3-3-2016

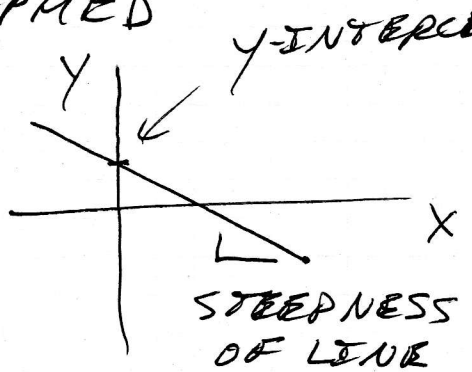
LINES

EQUATIONS OF THE FORM

$$y = ax + b$$

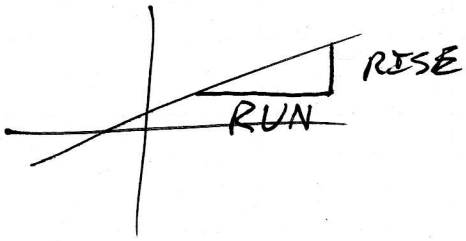
ARE LINES WHEN GRAPHED

MEMORIZE { a = SLOPE; b = Y-INTERCEPT



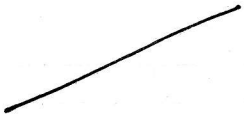
SLOPE

$$a = \frac{\text{RISE}}{\text{RUN}}$$



~~SLOPE~~

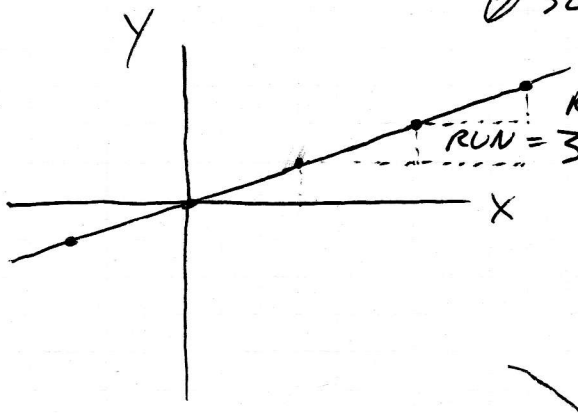
SIGN OF SLOPE:



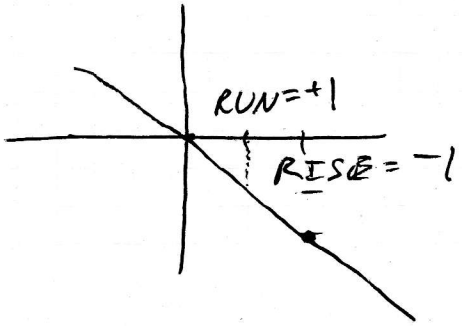
POSITIVE SLOPE (UPHILL LEFT-TO-RIGHT)

NEGATIVE SLOPE (DOWNHILL LEFT-TO-RIGHT)

0 SLOPE



$$a = \frac{1}{3}$$

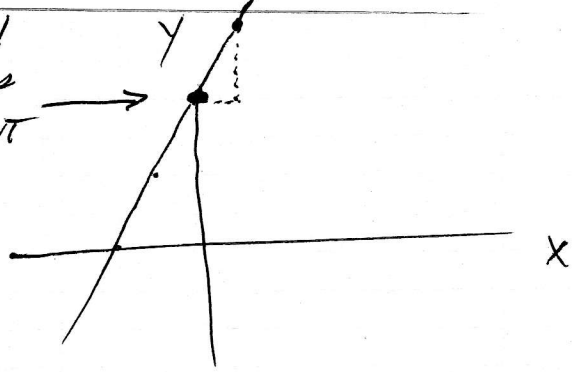


$$a = \frac{-1}{1} = -1$$

CONSTRUCTING A LINE FROM ITS EQUATION

$y = 2x + 4$

SLOPE Y-INT

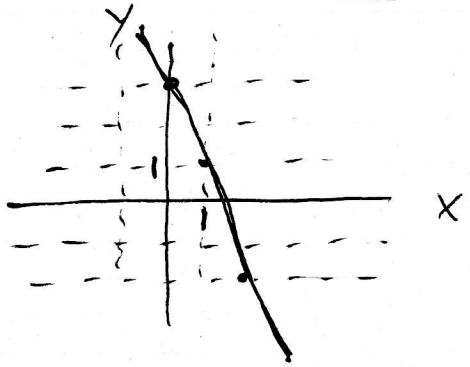


$\frac{2}{1} = 2 = \frac{\text{RISE}}{\text{RUN}}$

IDENTIFY THE EQUATION FROM THE GRAPH

b = Y-INT: $+3$

a = SLOPE: $-\frac{2}{1} = -2$



$y = ax + b$

$y = -2x + 3$

QUADRATICS

EQUATIONS OF THE FORM

$$y = ax^2 + bx + c$$

($a \neq 0$; b, c MAY BE 0)

MEMORIZE:
- a = CURVATURE
- c = Y-INTERCEPT

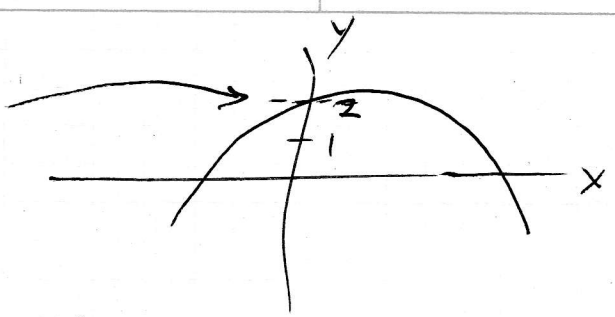
2 POSSIBILITIES FOR CURVATURE

OR

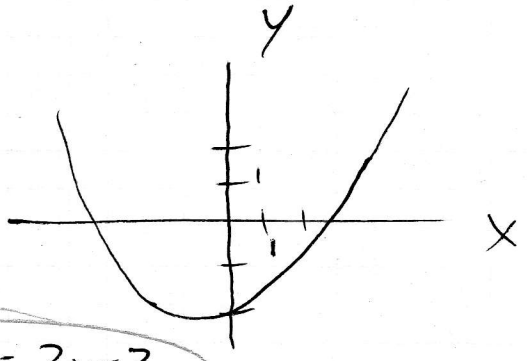
$a > 0$
POSITIVE CURVATURE

$a < 0$
NEGATIVE CURVATURE

c = y-INTERCEPT:
+2



IDENTIFYING A QUADRATIC BASED ON ~~IT~~ ITS GRAPH



y-INT: −2
CURV: +

OPTIONS

(a) ~~y = 2x + 2~~ (c) y = 2x − 2
(b) ~~y = −2x + 2~~ (d) ~~y = −2x − 2~~

(CHECK BY PLOTTING SOME NUMBERS: TRY x = 0, y = 2; x = 1, y = 0)

SOLVING FOR THE UNKNOWN IN A QUADRATIC EQUATION

QUADRATIC EQUATION IS OF THE FORM

$$0 = ax^2 + bx + c \qquad (\text{UNKNOWN} = x)$$

SOLVED BY USING THE QUADRATIC FORMULA

MEMORIZE THIS

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

SONG: 'POP GOES THE WEASEL'

$ax^2 + bx + c$

EXAMPLE: $2x^2 + x - 3 = 0$

SHOW YOUR WORK

$a = 2$
$b = 1$
$c = -3$

PLUG INTO QUAD. FORMULA

$$x = \frac{-(1) \pm \sqrt{(1)^2 - 4(2)(-3)}}{2 \cdot (2)}$$

FOR EXAM YOU CAN STOP HERE

$$x_1 = \frac{-1 + \sqrt{1^2 + 4 \cdot 2 \cdot 3}}{2 \cdot 2} = \frac{-1 + \sqrt{25}}{4}$$

$$= \frac{-1 + 5}{4} = 1$$

$$x_2 = \frac{-1 - \sqrt{25}}{4} = \frac{-6}{4} = -\frac{3}{2}$$

EXAMPLE: $x^2 - 2x + 1 = 0$

$a = 1$
$b = -2$
$c = 1$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(1)}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{4 - 4}}{2}$$

$x_1 = 1$ AND $x_2 = 1$

EXAMPLE: $0 = 4 - x^2 = -x^2 + 0x + 4$

$$x = \frac{-0 \pm \sqrt{0 - 4 \cdot (-1)(4)}}{2(-1)} = \pm 2$$

$a = -1$
$b = 0$
$c = 4$

EXAMPLE: $3x^2 - 2x = 6$ $\qquad ax^2 + bx + c = 0$

$-6 \quad -6$

$3x^2 - 2x - 6 = 0$

$a \quad b \quad c$

EXAMPLE: ~~$(x-2)(x+1)=0$~~

$(x-2)x = 0$

DISTRIBUTE x ACROSS PARENTHESES

$x \cdot x - 2 \cdot x = 0$

$x^2 - 2x + 0 = 0$

$a = 1 \quad b = -2 \quad c = 0$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(0)}}{2(1)}$$

$$= \frac{2 \pm 2}{2} = \frac{4}{2} \text{ AND } \frac{0}{2} = 2 \text{ AND } 0$$