***Fall – 2017 - Solutions for Math 082 Final Exam Review***

1. ***Evaluate the expression: when c = -4, x = 7 and y = 11***

$$\frac{28}{c}- \frac{35}{x}-y$$

***Substitute the values of variables in the given expression***

$$\frac{28}{-4}-\frac{35}{7}-11$$

***Now simplify each term to get:*** $-$***7 – 5 – 11 =*** $-$***23***

***Answer:*** $-$***23***

1. ***Evaluate the expression: when x = -6, y = -35, z =*** $\frac{1}{2}$

$$\frac{x}{12}- \frac{y}{5}+z$$

***Substitute the values of variables in the given expression***

$$\frac{-6}{12}- \frac{-35}{5}+\frac{1}{2}$$

***Now simplify each term to get:*** $-\frac{1}{2} +7 $***+*** $\frac{1}{2}$ ***= 7***

***Answer:*** $7$

1. ***Evaluate the expression:*** $(-b-2a)^{2}$ ***– 3c when a = -5, b = 13, c = -7***

***Substitute the values of variables in the given expression***

$(-13-2(-5))^{2}$ ***– 3(-7)***

***=*** $(-13+10)^{2}$ ***+ 21***

***=*** $(-3)^{2}$ ***+ 21***

***= 9 + 21***

***= 30***

***Answer: 30***

1. ***Evaluate the expression:***$(b+3a)^{2}$ ***- 3***$c^{2}$ ***when a = 5, b = -7, c = -1***

$(-7+3\left(5\right))^{2}$ ***- 3***$(-1)^{2}$

$= (-7+15)^{2}$ ***– 3 (1)***

$= 8^{2}$ ***– 3***

$=64$***− 3***$=61 $

***Answer: 61***

1. ***Simplify the expression:***

***5***$(8-10)^{3}$ ***-*** $[12 ÷\left(3\right)\left(2\right)]^{2}$

***= 5***$(-2)^{3 }$***–*** $[(4)(2)]^{2}$

***= 5(-8) -*** $8^{2}$

***= -40 - 64***

***= - 104***

***Answer: - 104***

1. ***Simplify the expression:***

***-2***$(7-9)^{3 }$ ***-*** $[8 ÷4.2]^{2}$

***= -2***$(-2)^{3}$ ***-*** $[2.2]^{2}$

***= -2(-8) -*** $4^{2}$

***= 16 – 16***

***= 0***

***Answer: 0***

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1. ***Simplify the expression:***

$12^{2 }$ ***- [21 + 6*** $÷ $***3]***

$=144$***– [21 + 2]***

$=144-$ ***23***$=121$

***Answer: 121***

1. ***Solve:***

***3x – 5 = 2x + 7***

***-2x -2x***

***\_\_\_\_\_\_\_\_\_\_\_\_***

***X – 5 = 7***

 ***+5 +5***

***-------------------***

***X = 12***

***Solution is***

***Answer: x = 12***

1. ***Solve:***

***5x + 3 = 6 – 2x***

***(The plan is to isolate x: First we should get all terms with an x on one side and everything else on the other side. This can be done by adding 2x to both sides and subtracting 3 from both sides***

***Now we get***

***7x = 3 (divide both sides by 3)***

$$\frac{7x}{7} =\frac{3}{7}$$

$$Answer : x=\frac{3}{7}$$

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1. ***Solve***

$$\frac{3}{5}x =-\frac{4}{7}+ x$$

$$For convenience, you can rewrite the equation as$$

$$\frac{3x}{5} =-\frac{4}{7} + \frac{x}{1}$$

$$To remove, fractions find out LCM of all the denominators and multiply $$

$$the entire equation by the LCM$$

***LCM of 5, 7, 1 = 35 =*** $\frac{35}{1}$

***Multiply all the terms on left side and right side of equal sign by LCM***

$$\left(\frac{35}{1}\right)\left(\frac{3x}{5} =-\frac{4}{7} + \frac{x}{1}\right)$$

***Now multiply all the terms of the equations by LCM =*** $\frac{35}{1}$

***You will get an equation without fraction***

***21x = -20 + 35x***

***-35x -35x***

***---------------------***

***-14x = -20***

***Divide both sides by -14***

$$\frac{-14x}{-14}= \frac{-20}{-14}$$

***Solution is: x =*** $\frac{10}{7}$

1. ***Solve:***

$\frac{6}{5} y$ ***+3 =*** $\frac{3}{10}- \frac{1}{5}y$

$$Follow the same procedure like the previous problem$$

$\frac{6y}{5}+\frac{3}{1}= \frac{3}{10} - \frac{1y}{5}$ ***LCM = 10 =*** $\frac{10}{1}$

$$\left(\frac{10}{1}\right)\left(\frac{6y}{5}+ \frac{3}{1}= \frac{3}{10} -\frac{1y}{5}\right)$$

***Distribute*** $\frac{10}{1}$ ***to all the terms of the equations.***

***12y + 30 = 3 – 2y***

***+2y +2y***

***----------------------***

***14y +30 = 3***

 ***-30 -30***

***--------------------***

***14y = -27***

***Now divide both sides by 14 to get the solution:***

***Answer: Y =*** $\frac{-27}{14}$

1. ***Solve: ***$12-7y=17y-15+20y$ ***(First simplify by multiplying out where called for)***

$12-7y=37y-15$ ***(and by combining like terms)***

$27=44y $***(added*** $7y$ ***and 15 to both sides to get*** $y$ ***on one side)
(You also could have subtracted*** $37y$ ***from both sides***

***and subtracted 12 from both sides to arrive at*** $-44y = -27$***).***

***Now divide both sides by 44 to get***

$\frac{27}{44}=y$ ***COMMENT: Did not occur here, but remember to try and simplify fractions before giving final answer)***

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1. ***Solve***

***4 – 5y = 7y – 2(3 – y) (on the right side of equal sign, distribute -2)***

***4 – 5y = 7y – 6 + 2y (combine like terms)***

***4 – 5y = 9y – 6***

***-4 -9y -9y -4 (add)***

***---------------------***

***-14y = -10 (divide both sides by -14)***

***Answer: Y =*** $\frac{-10}{-14}= \frac{5}{7}$

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1. ***Solve for x***

***Y = mx + b***

***-b -b***

***---------------***

***Y – b = mx (divide both sides by m)***

$$\frac{y-b}{m}= \frac{mx}{m}$$

***Answer: X =*** $\frac{y-b}{m}$

1. ***Solve for T***

***PV = nRT ( to find T, divide both sides by nR)***

$$\frac{PV}{nR}= \frac{nRT}{nR}$$

***Answer: T =*** $\frac{PV}{nR}$

1. ***Solve for s***

***N = r(A – s)***

***N = rA – rs***

***-rA -rA***

***--------------***

***N – rA = -rS To find s, divide both sides by -r***

$$\frac{N-rA}{-r}=s$$

$$\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$

1. ***The difference of 9 and 5 times a number is 14. Find the number.***

***The question is to find the number, which is unknown. This has to be assumed as a variable, say x. Now, follow the words in the problem and translate each word to mathematical symbol.***

***9 – 5x = 14 (now, solve for x)***

***-9 -9***

***-----------------***

***-5x = 5***

$\frac{-5x}{-5}= \frac{5}{-5}$***, x = -1***

***Answer is: The number is -1***

***­­­­­­­­­­­­­­­­­­­­­­­­***

***18. A number increased by 12 is four times the number. Find the number.***

***Solution:***

 ***Let*** $'x'$ ***be the unknown number***

***(By the given Condition)***

$x+12 =4x$ ***(Subtract both sides by*** $x$***)***

$$x+12-x=4x-x$$

$12=3x$ ***(Divide both sides by 3)***

$\frac{12}{3}=\frac{3}{3}x$

$4=x$ ***or x = 4. So the unknown number is 4***

***19. The sum of 4 and twice a number is 56. Find the number.***

 ***Solution:***

***Let*** $'x'$ ***be the unknown number***

***By the given Condition***

$4+2x=56$ ***(Subtract both sides by 4)***

$$4+2x-4=56-4$$

$$2x=52$$

$\frac{2}{2}x= \frac{52}{2}$ ***(Divide both sides by 2)***

$$x=26$$

***Hence the unknown number is 26.***

***20. For the inequality,:*** $-3<3x-4\leq 11$

***Solution:***

***Let*** $-3<3x-4\leq 11$

 ***+4 +4 +4***

 ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

 ***1 < 3x*** $\leq $ ***15***

***Divide all by 3*** $\frac{1}{3}<\frac{3x}{3}\leq \frac{15}{3}$

***Hence the answer is: a)*** $\frac{1}{3}<x\leq 5$

***b)***

***21. For the inequality:*** $3x-7<11+9x$

***Solution:***

***Given,*** $3x-7<11+9x$

***Now subtract both sides by*** $3x$ ***and subtract both sides by 11***

$$3x-7-3x-11<11+9x-3x-11$$

$$-18<6x$$

***Now divide both sides by 6***

$$\frac{-18}{6}<\frac{6}{6}x$$

$$-3<x$$

***Answer: a)*** $x>-3$

 ***b)***

***22. For the inequality:*** $23x-27>5\left(4x-6\right)$

***Solution:***

***Given*** $23x-27>5\left(4x-6\right)$

$$23x-27>20x-30$$

***Now, Subtract both sides by*** $20x$ ***and Adding both sides by 27***

$$23x-27-20x+27>20x-30-20x+27$$

$$3x>-3$$

***Now, Divide both sides by 3***

$$\frac{3}{3}x>\frac{-3}{3}$$

$$x>-1$$

***Answer: a)***$ x>-1$

***b)***

***23. Solve the inequality:*** $-17r+11\geq -5\left(3r-2\right)$

***Solution:***

***Given,*** $-17r+11\geq -5\left(3r-2\right)$

$$-17r+11\geq -15r+10$$

***Now Adding both sides by*** $15r$ ***and subtract both sides by 11***

$$-17r+11+15r-11\geq -15r+10+15r-11$$

$$-2r\geq -1$$

***Now divide both sides by -2***

By remarks

$$i)-a>-b⇒a<b$$

$$ii) a<b⇒\frac{1}{a}>\frac{1}{b}$$

$\frac{-2}{ -2}r\geq \frac{-1}{-2}$

$$r\leq \frac{1}{2}$$

***Answer:*** $ r\leq \frac{1}{2}$

***24. Is (-2, 3) a solution of the equation*** $-3y=-7$ ***? Justify your answer.***

***Solution:***

***Given, (-2,3) and*** $x-3y=-7$

***Now substitute the values of x and y .ie, x=-2 and y=3***

***We get,***

$$-2-3\left(3\right)=-7$$

$$-2-9=-7$$

$$-11=-7$$

***Now the constants of both sides are not equal to each other. So the given point***

***(-2, 3) is not a solution of the given equation.***

***25. Is (2,-3) a solution of the equation*** $x-3y=11$***? Justify your answer.***

***Solution:***

***Given, (2,-3) and*** $x-3y=11$

***Now substitute the values of x and y .ie, x=2 and y=-3***

***We get,***

$$x-3y=11$$

$$2-3\left(-3\right)=11$$

$$2+9=11$$

$$11=11$$

***Now the constants of both sides are equal to each other. So the given point (-2,3) is a solution of the given equation.***

***26. Is (1,-5) a solution of the equation***$ 5x-3y=-10$***? Justify your answer.***

***Solution:***

***Given, (1,-5) and*** $5x-3y=-10$

***Now substitute the values of x and y .ie, x=1 and y=-5***

***We get,***

$$5x-3y=-10$$

$$5\left(1\right)-3\left(-5\right)=-10$$

$$5+15=-10$$

$$20=-10$$

***Now the constants of both sides are not equal to each other. So the given point***

***(1,-5) is not a solution of the given equation.***

***27. Write the ordered pair (x,y) for each of the points labeled on the graph.***

***Solution:***

***Consider the point A.***

***By Cartesian coordinate system.***

***A is at a distance of 3 units from the origin along the negative direction of x-axis and 5 units distance from the origin along the positive direction of y-axis. Hence the coordinates of A are (-3,5).***

***Similarly, B: (-6,0) C: (-2,-5) D: (0, -2) E: (3,-3) F: (4, 0) G: (2,3) H: (0,1)***

***28. Write the equation of the line that passes through the points (4, 6) and (0, 3) . Write your answer in slope-intercept form.***

***Solution:***

***The equation of straight line in slope-intercept form is*** $y=mx+b$

***Since y-intercept is (0,b)***

***b=3***$ since the point is (0,3)$

***Also the line was passing through the point (4,6) = (x, y)***

***Hence*** $y=mx+b$

$$6=m\left(4\right)+3$$

$$6-3=4m$$

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

***Hence the equation of the line in slope-intercept form is*** $y=\frac{3}{4}x+3$

***29. Write the equation of the line that passes through the points (-9, -2) and (3, 4). Write your answer in slope-intercept form.***

***Solution:***

***The equation of straight line in slope-intercept form is*** $y=mx+b$

***Now, we have to find the slope “m”***

***Since*** $m=\frac{y\_{2}- y\_{1}}{x\_{2}- x\_{1}}$

***Now*** $m= \frac{4+2}{3+9}=\frac{6}{12}=\frac{1}{2}$

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

***By point-slope form***

$y-y\_{1}=m(x-x\_{1})$

***where (x1,y1)=(3,4) and*** $m=\frac{1}{2}$

$$y-4=\frac{1}{2}\left(x-3\right)$$

$$y=\frac{1}{2}x-\frac{3}{2}+4$$

$$y=\frac{1}{2}x-\frac{3}{2}+\frac{8}{2}$$

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

***Hence the equation of the line in slope-intercept form is*** $y=\frac{1}{2}x+\frac{5}{2}$

***30. Write the equation of the line that passes through the points (11, 7) and***

***(-3, -14). Write your answer in slope-intercept form.***

***Solution:***

***The equation of straight line in slope-intercept form is*** $y=mx+b$

***Now, we have to find the slope “m”***

***Since*** $m=\frac{y\_{2}- y\_{1}}{x\_{2}- x\_{1}}$

***Now*** $m= \frac{-14-7}{-3-11}=\frac{-21}{-14}=\frac{3}{2}$

$$m=\frac{3}{2}$$

***By point-slope form***

$y-y\_{1}=m(x-x\_{1})$

***where (x1,y1)=(-3,-14) and*** $m=\frac{3}{2}$

$$y-(-14)=\frac{3}{2}\left(x+3\right)$$

$$y+14=\frac{3x+9}{2}$$

$$y=\frac{3x}{2}+\frac{9}{2}-14$$

$$y=\frac{3x}{2}+\frac{9}{2}-\frac{28}{2}$$

***Hence the equation of the line in slope-intercept form is*** $y=\frac{3}{2}x-\frac{19}{2}$

***31. Graph the line:*** $y=\frac{2}{5}x+7$

***Solution:***

***Given,*** $y=\frac{2}{5}x+7$

***Let us take the values for ‘x’ form -5 to 5. Since the coefficient of x is a fraction, assume values of x-----🡪 as multiples of 5 (denominator) so that the value of y will be an integer.***

|  |  |  |  |
| --- | --- | --- | --- |
| ***X*** | ***-5*** | ***0*** | ***5*** |
| ***Y*** | ***5*** | ***7*** | ***9*** |

***Hence the points are (-5,5), (0,7), (5,9). Plot the points on the graph and draw a straight line.***

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***32. Graph the line:*** $y=\frac{-4}{3}x+2$

***Solution:***

***Given,*** $y=\frac{-4}{3}x+2$

***Let us take the values for ‘x’ from -3 to3. Since the coefficient of x is a fraction, assume values of x-----🡪 as multiples of 3 so that the value of y will be an integer.***

***Let us take the values for ‘x’ form -3 to 3 (ie,:*** $-3\leq x\leq 3$***).***

|  |  |  |  |
| --- | --- | --- | --- |
| ***X*** | ***-3*** | ***0*** | ***3*** |
| ***Y*** | ***6*** | ***2*** | ***-2*** |

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***Hence the points are (-3,6),*** $(0,2)$***, (3,-2)***

***33. Graph the line:*** $y=\frac{3}{5}x-4$

***Solution:***

***Given,*** $y=\frac{3}{5}x-4$

***Let us take the values for ‘x’ from -5 to 5 (ie,:*** $-5\leq x\leq 5$***). Assume values of x as multiples of 5 to get y values as integers***

|  |  |  |  |
| --- | --- | --- | --- |
| ***X*** | ***-5*** | ***0*** | ***5*** |
| ***Y*** | ***-7*** | ***-4*** | ***-1*** |

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***Hence the points are (-5,-7), (0,-4), (5,-1)***

***Plot the points on the graph and draw a straight line.***

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***34. For the line*** $2x-10y=-5$

 ***Find a) The y-intercept***

 ***b) The x-intercept***

***Solution:***

1. ***To find the y-intercept***

***Substitute x = 0 in the equation.***

***The given equation is*** $2x-10y=-5$

$$2(0)-10y=-5$$

***-10y = -5***

***Divide both sides by -5 to get y =*** $\frac{1}{2}$

***Hence the y-intercept is (0,*** $\frac{1}{2})$

1. ***To find the x-intercept***

***Substitute y = 0 in the equation.***

***The given equation is*** $2x-10(0)=-5$

$2x=-5$

***Now divide both sides by 2 to get***

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

***Hence the x-intercept is (***$-\frac{5}{2},0)$

***35. For the line*** $3x+2y=-6$

 ***Find a) The y-intercept***

 ***b) The x-intercept***

***Solution:***

1. ***To find the y-intercept, substitute x = 0***

***The given equation is*** $3x+2y=-6$

$3(0)+2y=-6$

$$2y=-6$$

***Now divide both sides by 2***

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

$$y=-3$$

***Hence the y-intercept is (0, -3)***

1. ***To find the x-intercept, substitute y = 0***

***The given equation is*** $3x+2y=-6$

$3x+2(0)=-6$

$$3x=-6$$

***Now divide both sides by 3***

$$\frac{3x}{3}=\frac{-6}{3}$$

$$x=-2$$

***Hence the x-intercept is*** $(-2,0$***)***

***36. For the line*** $-12x+8y=-6$

 ***Find a) The y-intercept***

 ***b) The x-intercept***

***Solution:***

1. ***To find the y-intercept, substitute x = 0***

***The given equation is*** $-12x+8y=-6$

$-12(0)+8y=-6$

$$8y=-6$$

***Now divide both sides by 8***

$$\frac{8y}{8}=\frac{-6}{8}$$

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

***Hence the y-intercept is (0,*** $-\frac{3}{4}$***)***

1. ***To find the x-intercept, substitute y = 0***

***The given equation is*** $-12x+8y=-6$

$-12x+8(0)=-6$

$$-12x=-6$$

$$12x=6$$

***Now divide both sides by 12***

$$\frac{12x}{12}=\frac{6}{12}$$

$$x=\frac{1}{2}$$

***Hence the x-intercept is*** $(\frac{1}{2},0$***)***

***37. Graph the linear equation:*** $2x-y=-6$

***Solution:***

***Given that,*** $2x-y=-6$

***If*** $x=0 $ ***then y intercept is:*** $2x-y=-6$

$$2\left(0\right)-y=-6$$

$$-y=-6$$

$$y=6$$

***Therefore, the point is (0,6)***

***If y=0 then, x intercept is:*** $2x-y=-6$

$$2x-0=-6$$

$$2x=-6$$

$$x=-3$$

***Therefore, the point is (-3,0)***

***Plot x and y intercepts***

***Then join the points by a***

***Straight line.***

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***Solution:***

***Given that*** $7x+5y=35$

***If*** $x=0 $ ***then y intercept is:*** $7x+5y=35$

$$7(0)+5y=35$$

$$5y=35$$

$$y=7$$

***Therefore, the point is (0,7)***

***If y=0 then x intercept is:*** $7x+5y=35$

$$7x+5(0)=35$$

$$7x=35$$

$$x=5$$

***Therefore, the point is (5,0)***

***Answer:***

***Plot x,y intercepts***

***Join the points by a straight line.***

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***39. Graph the equation:*** $3x-7y=42$

***Solution:***

***Given that*** $3x-7y=42$

***If*** $x=0 $ ***then, y intercept is:***

$$3(0)-7y=42$$

$$-7y=42$$

$$y=-6$$

***Therefore, the point is (0,-6)***

***If y=0 then, x intercept is:*** $3x-7y=42$

$$3x-7(0)=42$$

$$3x=42$$

$$x=14$$

***Therefore, the point is (14,0). Plot both x,y intercepts and join them by a straight line.***

***Answer:***

***40.***

***-11x = -5y – 13***

***Solve for y***

***-5y – 13 = -11x***

 ***+13 +13***

***----------------------------***

***-5y = -11x – 13***

***Divide all by -5***

***Y = (-11/-5)x -13***

***Y =*** $\frac{11}{5}$ ***x - 13***

***So slope =*** $\frac{11}{5}$

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***41. Find the slope of the line*** $y=-3$

***Solution: In the slope intercept form, y = mx + b, you will find mx term is not there – meaning m = 0. So slope is 0 and y intercept = b = -3***

***Given that*** $y=-3$

***Therefore the slope is*** $m=0$

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***42. Find the slope of the line*** $8x+5y=-11$

 ***-8x -8x***

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 ***5y = -8x – 11***

***Divide both sides by 5 to get:***

$$\frac{5y}{5}= \frac{-8x}{5}- \frac{11}{5}$$

***Here the coefficient of x is slope (m)***

***Slope = m =*** $\frac{-8}{5}$

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***43.Find the slope of the line*** $8y-5x=-11$

***Solution:***

***Given that*** $8y-5x=-11$

 ***+5x +5x***

 ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

 ***8y = 5x – 11***

***Divide both sides to get:***

***Y =*** $\frac{5}{8}x- \frac{11}{8}$

$$m=\frac{5}{8}$$

***Therefore the slope is*** $m=\frac{5}{8}$

***44. Solve the following system of equations by graphing:*** $2x-y=1$ ***and***

$x+2y=8$

***Solution:***

***Given that*** $2x-y=1$ ***and*** $x+2y=8$

***Now take the equation***$2x-y=1$

***If*** $x=0$ ***then*** $2(0)-y=1$

$-y=1$

$y=-1$ ***therefore, the point is (0, -1)***

***If*** $y=0$$2x-0=1$

$$2x=1$$

$x=\frac{1}{2}=0.5$ ***therefore, the point is (0.5,0)***

***Now take the equation*** $x+2y=8$

***If*** $x=0$$0+2y=8$

$$2y=8$$

$$y=\frac{8}{2}=4$$

$y=4 $***therefore, the point is (0,4)***

***If*** $y=0$$x+2(0)=8$

$x=8$ ***therefore, the point is (8,0)***

***Now plot the points on the graph (0,-1)(0.5,0) and (0,4)(8,0)***

***Both lines intersect at (2,3)***

***Here the intersection point is (2,3)***

***Hence the value of solution is x=2 and y=3***

***45. Solve the following system of equations by graphing:*** $-5x-y=7$ ***and***

$x+2y=4$

***Solution:***

***Given that*** $-5x-y=7$ ***and*** $x+2y=4$

***Now take the equation*** $-5x-y=7$

***If*** $x=0$ ***then*** $-5(0)-y=7$

$-y=7$

$y=-7$ ***therefore, the point is (0, -7)***

***If*** $y=0$$-5x-0=7$

$$-5x=7$$

$x=-\frac{7}{5}= -1.4$ ***therefore, the point***

***is (-1.4,0)***

***Now take the equation*** $x+2y=4$

***If*** $x=0$$0+2y=4$

$$2y=4$$

$$y=\frac{4}{2}=2$$

$y=2$***therefore, the point is (0, 2)***

***If*** $y=0$$x+2(0)=4$

$x=4$ ***therefore, the point is (4,0)***

***Now plot the points on the graph (0,-7), (-1.4,0) and (0,2), (4,0)***

******

***Both the lines intersect at (-2,3)***

***Here the intersection point is (-2,3)***

***Hence the value of solution is x= -2 and y=3***

***46. Solve the following system of equations by graphing:*** $5x+3y=3$ ***and*** $-x-3y=9$

***Solution:***

***Given that***$5x+3y=3$ ***and*** $-x-3y=9$

***Now take the equation*** $5x+3y=3$

***If*** $x=0$ ***then*** $5(0)+3y=3$

$3y=3$

$y=\frac{3}{3}=1 $***therefore, the point is (0,1)***

***If*** $y=0$$5x+3(0)=3$

$$5x=3$$

$x=\frac{3}{5}= 0.6$ ***therefore, the point is (0.6,0)***

***Now take the equation***$-x-3y=9$

***If*** $x=0$$0-3y=9$

$$-3y=9$$

$$y=-\frac{9}{3}=-3$$

$y=2$ ***therefore, the point is (0,-3)***

***If*** $y=0$$-x-3(0)=9$

$$-x=9$$

$$x=-9$$

 ***therefore, the point is (-9,0)***

***Now plot the points on the graph (0,1)(0.6,0) and (0,-3)(-9,0)***

***Now extend the lines till they intersect each other and note the intersection point***

***Here the intersection point is (3,-4)***

***Hence the value of solution is x= 3 and y=4***

***47. Solve the system of equation:*** $-2x+y=-1$ ***and*** $–x-2y=-8$

***Solution:***

***By elimination method,***

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

$–x-2y=-8$ ***---- (2)***

***Multiply equation (1) by 2 and adding with equation (2).***

$$-4x+2y=-2$$

$$ –x-2y=-8$$

 $-5x=-10$

$\left\{\left(1\right)×2\right\}+(2)$

$$5x=10$$

$$x=2$$

***Substitute x=2 in equation (1) we get,***

$$-2\left(2\right)+y=-1$$

$$-4+y=-1$$

$$y=-1+4$$

$$y=3$$

***Answer: x=2 and y=3***

***48. Solve the system of equation:*** $-5x-y=7$ ***and*** $0.5x+y=2$

***Solution:***

***By elimination method,***

$-5x-y=7$ ***---- (1)***

$0.5x+y=2$ ***---- (2)***

***AA***

***Add (1) and (2). Y terms wil get eliminated.***

***-4.5 x = 9***

***Divide both sides by -4.5 to get***

***X = -2***

***Now substitute x = -2 in eqn. (1):***

***-5(-2) – y = 7***

***-y = -10 + 7 = -3***

***Divide both sides by -1 to get***

***Y = 3***

***Answer: x=-2 and y=3***

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***49. Solve the system of equation:*** $-5x-3y=-3$ ***and*** $x+3y=-9$

***Solution:***

***By elimination method,***

$-5x-3y=-3$ ***---- (1)***

$x+3y=-9$ ***---- (2)***

$$-5x-3y=-3$$

$$x+3y=-9$$

 $-4x=-12$

1. ***+ (2)***

$$4x=12$$

$$x=\frac{12}{4}$$

$$x=3$$

***Substitute x=3 in equation (1) we get,***

$$-5(3)-3y=-3$$

$$-15-3y=-3$$

$$-3y=-3+15$$

$$-3y=12$$

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

$$y=-4$$

***Answer: x=3 and y=-4***

***50. Solve the following system of equations:*** $y=3x$ ***and*** $2x-3y=7$

***Solution:***

***Given that,***

$y=3x$ ***…. (1)***

$ 2x-3y=7$ ***…. (2)***

***Now substituting (1) in (2) we get,***

$$ 2x-3(3x)=7$$

$ 2x-9x=7$

$$-7x=7$$

$x=\frac{7}{-7}$

$x=-1$

***Now using*** $x=-1$ ***in (1) we get,***

$$y=3x$$

$$y=3(-1)$$

$$y=-3$$

***Hence the answer is (-1,-3)***

***51. Solve the following system of equations:*** $x=y+3$ ***and*** $y-2x=-5$

***Solution:***

***Given that,***$ x=y+3$ ***…. (1)***

$y-2x=-5$ ***…. (2)***

***Now substituting (1) in (2)***

$$y-2x=-5$$

$$y-2(y+3)=-5$$

$$y-2y-6=-5$$

$$-y-6=-5$$

$$-y=-5+6$$

$$-y=1$$

$$y=-1$$

***Now using*** $y=-1$ ***in (1)***

$$ x=y+3$$

$$ x=-1+3$$

$$x=2$$

***Answer is (2,-1)***

***52. Solve the following system of equations:*** $3x-5y=4$ ***and*** $7x+11y=-2$

***Given that,***

$3x-5y=4$ ***…. (1)***

$7x+11y=-2$ ***…. (2)***

***Multiply (1) by 7 and multiply (2) by 3. Then subtract. we get,***

 ***{(1) x 7}– {(2) x 3}***

1. ***X 7 ⇒***$21x-35y=28$***-----------------(3)***
2. ***X 3 ⇒***$21x+33y=-6$***------------------(4)***
3. ***– (4) (-)\_\_\_(-)\_\_\_\_\_\_(+)\_\_\_\_\_\_\_\_\_\_\_***

$-68y=34$

$$y=\frac{34}{-68}$$

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

***Now using*** $y=-\frac{1}{2}$ ***in (1),***

$$3x-5(-\frac{1}{2})=4$$

$$3x+\frac{5}{2}=4$$

$$3x=4-\frac{5}{2}$$

$$3x=\frac{8-5}{2}$$

$$x=\frac{3}{6}$$

$$x=\frac{1}{2}$$

***Answer: (***$\frac{1}{2},-\frac{1}{2})$

***53. Adult tickets for a play cost $5.50 and children tickets cost $2.00. For one performance, 398 tickets were sold. Receipts for the performance were $1426.00. Find the number of children tickets sold.***

 ***Solution:***

***Let ‘x’ be the no.of children tickets sold***

***Let ‘y’ be the no.of Adult tickets sold***

***By the given condition,***

***Total no. of tickets sold = 398***

$x+y=398$ ***…. (1)***

***Receipts for the performance were $1426.00***

$\left(2\right)x+\left(5.50\right)y=1426$ ***…. (2)***

 ***(2) – {(1) x 2}⇒***

 ***Multiply the 1st equation by 2 and subtract from 2***

 ***(2) ⇒*** $\left(2\right)x+\left(5.50\right)y=1426$

 ***(1) x 2 ⇒*** $2x+ 2y=796$

 ***\_\_(-)\_\_\_\_\_\_\_(-)\_\_\_\_\_\_\_(-)\_\_\_\_\_\_\_\_\_\_\_\_***

$3.5y = 630$

$$y=\frac{630}{3.5}×\frac{10}{10}$$

$$y=\frac{6300}{35}$$

$$y=180$$

***Using*** $y=180$ ***in (1)*** $x+y=398$

$$x+180=398$$

$$x=398-180$$

$$x=218$$

 ***Answer: 218 children tickets were sold.***

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***54. Two investments earn an annual income of $86. One investment earns an annual simple interest rate of 5%, and the other investment earns an annual simple interest rate of 6%. The total amount invested is $1500. How much is invested in each account?***

***Let ‘x’ be the 1st investment***

***Let ‘y’ be the 2nd investment***

***By the given condition,***

***The amount invested is $1500.***

$x+y=1500$ ***…. (1)***

***Annual income of the two investments is $86. (Interest rate of 5% and 6% respectively)***

***ie.,*** $x\left(5\%\right)+y\left(6\%\right)=86$

$\frac{5x}{100}+\frac{6y}{100}=86$ ***(since*** $x\%=\frac{x}{100}$***)***

$$\frac{5x+6y}{100}=86$$

$5x+6y=8600$ ***…. (2)***

***(2) - {(1) x 5} we get,***

 ***(2) ⇒*** $5x+6y=8600$

 ***(1) x 5 ⇒*** $5x+5y=7500$

 ***\_\_(-)\_\_(-)\_\_\_\_(-)\_\_\_\_***

$y=1100$

***Using*** $y=1100$ ***in equation (1)***

$$x+y=1500$$

$$x+1100=1500$$

$$x=1500-1100$$

$$x=400$$

***Answer: 1st investment is $400 at 5%***

 ***2nd investment is $1100 at 6%***

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***55. Two burgers and one order of fries contain 34 grams of fat. Two orders of fries and one burger contain 41 grams of fat. Find the number of grams of fat in each item.***

***Solution:***

***Let ‘x grams’ fat be in burger.***

***Let ‘y grams’ fat be in fries.***

***By the given condition,***

***Two burgers and one order of fries contain 34 grams of fat.***

$2x+y=34$ ***… (1)***

***Two orders of fries and one burger contain 41 grams of fat.***

$x+2y=41$ ***…. (2)***

***{(1) X 2} – (2) ⇒*** $4x+2y=68$

***⇒*** $x+2y=41$

 ***\_(-)\_\_(-)\_\_\_\_(-)\_\_***

$$3x=27$$

$$x=\frac{27}{3}$$

$$x=9$$

***Substituting,*** $x=9$ ***in equation (2) we get,***

$$x+2y=41$$

$$9+2y=41$$

$$2y=41-9$$

$$2y=32$$

$$y=\frac{32}{2}$$

$$y=16$$

***Answer: Burger: 9 grams***

***Fries : 16 grams***

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***56. Simplify:*** $\left(3y^{2}-11y-13\right)-\left(3y^{2}-y-1\right)$

***Solution:***

***Given that,***

$$=\left(3y^{2}-11y-13\right)-\left(3y^{2}-y-1\right)$$

$$=3y^{2}-11y-13-3y^{2}+y+1$$

$=-10y-12$

***Answer:*** $-10y-12$

***57. Simplify:*** $-4\left(t^{2}-7t-11\right)-2\left(3t^{2}-7t-5\right)$

***Solution:***

***Given that,*** $-4\left(t^{2}-7t-11\right)-2\left(3t^{2}-7t-5\right)$

$$ =-4t^{2}+28t+44-6t^{2}+14t+10$$

$$=-10t^{2}+42t+54$$

***Answer:*** $-10t^{2}+42t+54$

***58. Simplify:*** $3\left(x^{2}-7x-2\right)-\left(x^{2}+7x+13\right)$

***Solution:***

***Given that,*** $3\left(x^{2}-7x-2\right)-\left(x^{2}+7x+13\right)$

$=3x^{2}-21x-6-x^{2}-7x-13$

$=2x^{2}-28x-19$

***Answer:*** $2x^{2}-28x-19$

***59. Simplify:*** $\left(-3z^{7}\right)\left(-5z^{3}\right)$

***Solution: Given that,*** $\left(-3z^{7}\right)\left(-5z^{3}\right)$

$$=\left(-3z^{7}\right)\left(-5z^{3}\right)$$

$=15(z^{7})(z^{3})$

$$since (a^{m}×a^{n}=a^{m+n})$$

$ =15z^{7+3}$

$=15z^{10}$

***Answer:*** $15z^{10}$

***60. Simplify:*** $(-2x^{4})(3x^{2})(-4x^{5})$

***Solution:***

***Given that,*** $\left(-2x^{4}\right)\left(3x^{2}\right)\left(-4x^{5}\right)$

$=24(x^{4})(x^{2})(x^{5})$

$$since (a^{m}×a^{n}=a^{m+n})$$

$=24(x^{4+2+5})$

$=24 x^{11}$

***Answer:*** $24 x^{11}$

***61. Simplify:*** $\left(-2t\right)\left(-3t^{7}\right)\left(-4t^{4}\right)$

***Solution:***

***Given that,*** $\left(-2t\right)\left(-3t^{7}\right)\left(-4t^{4}\right)$

$$=-24\left(t\right)\left(t^{7}\right)\left(t^{4}\right)$$

$=-24\left(t^{1+7+4}\right)$

$$since (a^{m}×a^{n}=a^{m+n})$$

$$=-24 t^{12}$$

***Answer:*** $-24 t^{12}$

***62. Simplify:*** $\left(2t-5\right)\left(3t+5\right)$

***Solution:***

***Given that,*** $\left(2t-5\right)\left(3t+5\right)$

$=\left(2t\right)\left(3t\right)+\left(2t\right)\left(5\right)-\left(5\right)\left(3t\right)-\left(5\right)\left(5\right)$

***Since (a+b)(c+d)=ac+ad+bc+bd***

$$=6t^{2}+10t-15t-25$$

$$=6t^{2}-5t-25$$

***Answer:*** $6t^{2}-5t-25$

***63. Simplify:*** $\left(3x-1\right)\left(x+3\right)$

***Solution:***

***Given that,*** $\left(3x-1\right)\left(x+3\right)$

$$Since (a+b)(c+d)=ac+ad+bc+bd$$

$$=\left(3x\right)\left(x\right)+\left(3x\right)\left(3\right)-\left(1\right)\left(x\right)-\left(1\right)\left(3\right)$$

$=3x^{2}+9x-x-3$

$$=3x^{2}+8x-3$$

***Answer:*** $3x^{2}+8x-3$

***64. Simplify:*** $\left(5x-7\right)\left(2x+3\right)$

***Solution:***

***Given that,*** $\left(5x-7\right)\left(2x+3\right)$

$$Since (a+b)(c+d)=ac+ad+bc+bd$$

$$=\left(5x\right)\left(2x\right)+\left(5x\right)\left(3\right)-\left(7\right)\left(2x\right)-\left(7\right)\left(3\right)$$

$$=10x^{2}+15x-14x-21$$

$$=10x^{2}+x-21$$

***Answer:*** $10x^{2}+x-21$

***65. Simplify, write answer with positive exponents: (4x3)2***

***Solution:***

***Given that, (4x3)2***

***= (42)(x3)2***

***=16( x3 x 2)***

***since (am)n = am x n***

***=16 x6***

***Answer: 16 x6***

***66. Simplify, write answer with positive exponents:*** $(-3x^{-3}y^{4})^{3}$

***Solution:***

***Given that,*** $\left(-3x^{-3}y^{4}\right)^{3}$

since (am)n = am x n

$$a^{m}=\frac{1}{a^{-m}} also a^{-m}=\frac{1}{a^{m}}$$

$=(-3^{3})(x^{-3})^{3}(y^{4})^{3}$

$=-27\left(x^{-9}\right)\left(y^{12}\right)$

$=\frac{-27y^{12}}{x^{9}}$

***Answer:*** $\frac{-27y^{12}}{x^{9}}$

***67. Simplify, write answer with positive exponents:*** $(-4x^{5}y^{-2})^{4}$

***Solution:***

***Given that,***

since (am)n = am x n

$$a^{m}=\frac{1}{a^{-m}} also a^{-m}=\frac{1}{a^{m}}$$

$$\left(-4x^{5}y^{-2}\right)^{4}$$

$$=(-4^{4})(x^{5})^{4}(y^{-2})^{4}$$

$=256\left(x^{20}\right)\left(y^{-8}\right)$

$=256\frac{x^{20}}{y^{8}}$

***Answer:*** $=256\frac{x^{20}}{y^{8}}$

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***68. Simplify, write answer with positive exponents:*** $\frac{16x^{11}y^{5}}{-8x^{8}y^{2}}$

***Solution:***

***Given that,*** $\frac{16x^{11}y^{5}}{-8x^{8}y^{2}}$ ***=*** $\left(\frac{16}{-8}\right)\left(\frac{x^{11}}{x^{8}}\right)\left(\frac{y^{5}}{y^{2}}\right)$

$=(-2)(x^{11-8})(y^{5-2})$

$$since \frac{a^{m}}{a^{n}}=a^{m-n}$$

$$=-2x^{3}y^{3}$$

***Answer:*** $-2x^{3}y^{3}$

***69. Simplify, write answer with positive exponents:*** $\frac{-60x^{13}y^{4}t^{5}}{15x^{9}y^{3}t}$

***Solution:***

$$since \frac{a^{m}}{a^{n}}=a^{m-n}$$

***Given that,*** $\frac{-60x^{13}y^{4}t^{5}}{15x^{9}y^{3}t}$

$$\left(\frac{-60}{15}\right)\left(\frac{x^{13}}{x^{9}}\right)\left(\frac{y^{4}}{y^{3}}\right)\left(\frac{t^{5}}{t^{1}}\right)$$

$$=(-4)(x^{13-9})(y^{4-3})(t^{5-1})$$

$$=(-4)(x^{4})(y)(t^{4})$$

$$=-4x^{4}yt^{4}$$

***Answer:*** $-4x^{4}yt^{4}$

***70. Simplify, write answer with positive exponents:*** $\frac{-15x^{9}y^{3}t}{60x^{13}y^{4}t^{5}}$

***Solution:***

***Note: Always, move the smaller value exponent (for the same base) towards the greater value exponent to the other side of fraction and change sign***

***Given that,*** $\frac{-15x^{9}y^{3}t}{60x^{13}y^{4}t^{5}}$ ***=*** $\left(\frac{-15}{60}\right)\left(\frac{x^{9}}{x^{13}}\right)\left(\frac{y^{3}}{y^{4}}\right)\left(\frac{t^{1}}{t^{5}}\right)$

$$ $$

$$=\left(\frac{-1}{4}\right)\left(\frac{1}{x^{13-9}}\right)\left(\frac{1}{y^{4-3}}\right)\left(\frac{1}{t^{5-1}}\right)$$

$$=\frac{-1}{4x^{4}yt^{4}}$$

***Answer:*** $\frac{-1}{4x^{4}yt^{4}}$

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***71. Simplify:*** $\frac{8y^{-3}}{4y^{-5}}$

***Solution:***

***Given that,*** $\frac{8y^{-3}}{4y^{-5}}$ ***=*** $2\frac{y^{-3+5}}{1}$

***Answer:*** $2y^{2}$

***72. Write:***

***a) 4.05643 x 104 in decimal Notation.***

***Solution:***

***Given that 4.05643 x 104***

***Move the decimal point equal to the number of places specified by the power of ten***

***(Move to the right if the power of ten is positive, move to the left if negative)***

***Here the power of ten is 4***

***So we have to move the decimal point to the right side for 4 decimal places***

 ***4.05643 x 104 = 40564.3***

***Answer: 40564.3***

***b) 787.507 in scientific notation***

***Solution:***

***Given that 787.507***

***Move the decimal point so that there is only one non-zero digit to its left.***

***Count the number of digits between the old and new decimal point. This gives the power of 10.***

***Here 787.507 = 7.87507 x 102***

***Answer: 7.87507 x 102***

***c)*** $\left(7×10^{11}\right)\left(8×10^{-8}\right)$ ***in scientific notation after simplifying.***

***Solution:***

$=\left(7×10^{11}\right)\left(8×10^{-8}\right)$

$=\left(7×8×10^{11}×10^{-8}\right)$

$$a^{m}×a^{n}=a^{m+n}$$

$$=56×10^{3}$$

$$=5.6×10^{4}$$

***Answer:*** $5.6×10^{4}$

***d)*** $\frac{8×10^{5}}{2×10^{-8}}$ ***in scientific notation after simplifying.***

***Solution:***

$$=\frac{8×10^{5}}{2×10^{-8}}$$

$$=\frac{8}{2}×10^{5}×10^{8}$$

$$=4×10^{5+8}$$

$$=4×10^{13}$$

***Answer:*** $4×10^{13}$

***73. Factor out the GCF from the polynomial:*** $8z^{5}-12z^{7}$

***Solution:***

GCF of 8 and 12 is 4

GCF of z5 and z7 is z5

$$=8z^{5}-12z^{7}$$

$$=4z^{5}(2-3z^{2})$$

***Answer:*** $4z^{5}(2-3z^{2})$

***74. Factor out the GCF:*** $6x^{2}y^{3}+9x^{3}y$

GCF of 6 and 9 is 3

GCF of x2 and x3 is x2

GCF of y3 and yis y

***Solution:***

$$=6x^{2}y^{3}+9x^{3}y$$

$$=3x^{2}y(2y^{2}+3x)$$

***Answer:*** $3x^{2}y(2y^{2}+3x)$

***75. Factor out the GCF:*** $28r^{4}s^{5}+7r^{3}s-35r^{4}s^{3}$

GCF of 28,35,7 is 7

GCF of $r^{4},r^{3}$ is $r^{3}$

GCF of $s^{3},s^{2},s$ is $s$

***Solution:***

$$=28r^{4}s^{5}+7r^{3}s-35r^{4}s^{3}$$

$$=7r^{3}s(4rs^{4}+1-5rs^{2})$$

***Answer:*** $7r^{3}s(4rs+1-5rs^{2})$

***NOTE:***

***For the following problems (76 through 85), wherever factoring is necessary, “ac” method is used.***

***Write the trinomial in descending power of x.***

***a***$x^{2}$ ***+ bx + c form***

***Factor any GCF. Then***

***identify a,b,c***

***Find the product of a and c = ac***

***Now find 2 factors of ac such that they add to give you b and multiply to give you ac***

***Then use those 2 factors and rewrite the expression in 4 terms by splitting the “b” term into 2 terms.***

***Then factor by grouping.***

***76. Completely factor:*** $x^{2}-8x-33$

***Solution:***

$$-33$$

$=x^{2}-8x-33$

$$3$$

$$-11$$

$$=x^{2}-11x+3x-33$$

$$=x\left(x-11\right)+3(x-11)$$

$$=\left(x-11\right)(x+3)$$

***Answer:*** $\left(x-11\right)(x+3)$

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***77. Completely factor:*** $x^{2}+7x-18$

***Solution:***

$$-18$$

$$-2$$

$$9$$

$$=x^{2}+7x-18$$

$$ =x^{2}+9x-2x-18$$

$$=x\left(x+9\right)-2(x+9)$$

$$=\left(x+9\right)(x-2)$$

***Answer:*** $\left(x+9\right)(x-2)$

***78. Completely factor :***$ 81-4x^{2}$

***Solution:***

$=81-4x^{2}$

$$a^{2}-b^{2}=\left(a+b\right)(a-b)$$

$$=(9)^{2}-(2x)^{2}$$

$$=\left(9+2x\right)(9-2x)$$

***Answer:*** $\left(9+2x\right)(9-2x)$

***79. Completely factor:*** $x^{2}-3x-40$

***Solution:***

$$-40$$

$$-8$$

$$5$$

$$=x^{2}-3x-40$$

$$=x^{2}-8x+5x-40$$

$$=x\left(x-8\right)+5(x-8)$$

$$=\left(x-8\right)(x+5)$$

***Answer:*** $\left(x-8\right)(x+5)$

***80. Completely factor:*** $a^{2}+2ab+b^{2}$

***Solution:***

$=a^{2}+2ab+b^{2}$

$$ a^{2}b^{2}$$

$$ab$$

$$ab$$

$$=a^{2}+ab+ab+b^{2}$$

$$=a\left(a+b\right)+b(a+b)$$

$$=\left(a+b\right)(a+b)$$

$$=(a+b)^{2}$$

***Answer:*** $(a+b)^{2}$

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***81. Completely factor:*** $2x^{3}-6x^{2}+4x$

***Solution:***

$$2$$

$$-2$$

$$-1$$

$$=2x^{3}-6x^{2}+4x$$

$$=2x(x^{2}-3x+2)$$

$$=2x(x^{2}-x-2x+2)$$

$$=\left(2x\right)\{x\left(x-1\right)-2\left(x-1\right)\}$$

$$=\left(2x\right)\{\left(x-1\right)\left(x-2\right)\}$$

$$=(2x)(x-1)(x-2)$$

***Answer:***$ (2x)(x-1)(x-2)$

***82. Completely factor:*** $x^{2}-3xy-4y^{2}$

 -4

***Solution:***

$$-4$$

$$1$$

$$=x^{2}-3xy-4y^{2}$$

$$=x^{2}+xy-4xy-4y^{2}$$

$$=x\left(x+y\right)-4y(x+y)$$

$$=\left(x+y\right)(x-4y)$$

***Answer:*** $\left(x+y\right)(x-4y)$

***83. Solve the equation by factoring:*** $x^{2}-6x+8=0$

***Solution:***

$$8$$

$$-2$$

$$-4$$

$$x^{2}-6x+8=0$$

$$x^{2}-4x-2x+8=0$$

$$x\left(x-4\right)-2\left(x-4\right)=0$$

$$\left(x-4\right)\left(x-2\right)=0$$

$$\left(x-4\right)=0 and \left(x-2\right)=0$$

$$x-4=0 and x-2=0$$

$$x=4 and x=2$$

***Answer:*** $\{4,2\}$

***84. Solve the equation by factoring:*** $z^{2}+z=30$

***Solution:***

$$-30$$

$$-5$$

$$6$$

$$z^{2}+z=30$$

$$z^{2}+z-30=0$$

$$z^{2}+6z-5z-30=0$$

$$z\left(z+6\right)-5\left(z+6\right)=0$$

$$\left(z+6\right)\left(z-5\right)=0$$

$$z+6=0 and z-5=0$$

$$z=-6 and z=5$$

***Answer:*** $\{-6,5\}$

***85. Solve the equation by factoring:*** $2x^{2}-10x-12=0$

***Solution:***

$$ -6$$

$$1$$

$$-6$$

$$2x^{2}-10x-12=0$$

$$2(x^{2}-5x-6)=0$$

$$2(x^{2}-6x+x-6)=0$$

$$2\{x\left(x-6\right)+1\left(x-6\right)\}=0$$

$$2\left\{\left(x-6\right)\left(x+1\right)\right\}=0$$

$$\left(x-6\right)\left(x+1\right)=0$$

$$x-6=0 and x+1=0$$

$$x=6 and x=-1$$

***Answer:*** $\{6,-1\}$