

Linear Equations Test REVIEW

Topics:

- Slope and Rate of Change
- 3 Forms
 - Slope-Intercept
 - Standard Form
 - Point-Slope Form
- Arithmetic Sequences
- Scatter Plots and Regression
 - By hand
 - With Calculator
- Linear Inequalities
- Linear Inverse
- Direct Variation
- Parallel and Perpendicular Lines
- Graphs

Practice:

What is the slope of the line that passes through (4, -6) and (10, 2)?

$$m = \frac{-6 - 2}{4 - 10} = \frac{-8}{-6} = \boxed{\frac{4}{3}}$$

What is the equation for the **inverse** of the function $y = 4x - 5$?

$$\begin{array}{l}
 y = 4x - 5 \\
 x = \frac{y + 5}{4} \\
 \frac{x + 5}{4} = \frac{4y}{4}
 \end{array}
 \rightarrow
 \boxed{y = \frac{x + 5}{4} = \frac{1}{4}x + \frac{5}{4}}$$

$f^{-1}(x)$

Given the line $2x + 3y = 4$, what is the y-intercept?

$$y\text{-int: } \cancel{2(0)} + \frac{3y}{3} = \frac{4}{3}$$

$$\boxed{y\text{-int: } \frac{4}{3}}$$

$$(0, \frac{4}{3})$$

Write an equation of a line in slope-intercept form that passes through the points

$(-6, 6)$ and $(9, 1)$. Convert to Standard Form.

$$m = \frac{1-6}{9-(-6)} = \frac{-5}{15} = -\frac{1}{3}$$

$$y-1 = -\frac{1}{3}(x-9)$$

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

+1 +1

slope-intercept

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

$$\left[\frac{1}{3}x + y = 4 \right] \times 3$$

$+\frac{1}{3}x$ $+\frac{1}{3}x$

$$x + 3y = 12$$

Standard Form

Determine the equation of a line that is parallel to the line $y = 3x - 5$, and passes

through the origin.

$$m = 3 \quad x_1 = 0 \quad y_1 = 0$$

$y\text{-int: } 0 = b$

$$y = mx + b$$

$$y = 3x + 0$$

$$y = 3x$$

Determine the equation of the line in standard form that is perpendicular to the line

$y = 3x - 5$ and passes through the point $(-6, 1)$.

$$m = -\frac{1}{3}$$

$$x_1 = -6$$

$$y_1 = 1$$

$$y-1 = -\frac{1}{3}(x-(-6))$$

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

+1 +1

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

$$+\frac{1}{3}x \quad +\frac{1}{3}x$$

$$\left(\frac{1}{3}x + y = -1 \right) \times 3 \rightarrow x + 3y = -3$$

Write an equation of a line in point-slope form that passes through the point (2, 6)

and has a slope of -3. Convert to Slope-intercept.

$$m = -3$$

$$x_1 = 2$$

$$y_1 = 6$$

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

$$y - 6 = -3(x - 2)$$

Point + Slope

$$\cancel{y - 6} + 6 = -3x + 6 + 6$$

$$y = -3x + 12$$

Write an equation of a line in slope-intercept form that passes through the

point $(-1, -3)$ and has slope $m = \frac{3}{5}$.

$$y - (-3) = \frac{3}{5}(x - (-1))$$

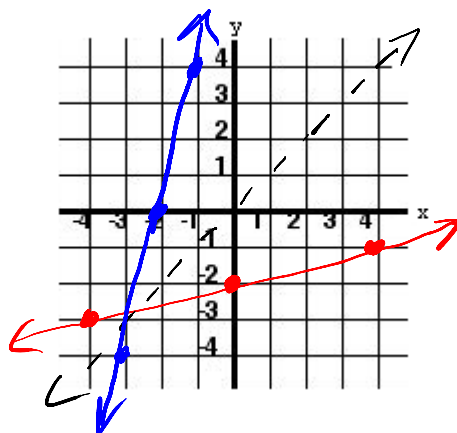
$$y + 3 = \frac{3}{5}(x + 1)$$

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

$$y = \frac{3}{5}x + \frac{3}{5} - \frac{15}{5}$$

$$y = \frac{3}{5}x - \frac{12}{5}$$

Given the function $f(x) = \frac{1}{4}x - 2$, Determine $f^{-1}(x)$. Then graph $f(x)$, $f^{-1}(x)$, and the line $y = x$ on the coordinate axes below.



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

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

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

$$y = 4x + 8$$

Graph using the inverse points.

Determine the inverse of $\{(-2, -2), (2, -2), (4, 2)\}$

$$\{(-2, -2), (-2, 2), (2, 4)\}$$

Assume that y varies directly with x . When $x = 25$, $y = 42$.

Determine y when $x = 35$.

$$\begin{aligned} y &= kx \\ 42 &= k(25) \\ k &= \frac{42}{25} \\ y &= \frac{42}{25}x \end{aligned} \quad \rightarrow \quad y = \frac{42}{25}(35)$$

$y = 58.8$

Find r for which the points $(r, 27)$ and $(5, 6)$ have a slope of $\frac{2}{3}$.

$$\frac{2}{3} = \frac{27-6}{r-5}$$

$$2(r-5) = 3(21)$$

$$2r - 10 = 63$$

$$2r = 73$$

$$r = \frac{73}{2} = 36.5$$

List the following r -values from weakest to strongest: 0.85, -0.75 , -0.95 , 0.99

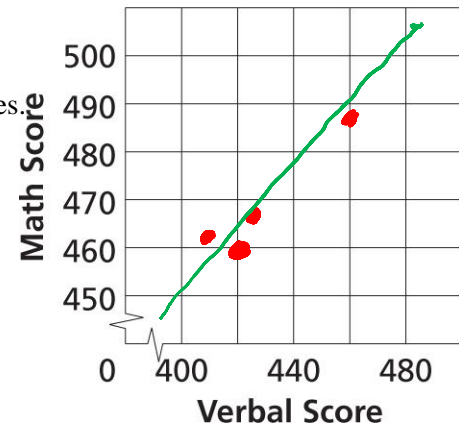
$$-.75, .85, .95, .99$$

weakest

strongest.

1. Make a scatter plot relating the verbal scores and the math scores.

State Graduation Scores		
Year	Verbal Score	Math Score
1975	460	488
1985	424	466
1995	410	463
2005	420	460



Does the scatter plot show a *positive*, a *negative*, or *no correlation*? What does that relationship represent?

positive. As verbal scores increase, so do math scores.

Write the equation for a line of fit. Predict the corresponding math score for a verbal score of 445.

(440, 480) $m = \frac{20}{30} = \frac{2}{3}$ $y = \frac{2}{3}x + 186.67$
(410, 460) $y - 460 = \frac{2}{3}(x - 410)$ $\frac{2}{3}(445) + 186.67 = 483$

2. The table gives the life expectancy of a child born in the United States in a given year.

a. Enter the data into the calculator. Use years since 1920 as the independent variable

b. Describe the correlation of the scatterplot.

Strong, Positive

c. Find the linear regression Equation

$y = .27x + 57$

d. What is the r-value? What does the r-value indicate?

$r = .975$

Years of Life Expected at Birth		
	Year of Birth	Life Expectancy (years)
<i>0</i>	1920	54.1
<i>10</i>	1930	59.7
<i>20</i>	1940	62.9
<i>30</i>	1950	68.2
<i>40</i>	1960	69.7
<i>50</i>	1970	70.8
<i>60</i>	1980	73.7
<i>65</i>	1985	74.7
<i>70</i>	1990	75.4
<i>75</i>	1995	75.8

- e. Use the data to predict the life expectancy of a baby born in 2016. Explain how you determined your answer (interpolation or extrapolation). Is your answer reasonable in context?

yes

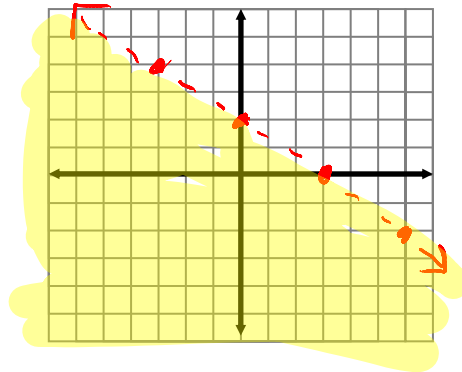
83.3 years

Graph the following Inequalities

$$y < -\frac{2}{3}x + 2$$

↑
Dotted

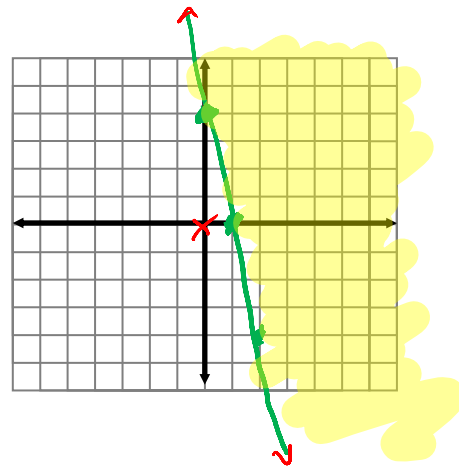
Write one solution:



$$4x + y \geq 4$$

$0 \geq 4 \rightarrow \text{False}$

Write one solution:



Find the missing terms: 102, 71, 40, 9, -22, -53
(2, 71) (5, -22)

$$d = \frac{71 - (-22)}{2 - 5} = \frac{93}{-3} = -31$$

Write a formula for this sequence:

$$a_1 = 102$$

$$a_n = 102 + (n-1)(-31)$$

$$d = -31$$

$$a_n = -31n + 133$$

What is the 13th term?

$$a_{13} = -31(13) + 133$$

$$a_{13} = -270$$