Mathematics 52
Study Guide 2
Fall 2016
Professor: Mohammed Kaabar
Course ID: (27488) and (27501)

Student's Name:..Mohammed Kaabar.........
Student's ID:...—Solution—.........

Note: This study guide contains practice questions that are very useful for your preparation for the second exam in ***Elementary Algebra***.

Problem 1: Determine whether the following is **TRUE** or **FALSE** and if it is false **EXPLAIN** why:

False a. Linear inequality is a mathematical expression that has an equal sign only. linear Equati

False b. Suppose that a solution for a linear inequality is $-2 < \psi \leq 1$, then this solution in the interval notation can be written as $\{\psi | -2 < \psi \leq 1\}$. Set-Builder Notatio

False c. Given that l_1 and l_2 are non-vertical lines. If $l_1 \parallel l_2$, then $m_1 \cdot m_2 = -1$. $m_1 = m_2$

False d. Given that l_1 and l_2 are non-vertical lines. If l_1 and l_2 make an angle of $90°$, then $m_1 = m_2$. $m_1 \cdot m_2 = -1$

True e. It is possible to derive the slope-point form of equation of line using the slope formula by considering the slope passes through (x_1, y_1) and (x, y).

False f. $(apple + tomato)^2 = (apple)^2 + 2(tomato)(tomato) + (tomato)^2$

$= (apple)^2 + 2(apple)(tomato) + (tomato$

False g. $(2\ pumpkins - 3\ sweet\ potatos)^2 = (4\ pumpkins)^2 - 24(pumpkins)(sweet\ potatos) + 9(sweet\ potatos)^2$

12

False h. $(2x+4)^2 = 4(x+2)^2$

$(2x+4)^2 = 4x^2 + 16x + 16$

True i. $(z^2-25)^{-2} = \frac{1}{((z-5)(z+5))^2}$

$\frac{1}{(z^2-25)^2} = \frac{1}{((z-5)(z+5))^2}$

True j. $\frac{1^{1,000,000,000}}{0^0} = 1$

$\frac{1}{1} = 1$

Problem 2: Answer each of the following:

a. $\frac{1}{2^{-3}} = \frac{1}{2^{-3}} = 2^3 = \boxed{8}$

b. $\frac{2^0-1}{2^{2-2}} = \frac{1-1}{2^0} = \frac{0}{1} = \boxed{0}$

c. $(-5^0) \cdot (1) = 1 \cdot 1 = \boxed{1}$

d. $x^3y^{-1}z^2m^2ym^{-2}x^{-2} = \boxed{xz^2}$

e. $\frac{\Psi^{-5}\Lambda^{-1}\Sigma^2}{\Lambda^1\Sigma^1\Pi^{-1}} = \boxed{\frac{\Sigma\,\pi}{\Psi^5\Lambda^2}}$

f. $0^{-3} = \frac{1}{0^3} = \frac{1}{0}$ $\boxed{\text{Undefined}}$

g. What is the name of zero slope? Horizontal slope

h. What is the name of undefined slope? Vertical Slope

i. 5 x 5 x ... x 5 = 5^n

j. $6^{-1} = \frac{1}{6}$

ⓓ $\frac{\cancel{x^3}z^2\cancel{m^2}\cancel{y}}{\cancel{y}\cancel{m^2}\cancel{x^2}}$ $\boxed{xz^2}$

ⓔ $\frac{\Sigma^{\cancel{2}}\,\Pi}{\Psi^5\Lambda\Lambda\cancel{\Sigma}} = \frac{\Sigma\Pi}{\Psi^5\Lambda^2}$

Problem 3: Add the following:

$$\text{a.} + \begin{array}{l}(2x^7 + 4x^2 - 2x^0 + 2x^3 + 5x^6) \\ (2x^0 - 12x^2 + 5x^8 + 4x^3 + 10x^2) \\ \hline \end{array}$$

$$\begin{array}{lllll} & +2x^7 + 5x^6 + & +2x^3 + 4x^2 & & -2x^0 \\ 5x^8 & & +4x^3 - 2x^2 & & +2x^0 \\ \hline \end{array}$$

$$5x^8 + 2x^7 + 5x^6 + 6x^3 + 2x^2 + 0$$

The answer is as follows:-

$$(5x^8 + 2x^7 + 5x^6 + 6x^3 + 2x^2)$$

Problem 4: Subtract the following:

$$\begin{array}{r} (-2x^5 + 3x^2 - 2x^0 + 1x^5 + 5x^6) \\ -\ (12x^0 - 12x^2 + 0x^7 + 3x^2 + 8x^4) \end{array}$$

$$\begin{array}{l} \quad 5x^6 - x^5 \qquad\qquad +3x^2 - 2x^0 \\ - \qquad\qquad\qquad +8x^4 - 9x^2 - 12x^0 \\ 0x^7 \\ \hline \quad 5x^6 - x^5 - 8x^4 + 6x^2 + 10x^0 \end{array}$$

$$= \boxed{5x^6 - x^5 - 8x^4 + 6x^2 + 10}$$ ← Answer

Problem 5: Multiply the following:

$$(2x^2 + 2x^1 - 12x^0)$$

$$\text{X} \qquad (x^2 + x + 1)$$

$$= (2x^2 + 2x - 12) \cdot (x^2 + x + 1)$$

$$= 2x^4 + 2x^3 + 2x^2 + 2x^3 + 2x^2 + 2x - 12x^2 - 12x - 12$$

$$= \boxed{2x^4 + 4x^3 - 8x^2 - 10x - 12} \leftarrow \text{Answer}$$

Problem 6: Divide the following using both long division and synthetic division methods:

call it $A(x)$ $\rightarrow$ $x^3 - 1$

$$\frac{x^3 - 1}{x - 1}$$

call it $B(x)$ $\leftarrow$ $x - 1$

$\deg(A(x)) \geq \deg(B(x))$

$3 \geq 1$

✓ good!

long Division

$$
\begin{array}{r|l}
 & x^2 + x + 1 \\
\hline
x - 1 & \cancel{x^3} + 0x^2 + 0x - 1 \\
 & -\cancel{x^3} + x^2 \\
\hline
 & \cancel{x^2} + 0x - 1 \\
 & -\cancel{x^2} + x \\
\hline
 & \cancel{x} - 1 \\
 & -\cancel{x} + 1 \\
\hline
 & \boxed{0}
\end{array}
$$

$\boxed{0} \rightarrow$ remainder

solution is: $(x^2+x+1) + \dfrac{0}{x-1}$

$= \boxed{(x^2+x+1)}$

Synthetic Division

$$
\begin{array}{c|cccc}
1 & 1 & 0 & 0 & -1 \\
 & \downarrow & 1 & 1 & 1 \\
\hline
 & 1 & 1 & 1 & \boxed{0}
\end{array}
$$

$\boxed{0} \rightarrow$ remainder

solution is $\boxed{x^2 + x + 1}$

(d) $(5z+2) = -4$ or $-5z-2=-4$

$5z = -4-2$ | $-5z = -4+2$

$5z = -6$ | $\cancel{-}5z = \cancel{-}2$

$\boxed{z = \frac{-6}{5}}$ or $\boxed{z = \frac{2}{5}}$ ← solution

Problem 7: Solve each of the following:

a. $3z + 5 < -2 + 12z$

b. $-10\zeta + 12 \le -2 - 2\zeta$

c. $-12\delta^0 + 11^{\sqrt[3]{8}} < \left(-\frac{-31200.43}{-340123.2}\right)^{0+1-1} + 10\delta + \frac{2}{2^{-1}}\delta$

d. $|5z + 2| = -4$

e. $|5\varepsilon^{0-1+2} + 2\varepsilon^0 - 1| \ge -4^0 + \frac{1}{2^{-2}}$

f. $(|5y + 12| + |5y - 5^2 + 15y^0|) \le -4$

g. $\frac{|25\tau+5|}{-2|25\tau+5|} = -4$

(a) $3z + 5 < -2 + 12z$

$2 + 5 < 12z - 3z$

$\frac{7}{9} < \frac{9z}{9} \Rightarrow \boxed{z > \frac{7}{9}}$ ← solution

(b) $-10\zeta + 2\zeta \le -2 - 12$

$\frac{-8\zeta}{-8} \underset{\ge}{\le} \frac{-14}{-8} \Rightarrow \zeta \ge \frac{\cancel{14}^{7}}{\cancel{8}_{4}} \Rightarrow \boxed{\zeta \ge \frac{7}{4}}$ ← solution

(c) $-12 + 121 < 1 + 10\delta + 4\delta$

$-12 + 121 - 1 < 14\delta \Rightarrow \frac{108}{14} < \frac{14\delta}{14} \Rightarrow \boxed{\frac{54}{7} < \delta}$ ← solution

7a

(e) $|5\varepsilon + 2 - 1| \geq 1 + 4$

$|5\varepsilon + 1| \geq 5$

$(5\varepsilon + 1) \geq 5$ or $-5\varepsilon - 1 \geq 5$

$5\varepsilon \geq 4$

$\boxed{\varepsilon \geq \frac{4}{5}}$

$-5\varepsilon \geq 5 + 1$

$\frac{-5\varepsilon}{-5} \geq \frac{6}{-5}$

$\boxed{\varepsilon \leq -\frac{6}{5}}$

Solution

(f) $|5y + 12| + |5y - 25 + 15| \leq -4$

$(5y + 12) + (5y - 25 + 15) \leq -4$

$10y + 2 \leq -4$

$10y \leq -4 - 2$

$10y \leq -6$

$y \leq -\frac{\cancel{6}^{3}}{\cancel{10}_{5}}$

$\boxed{y \leq \frac{-3}{5}}$

or

$-5y - 12 - 5y + 25 - 15 \leq -4$

$-10y - 2 \leq -4$

$-10y \leq -4 + 2$

$-10y \leq -2$

$y \geq \frac{+\cancel{2}^{1}}{+\cancel{10}_{5}} \Rightarrow \boxed{y \geq \frac{1}{5}}$

or

Solution

(7)

9

$$\frac{\cancel{|25t+5|}}{-2\cancel{|25t+5|}} = -4$$

$$\overset{??}{\boxed{-2}} \overset{?!}{=} \overset{!!}{\boxed{-4}}$$

No solution
for this question

Problem 8: Find the slope of the line that passes through each pair of points:

$x_1 \; y_1 \quad x_2 \; y_2$

Part a: $(-6,5)$ and $(6,2)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 5}{6 - -6} = \frac{-\cancel{3}^{1}}{\cancel{12}_{4}} = \boxed{-\frac{1}{4}}$$

$x_1 \; y_1 \quad x_2 \; y_2$

Part b: $(-1,-5)$ and $(0,0)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - -5}{0 - -1} = \frac{5}{1} = \boxed{5}$$

Problem 9: Find the equation of the line with given properties:

$l_1 \; x_1 \; y_1$

a. A line passes through $(0,-2)$ and is perpendicular to the line:

$l_2 \; 6x^0 + 12x^1 - 13y^0 + 5y^1 = -12.$

$x_1 \; y_1 \qquad m = 0$

b. A line passes through $(1,-2)$ and has a horizontal slope.

$$\boxed{\begin{aligned} y - y_1 &= m(x - x_1) \\ y + 2 &= 0(x - 1) \\ y + 2 &= 0 \\ &\boxed{y = -2} \end{aligned}}$$

$l_2: 6 + 12x - 13 + 5y = -12$

$12x \; -7 + 5y = -12 \Rightarrow 5y = -12 + 7 - 12x$

$\frac{5y}{5} = \frac{-12x}{5} - \frac{5}{5} \Rightarrow \boxed{y = \frac{-12}{5}x - 1} \quad \boxed{m_2 = \frac{-12}{5}}$

Since $l_1 \perp l_2$, then $m_1 \cdot m_2 = -1$ so $\boxed{m_1 = \frac{5}{12}}$

$\boxed{\frac{5}{12}} \cdot -\frac{12}{5}$

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

$y + 2 = \frac{5}{12}(x - 0) \Rightarrow y + 2 = \frac{5}{12}x \Rightarrow \boxed{y = \frac{5}{12}x - 2}$

The equation of the line

Problem 10: Graph the following:

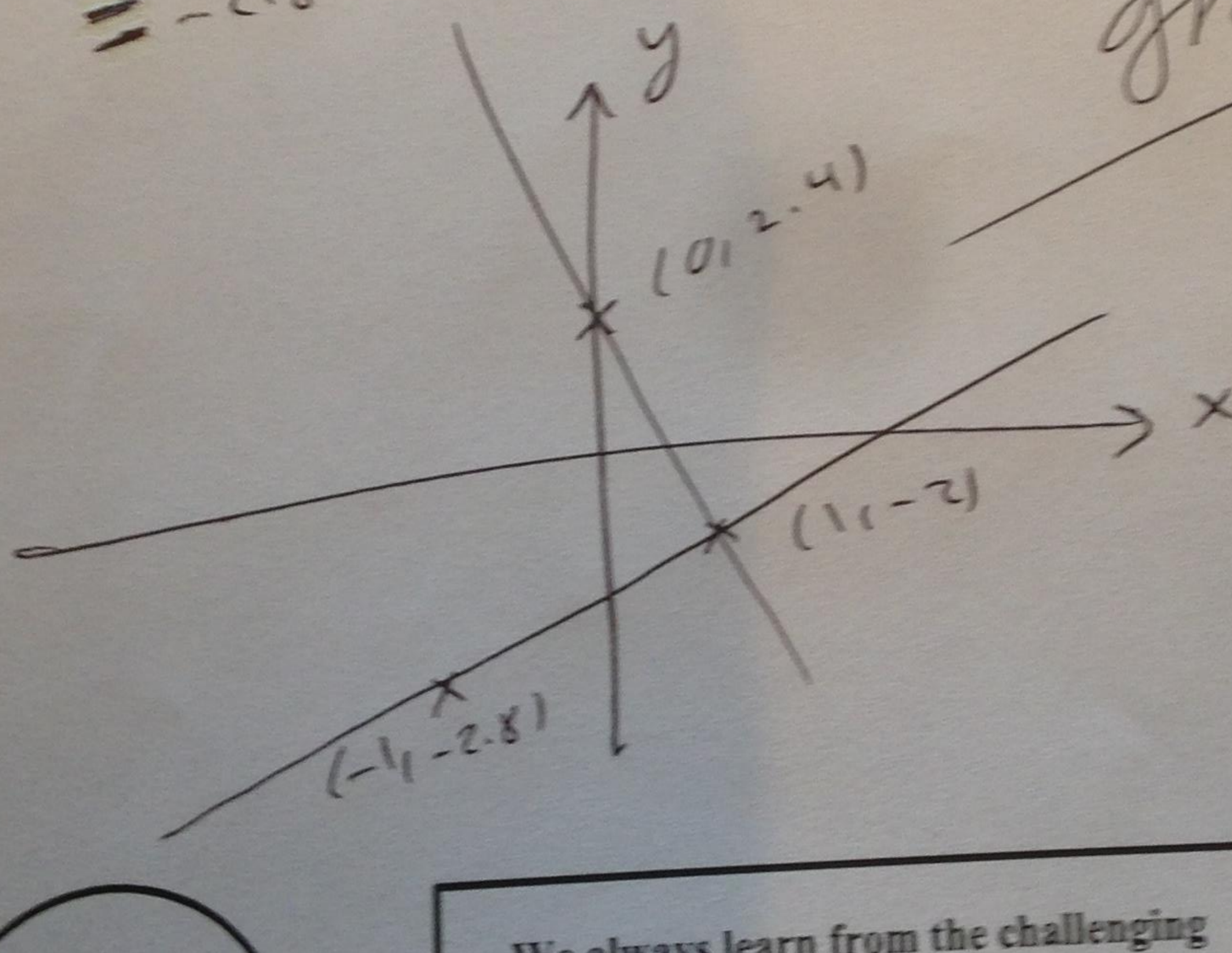
$$\frac{5y^2 + 25y}{(y+5)} = 2x - 12$$

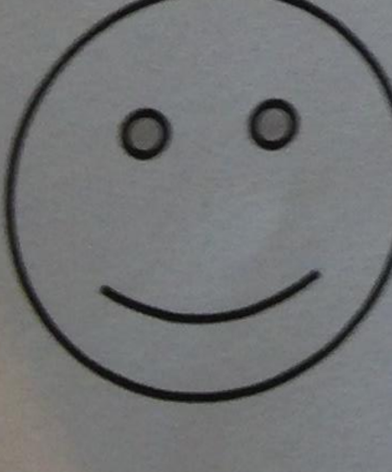
$$\frac{5y\cancel{(y+5)}}{\cancel{(y+5)}} = 2x - 12$$

$$5y = 2x - 12 \Rightarrow \boxed{y = \frac{2x}{5} - \frac{12}{5}}$$

x	-1	0	1
y	$\frac{-14}{5}$ $= -2.8$	$\frac{-12}{5}$ $= 2.4$	-2

graph





We always learn from the challenging math problems.

Practice + Study = Success

Good Luck in Exam 2

Mohammed Kaabar