QUIZ #2 @ 80 points

Write in a neat and organized fashion. <u>Write your complete solutions on SEPARATE PAPER.</u> You should use a pencil. For an exercise to be complete there needs to be a detailed solution to the problem. Do not just write down an answer. No proof, no credit given! Clearly label each exercise.

Factor the following expressions:

1) $36 - x^2$

2) $m^2 - 17m + 30$

3) $3t^2 - 11t - 20$

4) $2x^2 - 10x + 3xy - 15y$

5) $3y^2 - 48y + 192$

6) $x^3 - 64$

7) $a^2 + 16$

Solve each equation by the factoring method:

8) $9x^3 - 49x = 0$

9) $3x(x+1) = 2x + 2$

10) $a^2 + (a+3)^2 = 225$

11) $(y-4)(y-2) = 15$

Do the following:

12) Find the slope of the line $5x - 3y = -2$.

13) Find an equation for the line passing through $(2, -5)$ and having slope $\dfrac{1}{2}$. Then write the equation in slope-intercept form and standard form.

14) Find an equation for the line passing through $(2, 4)$ and $(-1, 8)$.

15) Graph the equation $\dfrac{1}{2}x + 2y = 3$ showing the intercepts.

Quiz 2 - Solutions

FACTOR COMPLETELY:

① $36 - x^2 = 6^2 - x^2$
$= \boxed{(6-x)(6+x)}$

② $m^2 - 17m + 30 = \boxed{(m-15)(m-2)}$
$\left(\begin{array}{c} \text{product} = c = 30 < \begin{smallmatrix} -15 \\ -2 \end{smallmatrix} \\ \text{sum} = b = -17 \\ \hline 30 = 15 \cdot 2 \end{array} \right)$

③ $3t^2 - 11t - 20 =$
$a \neq 1$, we'll split the middle term
$\left(\begin{array}{c} \text{product} = ac \\ = -60 < \begin{smallmatrix} +4 \\ -15 \end{smallmatrix} \\ \text{sum} = b = -11 \\ \hline 60 = 4 \cdot 15 \end{array} \right)$

$3t^2 - 11t - 20 = 3t^2 - 15t + 4t - 20$

$= 3t(t-5) + 4(t-5)$
$= \boxed{(t-5)(3t+4)}$

④ $2x^2 - 10x + 3xy - 15y =$
$= 2x(x-5) + 3y(x-5)$
$= \boxed{(x-5)(2x+3y)}$

⑤ $3y^2 - 48y + 192 =$
$= 3(y^2 - 16y + 64)$
$= \boxed{3(y-8)^2}$

⑥ $x^3 - 64 = x^3 - 4^3$
$= (x-4)(x^2 + 4x + 4^2)$
$= \boxed{(x-4)(x^2 + 4x + 16)}$

⑦ $a^2 + 16 - \boxed{\text{prime}}$

Solve each equation:

⑧ $9x^3 - 49x = 0$
$x(9x^2 - 49) = 0$
$x((3x)^2 - 7^2) = 0$
$x(3x-7)(3x+7) = 0$
$x = 0$ OR $3x - 7 = 0$ OR $3x + 7 = 0$
$\qquad\qquad x = \dfrac{7}{3} \qquad\qquad x = \dfrac{-7}{3}$

$\boxed{x \in \left\{ 0, \dfrac{7}{3}, \dfrac{-7}{3} \right\}}$

⑨ $3x(x+1) = 2x + 2$
$3x^2 + 3x - 2x - 2 = 0$
$3x^2 + x - 2 = 0$
$a \neq 1$, we'll split the middle term
$\qquad \text{product} = ac = -6 < \begin{smallmatrix} +3 \\ -2 \end{smallmatrix}$
$\qquad\qquad \text{sum} = b = 1$
$\qquad\qquad \overline{\qquad 6 = 3 \cdot 2 \qquad}$

$3x^2 + 3x - 2x - 2 = 0$
$3x(x+1) - 2(x+1) = 0$
$(x+1)(3x-2) = 0$
$x + 1 = 0$ OR $3x - 2 = 0$
$x = -1 \qquad\qquad x = \dfrac{2}{3}$

$\boxed{x \in \left\{ -1, \dfrac{2}{3} \right\}}$

(10) $a^2 + (a+3)^2 = 225$

$a^2 + a^2 + 6a + 9 - 225 = 0$

$2a^2 + 6a - 216 = 0 \qquad / \div 2$

$a^2 + 3a - 108 = 0$

$\qquad \text{product} = c = -108 \overset{+12}{\underset{-9}{<}}$

$\qquad \underline{\text{sum} = b = 3}$

$\qquad 108 = 12 \cdot 9$

$(a + 12)(a - 9) = 0$

$a + 12 = 0 \qquad \text{OR} \qquad a - 9 = 0$

$\quad a = -12 \qquad\qquad\qquad a = 9$

$\boxed{a \in \{-12, 9\}}$

(11) $(y - 4)(y - 2) = 15$

$y^2 - 2y - 4y + 8 - 15 = 0$

$y^2 - 6y - 7 = 0 \qquad\qquad \text{product} = c = -7 \overset{+1}{\underset{-7}{<}}$

$(y + 1)(y - 7) = 0 \qquad\qquad \underline{\text{sum} = b = -6}$

$\qquad\qquad\qquad\qquad\qquad 7 = 7 \cdot 1$

$y + 1 = 0 \quad \text{OR} \quad y - 7 = 0$

$\quad y = -1 \qquad\qquad y = 7$

$\boxed{y \in \{-1, 7\}}$

(12) $5x - 3y = -2$

To find the slope, we solve the equation for y:

$5x + 2 = 3y \qquad / \div 3$

$y = \frac{5}{3}x + \frac{2}{3} \qquad (\text{slope-}\cap \text{ form})$

so $\boxed{m = \frac{5}{3}}$

(13) $(2, -5)$

$\quad m = \frac{1}{2}$

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

$y - (-5) = \frac{1}{2}(x - 2)$

$\boxed{y + 5 = \frac{1}{2}(x - 2)}$ slope-point form

$y + 5 = \frac{1}{2}x - 1$

$y = \frac{1}{2}x - 1 - 5$

$\boxed{y = \frac{1}{2}x - 6}$ slope-$\cap$ form

$-\frac{1}{2}x + y = -6$ standard form

(14) $(2, 4)$ and $(-1, 8)$

Then, $m = \frac{\Delta y}{\Delta x} = \frac{8 - 4}{-1 - 2} = \frac{4}{-3}$

$m = -\frac{4}{3}$

Use $(2, 4)$ and $m = -\frac{4}{3}$

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

$\boxed{y - 4 = -\frac{4}{3}(x - 2)}$ slope-pt form

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

x	y	
0	$\frac{3}{2}$	$(0, \frac{3}{2})$ y-$\cap$
6	0	$(6, 0)$ x-$\cap$

let $x = 0 \Rightarrow 2y = 3$

$\qquad\qquad y = \frac{3}{2}$

let $y = 0 \Rightarrow \frac{1}{2}x = 3$

$\qquad\qquad x = 6$