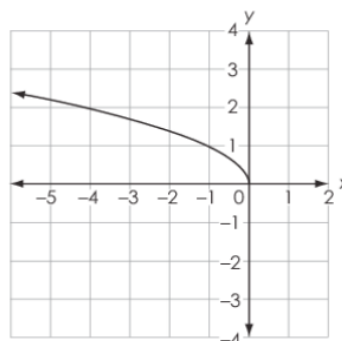
Ⓐ

Ⓒ

Ⓑ

Ⓓ
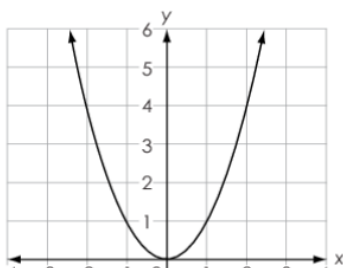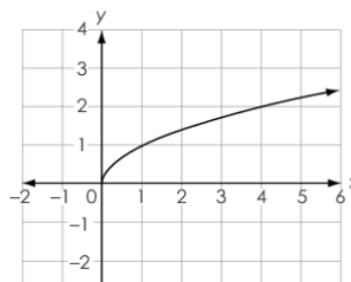
Trent plants a sunflower that is 6 inches tall. The sunflower is expected to grow at an average rate of 1.5 inches per day during the next month.

A.  Create an equation that Trent can use to find the number of days, $x$, it will take the sunflower to grow to a height of 45 inches.

B.  How many days will it take the sunflower to grow to a height of 45 inches?

A. [                    ]

B. [                    ] *days*

Bryson collects data on the depth of a river at various points and the velocity of the river at those points. His data have a correlation coefficient of –0.9382.

Which scatterplot could represent Bryson's data?
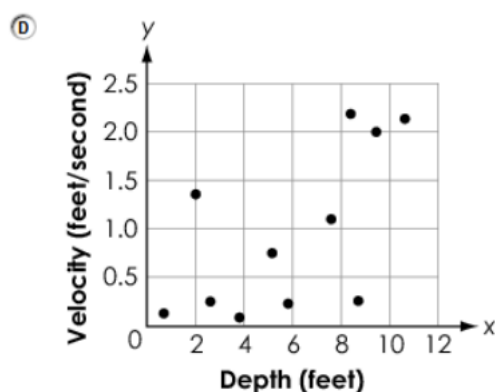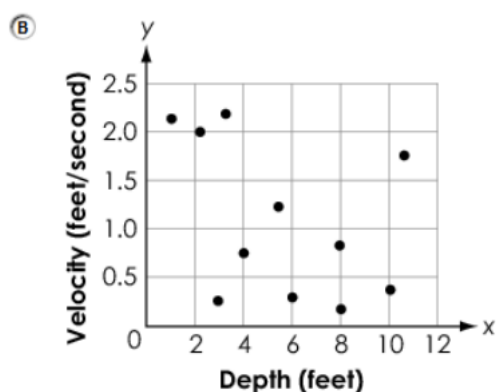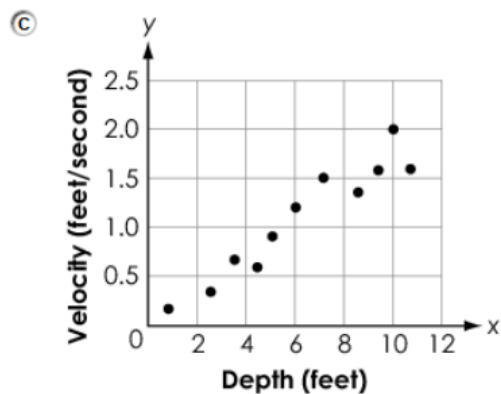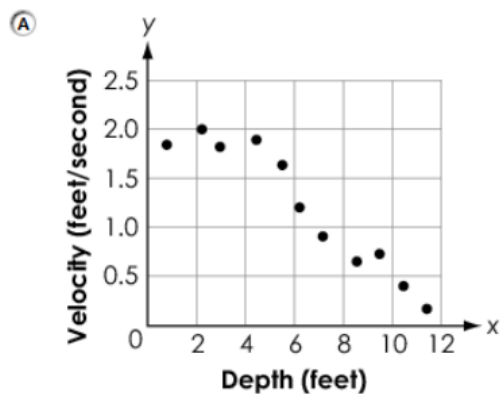


Some of the steps in Raya's solution to $2.5(6.25x + 0.5) = 11$ are shown.

| Statement | Reason |
|---|---|
| 1. $2.5(6.25x + 0.5) = 11$ | 1. Given |
| 2. | 2. |
| 3. | 3. Subtraction property of equality |
| 4. $x=0.624$ | 4.        ? |

Select the correct reason for line 4 of Raya's solution.

- Closure property
- Distributive property
- Addition property of equality
- Division property of equality
- Symmetric property of equality