Name: ANSWER KEY Period: 1 OF 6

DTMD: Four Questions - Note Taking Guide

Write in words a complete and thorough explanation of what process or procedures one would go through to arrive at a GRAPHED SHAPE for the following problems...

$y = 2x + 4$

STUDENT ANSWERS MAY VARY ~

- FIND y INTERCEPT : (0,4)
- PLOT " " ON AXIS PLANE
- COUNT SLOPE FROM (0,4) UP 2, RIGHT 1
- CONNECT DOTS W/ STRAIGHT LINE
- LABEL AXIS & (0,4)

$y = 2(x - 4) + 12$

STUDENT ANSWERS MAY VARY ~

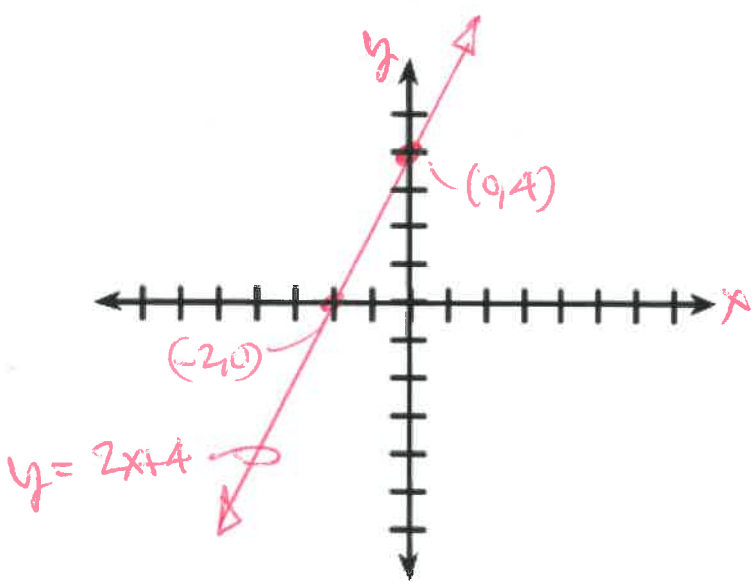
- SIMPLIFY RIGHT SIDE OF EQUATION
- SEE ABOVE STEPS
- LABEL AXIS & (0,4)

Graph the function ***y* = 2*x* + 4** on the axis plane using the table below:

① ②

x	y
-2	0
-1	2
0	4
1	6
2	8

"b" *



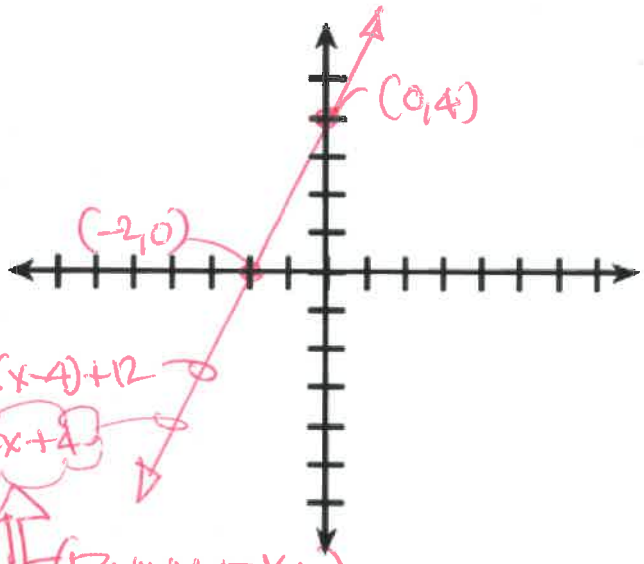
Name: ANSWER KEY Period: 2 OF 6

DTMD: Four Questions - Note Taking Guide

Graph the function ***y = 2(x - 4) + 12*** on the axis plane using the table below:

x	y
-2	0
-1	2
0	4
1	6
2	8

$m = \frac{\Delta y}{\Delta x} = \frac{2}{1}$



$y = 2(x-4)+12$

$y = 2x+4$

(EQUIVALENCE)

Given the functional form: $y = a(x - h)^n + k$ (FROM DESMOS EXPLORATION)

What might changing "***a***" do?

- SQUEEZE & STRETCH FUNCTION
- FLIPS (REFLECTS ABOUT "X" AXIS) FUNCTION

What might changing "***n***" do?

- CHANGES END BEHAVIORS
  → EVEN: ↑↑ OR ↓↓ // ODD: ↑↓ OR ↓↑

What might changing "***h***" do?

- MOVES FUNCTION LEFT OR RIGHT WITHOUT CHANGING ITS SHAPE

What might changing "***k***" do?

- MOVES FUNCTION UP OR DOWN WITHOUT CHANGING ITS SHAPE

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DTMD: Four Questions - Note Taking Guide

Create a Reference Key for yourself…

Four Questions:

1) Is the function even or odd?

impliciation:

2) Is the function positive or negative?

impliciation:

3) How many curves (max)?

impliciation: EXPONENT − 1 = # OF CURVES

4) Where is (h, k) = (?, ?)

impliciation: * → AS IS; → OPPOSITE

DETERMINES "QUADRANT" WHICH CONTAINS "VERTEX" OR CRITICAL POINT (h, k)

Where do I look for the ANSWERS…

2 1 3

$$y = a(x - h)^n + k$$

4* 4

OPP AS IS

Vocabulary Development:

DOMAIN:	"x"	Input
RANGE:	"y"	Output

What Do You Notice (What Pattern)?

X BEFORE Y

D BEFORE R

I BEFORE O

THEY ARE ALL IN ALPHABETICAL ORDER

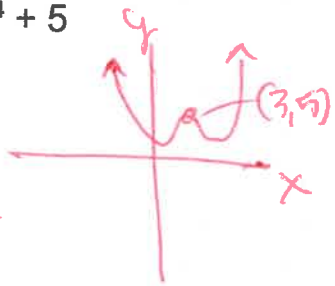
Name: ANSWER KEY Period: 4 OF 6

DTMD: Four Questions - Note Taking Guide

SKETCHING FUNCTIONS:

$y_1 = 2(x - 3)^4 + 5$

① EVEN ∪ ✗
② pos ∪
③ 4-1 = ③
④ (3, 5) QI

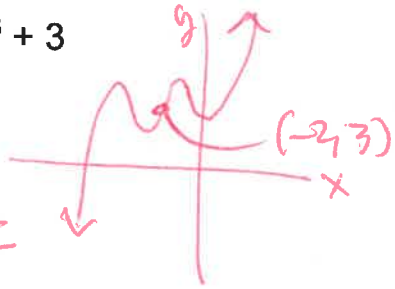


$q(x) = -(x + 4)^3 - 2$

① odd ↔
② neg ↘
③ 3-1 = ②
④ (-4,-2) QIII

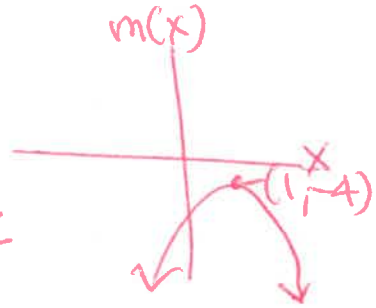
$y_2 = (x + 2)^5 + 3$

① odd ↔
② pos ↗
③ 5-1 = ④
④ (-2,3) QII



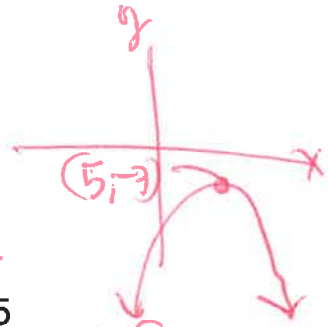
$m(x) = -(x - 1)^2 - 4$

① Even ∪ ✗
② neg ∩
③ 2-1 = ①
④ (1, -4) Q = IV



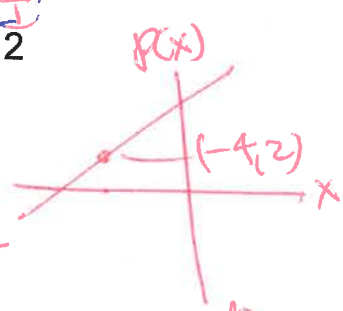
$y_3 = (x - 5)^2 - 3$

① Even ∪ ✗
② pos ∪
③ 2-1 = ①
④ (5,-3) Q IV



$p(x) = -(x + 4)^1 + 2$ * SLOPE $\frac{-1}{1}$

① ODD —
② NEG ↘
③ 1-1 = 0 *
④ (-4,2) QII

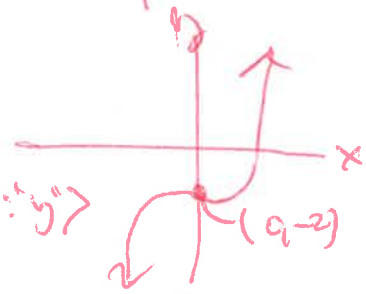


$f(x) = 3(x - 0)^4 + 5$

① EVEN ✗ ∪
② pos ∪
③ 4-1 = ③
④ (0,5) <ON AXIS: "y">

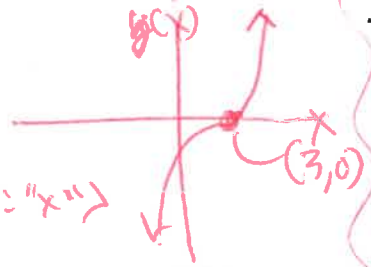
$y_4 = 3x^3 - 2$

① odd —
② pos ↗
③ 3-1 = ②
④ (0,-2) <ON AXIS: "y">



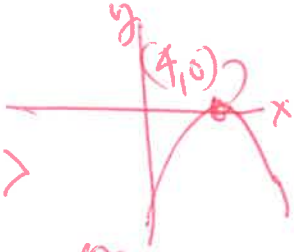
$y(x) = 2(x - 3)^3 + 0$

① odd —
② pos ↗
③ 3-1 = ②
④ (3,0) <ON AXIS: "x">



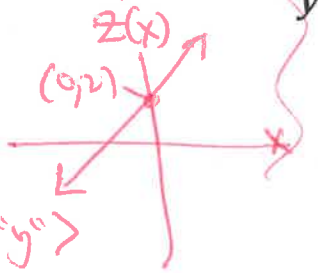
$y_5 = -(x + 4)^2$

① EVEN ∩ ✗
② NEG ∩
③ 2-1 = ①
④ (4,0) <ON AXIS: "x">



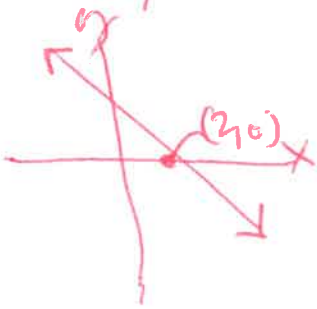
$z(x) = (x - 0)^1 + 2$

① odd — * SLOPE $\frac{1}{1}$
② pos ↗
③ 1-1 = 0 *
④ (0,2) <ON AXIS: "y">



$y_6 = -(x + 2)^1 - 0$

① odd — * SLOPE $\frac{-1}{1}$
② NEG ↘
③ 1-1 = 0 *
④ (2,0)



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DTMD: Four Questions - Note Taking Guide

Reflect and Extend:

Are these equivalent expressions? Explain your answer below:

$y - k = a(x - h)^n$ vs. $y = a(x - h)^n + k$

$y - \cancel{k} = a(x-h)^n$
$\cancel{+k}$ $+k$
$y = a(x-h)^n + k$

$\boxed{\therefore \text{ YES}}$

How are the two formula similar?

$y - k = a(x - h)^n$ vs. $y - y_1 = m(x - x_1)^n$

WE SEE USING THIS GRAPHIC ORGANIZER THAT THE STRUCTURE OF THE EQUATIONS ARE $\boxed{\text{SIMILAR}}$

How are they different?

$y_1 \longleftrightarrow k$ $x_1 \longleftrightarrow h$

CORRESPONDING PARTS OF EQUATIONS HAVE DIFFERENT VARIABLES

Could these be equivalent expressions? Explain your answer below:

$y = mx^{n=1} + b$ vs. $y - y_1 = m(x - x_1)^{n=1}$ @ $n=1$

$y = mx^1 + b$

$y - \cancel{y_1} = mx^1 - mx_1 + y_1$
$\cancel{+y_1}$

$y = mx^1 - mx_1 + y_1$

$y = mx^1 \underbrace{(-mx_1 + y_1)}_{b}$

$\boxed{\text{POSSIBLY}}$

IF $b = -mx_1 + y_1$

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DTMD: Four Questions - Note Taking Guide

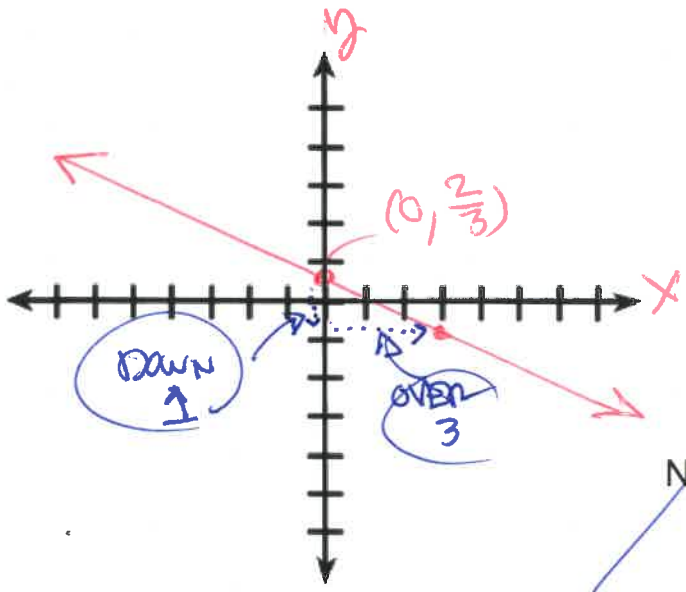
Write the following Linear forms under their respective heading:

Slope Intercept Form:	Point Slope Form:
$y = mx + b$	$y - y_1 = m(x - x_1)$

How might the "FOUR QUESTIONS" help you graph LINEAR functions?

1. odd or even works
2. pos or neg works
3. exp −1 works
4. (h,k) is HELPFUL (works)

Graph the following by converting from its present form to "slope-intercept" form… convert first, then use your four questions to check your accuracy:



$y = \frac{1}{3}(x - 4)^1 + 2$ convert below:

$y = \frac{1}{3}x - \frac{4}{3} + \frac{2(3)}{1(3)}$

$y = -\frac{1}{3}x - \frac{4}{3} + \frac{6}{3}$

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

① ③ ② ④ "x"

Now Graph…

Now use Four Questions to check:

1. ODD —
2. NEG ↘
3. $1 - 1 = 0$
4. $(0, \frac{2}{3})$

WHEN MY EXPONENT IS "1" THEN "a" IS ACTUALLY SLOPE "m"

↳ TO HELP SKETCH W/ ACCURACY