

12TH GRADE MATH PLACEMENT EXAM

1 Factor the following expressions

A) $x^2 - 81 = (x+9)(x-9)$

B) $4x^2 - 49 = (2x+7)(2x-7)$

C) $x^2 - 6x - 40 = (x+10)(x-4)$

D) $6x^2 + 5x - 4 = (2x-1)(3x+4)$

2. (A) $(3x+6)(-2x-3)$

Solution

$$\begin{aligned} 3x(-2x-3) + 6(-2x-3) \\ -6x^2 - 9x + 12x - 18 \\ -6x^2 - 21x - 18 \text{ or} \\ 6x^2 + 21x + 18 \end{aligned}$$

B) $(3x^2+2x-4)(4x-1)$

$$\begin{aligned} 4x(3x^2+2x-4) - 1(3x^2+2x-4) \\ 12x^3 + 8x^2 - 16x - 3x^2 - 2x + 4 \\ 12x^3 + 8x^2 - 3x^2 - 16x - 2x + 4 \\ 12x^3 + 5x^2 - 18x + 4 \end{aligned}$$

3. Find the slope of the line connecting the points $(-3, 4)$ and $(5, -2)$

Solution

$$\begin{aligned} \frac{4 - (-2)}{-3 - 5} &= \frac{6}{-8} = \frac{3}{-4} \\ &= -\frac{3}{4} \\ &= \underline{\underline{-\frac{3}{4}}} \end{aligned}$$

4. Find equation of the line
Slope 3 and a y intercept of -5
 $(0, -5)$ 3

$$\frac{y - (-5)}{x - 0} = 3$$

$$\frac{y + 5}{x - 0} = 3$$

$$y + 5 = 3(x - 0)$$

$$y + 5 = 3x - 0$$

$$y = 3x - 5$$

- ⑤ Find the equation of the line with slope $-\frac{1}{2}$ through points $(-2, 4)$

Solution

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

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

$$2(y-4) = -1(x+2)$$

$$2y - 8 = -x - 2$$

$$2y = -x - 2 + 8$$

$$\frac{2y}{2} = \frac{-x}{2} + \frac{6}{2}$$

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

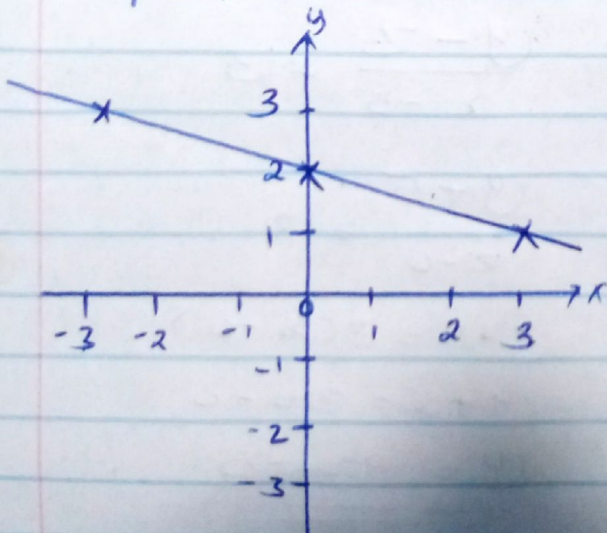
- ⑦ Graph the linear equation

Solution

$$\frac{6y}{6} = \frac{-3x + 12}{6} = \frac{12}{6}$$

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

x	-3	0	3
y	3	2	1

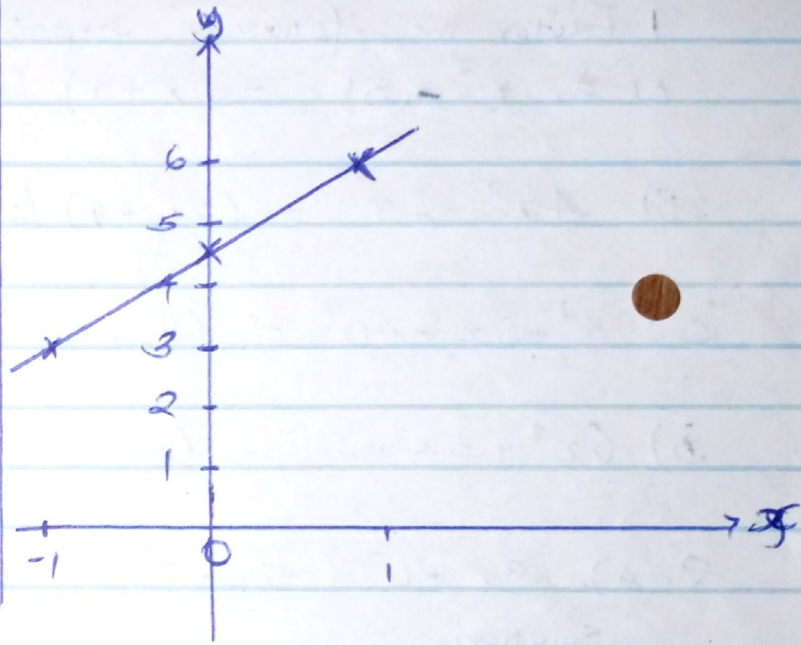


- ⑥ using a domain of $(-1, 0)$ and 1
Graph the line $-3x + 2y = 9$

Solution

$$\frac{2y}{2} = \frac{3x}{2} + \frac{9}{2} = y = \frac{3}{2}x + \frac{9}{2}$$

x	-1	0	1
y	3	4.5	6



$$3x + 6y = 12$$

8

-3, -2, 0 and 1

range - 3 and 1

9 YES + Because the values ~~used~~ used to draw them are real values of x and y

10 Find the inverse function of $y = -3x + 2$

Solution

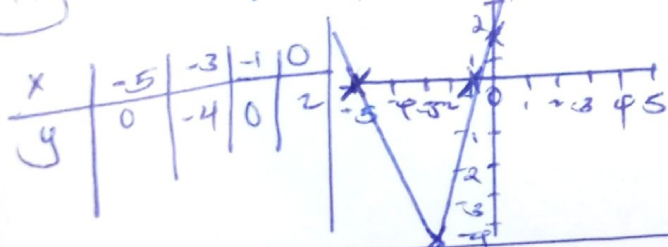
$$x = -3y + 2$$

$$(x-2) = -3y$$

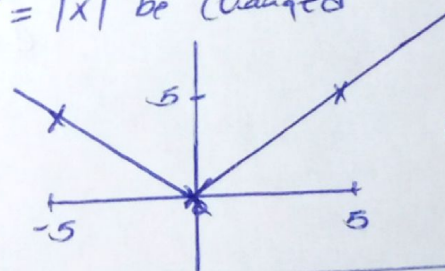
$$y = -\frac{1}{3}(x-2)$$

$$\underline{\underline{\quad\quad\quad}}$$

11 Given $y = 2|x+3| - 4$, how would the graph of $y = |x|$ be changed



x	-5	0	5
y	5	0	5

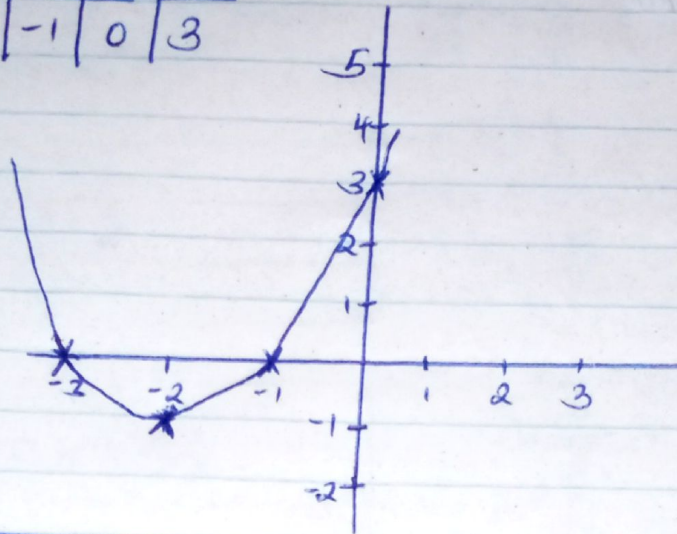


12 Given $y = \sqrt{x-4} + 3$ how would the graph of $y = \sqrt{x}$ be changed
(0,0)

Ans the starting point changes
from (4, 3) to origin (0, 0)

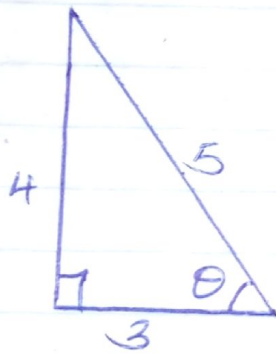
13 Graph the following quadratic equation $y = (x+2)^2 - 1$

x	-3	-2	-1	0
y	0	-1	0	3



14. Write the $\sin \theta$, $\cos \theta$ and $\tan \theta$ as ratios using the given triangle

SOHCAHTOA



Solution

$$\sin \theta = \frac{4}{5}$$

$$\cos \theta = \frac{3}{5}$$

$$\tan \theta = \frac{4}{3}$$

15(a) Change the equation $y = e^{x+3}$ into logarithm form

$$x+3 = \log_e y$$

$$x = \log_e y - 3$$

15(b) Solve the equation for y in terms of x if $\ln y = -3x - 4$

$$x = 0$$

$$y = 0.0009$$