① $13(x-52)=26$

$13x-676=26$

$13x-676+676=26+676$

$13x=702$

$\frac{13x}{13}=\frac{702}{13}$

$x=54$

Math 0310 Final Exam Review

Dept

033114

② $2(6x+8)=4(2x+12)$

Step by Step Solution

$12x+16=8x+48$

$12x+16-16=8x+48-16$

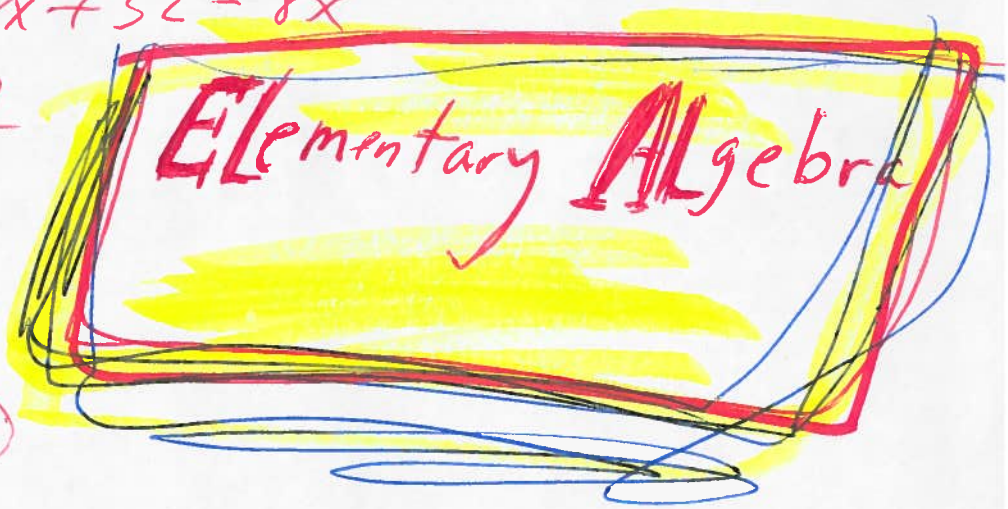
$12x=8x+32$

$12x-8x=8x+32-8x$

$4x=32$

$\frac{4x}{4}=\frac{32}{4}$

$x=8$



(3) $-7x + 3(2x-4) = -9-4x$

$-7x + 6x - 12 = -9-4x$

$-1x - 12 = -9-4x$

$-1x - 12 + 12 = -9-4x+12$

$-1x = -4x + 3$

$-1x + 4x = -4x + 3 + 4x$

$3x = 3$

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

$x = 1$

(4) $9x + 5(-2x-5) = -18-8x$

$9x - 10x - 25 = -18-8x$

$-1x - 25 = -18-8x$

$-1x - 25 + 25 = -18-8x+25$

$-1x = -8x + 7$

$-1x + 8x = -8x + 7 + 8x$

$7x = 7$

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

$x = 1$

(5.) $7.3p - 22 = 6.3p - 11$

$7.3p - 22 + 22 = 6.3p - 11 + 22$

$7.3p = 6.3p + 11$

$7.3p - 6.3p = 6.3p + 11 - 6.3p$

$p = 11$

(6.) $-7q + 1.0 = -24.5 - 1.9q$

$-7q + 1.0 - 1.0 = -24.5 - 1.9q - 1.0$

$-7q = -1.9q - 25.5$

$-7q + 1.9q = -1.9q - 25.5 + 1.9q$

$-5.1q = -25.5$

$\frac{-5.1q}{-5.1} = \frac{-25.5}{-5.1}$

$q = 5$

(7.) $-0.05(60) + 0.6x = 0.3(60 + x)$

$-3 + 0.6x = 18 + 0.3x$

$-3 + 0.6x + 3 = 18 + 0.3x + 3$

$0.6x = 0.3x + 21$

$0.6x - 0.3x = 0.3x + 21 - 0.3x$

$0.3x = 21$

$\frac{0.3x}{0.3} = \frac{21}{0.3}$

$x = 70$

(8) $\frac{5x}{2} + \frac{8}{3} = \frac{7x}{3}$ LCD = 6

$\frac{5x}{2}(6) + \frac{8}{3}(6) = \frac{7x}{3}(6)$ Mult by LCD

$5x(3) + 8(2) = 7x(2)$

$15x + 16 = 14x$

$15x + 16 - 16 = 14x - 16$

$15x = 14x - 16$

$15x - 14x = 14x - 16 - 14x$

$x = -16$

(9) $\frac{7}{3} - \frac{x}{3} = \frac{x}{4}$ LCD = 12

$\frac{7}{3}(12) - \frac{x}{3}(12) = \frac{x}{4}(12)$ Mult by LCD

$7(4) - x(4) = x(3)$

$28 - 4x = 3x$

$28 - 4x - 28 = 3x - 28$

$-4x = 3x - 28$

$-4x - 3x = 3x - 28 - 3x$

$-7x = -28$

$\frac{-7x}{-7} = \frac{-28}{-7}$

$x = 4$

10. $\frac{r+6}{5} = \frac{r+8}{7}$ LCD = 35

$35\left(\frac{r+6}{5}\right) = 35\left(\frac{r+8}{7}\right)$ Mult by LCD

$7(r+6) = 5(r+8)$

$7r + 42 = 5r + 40$

$7r + 42 - 42 = 5r + 40 - 42$

$7r = 5r - 2$

$7r - 5r = 5r - 2 - 5r$

$2r = -2$

$\frac{2r}{2} = \frac{-2}{2}$

$r = -1$

11. $-8x + 3 + 6x = -2x + 8$

$-2x + 3 = -2x + 8$

$-2x + 3 - 3 = -2x + 8 - 3$

$-2x = -2x + 5$

$-2x + 2x = -2x + 5 + 2x$

$0 \neq 5$

No Solution OR $\emptyset$ OR $\{\}$

(12) $22x + 11(x+1) = 33(x+1) - 22$

$22x + 11x + 11 = 33x + 33 - 22$

$33x + 11 = 33x + 11$

$33x + 11 - 11 = 33x + 11 - 11$

$33x = 33x$

$33x - 33x = 33x - 33x$

$0 = 0$

all Real #s or $\{x \mid x \in R\}$

(13) $17x + 3y = 13$ Solve for (y)

$17x + 3y - 17x = 13 - 17x$

$3y = 13 - 17x$

$\frac{3y}{3} = \frac{13}{3} - \frac{17x}{3}$

$y = \frac{13}{3} - \frac{17x}{3}$

$y = -\frac{17x}{3} + \frac{13}{3}$

OR

$y = mx + b$ form

(14) $A = P(1+rt)$ Solve for t

$A = 1P + Prt$

$A = P + Prt$

$A - P = P + Prt - P$

$A - P = Prt$

$\frac{A-P}{Pr} = \frac{Prt}{Pr}$

$$\frac{A-P}{Pr} = t$$

(15) $A = \frac{1}{2}h(a+b)$ Solve for a

$2A = 2(\frac{1}{2})h(a+b)$

$2A = h(a+b)$

$2A = ha + hb$

$2A - hb = ha + hb - hb$

$2A - hb = ha$

$\frac{2A-hb}{h} = \frac{ha}{h}$

$$\frac{2A-hb}{h} = a$$

(16) $7x > 28$

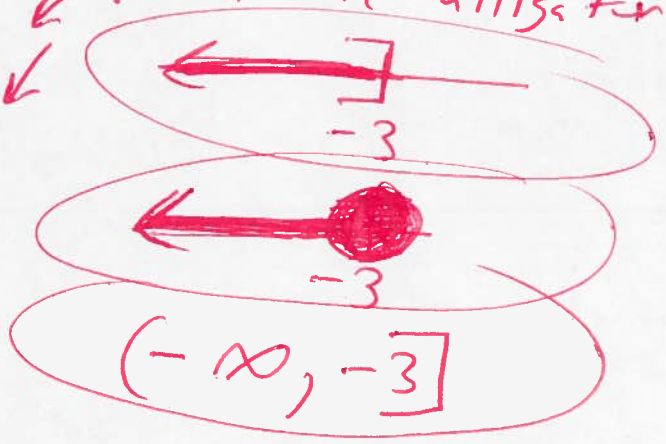
$\frac{7x}{7} > \frac{28}{7}$

$x > 4$

(17.) $-7x \geq 21$

$\frac{-7x}{-7} \leq \frac{21}{-7}$ ← Turn the alligator around

$x \leq -3$



(18) $9x - 8 \leq 4x - 12$

$9x - 8 + 8 \leq 4x - 12 + 8$

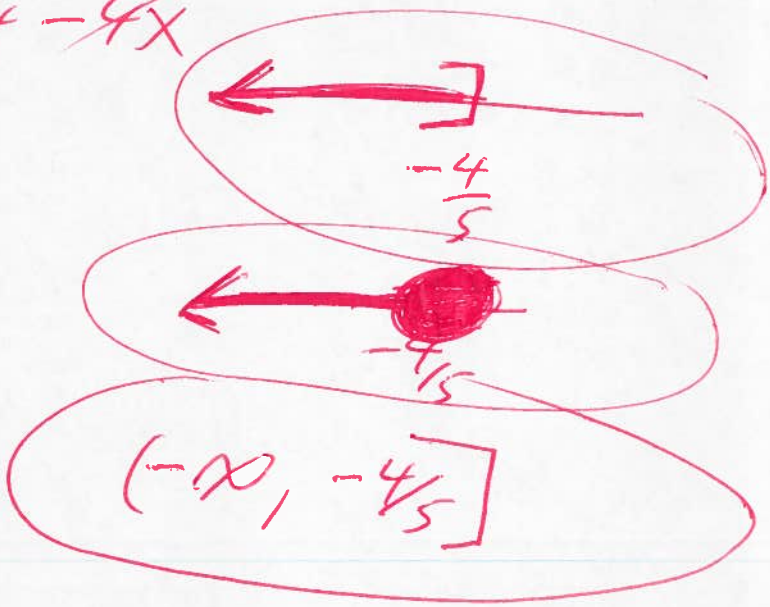
$9x \leq 4x - 4$

$9x - 4x \leq 4x - 4 - 4x$

$5x \leq -4$

$\frac{5x}{5} \leq \frac{-4}{5}$

$x \leq -\frac{4}{5}$



19. Determine if the ordered pair is a solution to the equation.

$(0, 7)$ $\quad 10x - 8y = 56$

x y

$10(0) - 8(7) = 56$? Substitute

$0 - 56 = 56$?

$-56 \neq 56$ NO

20. Determine if the ordered pair is a solution to the equation.

$(2, 0)$ $\quad 6y + 4x = 8$

x y

$6(0) + 4(2) = 8$? Substitute

$0 + 8 = 8$?

$8 = 8$ Yes

Graph

First Method

Solve for y

(21) $2x - 3y = 6$

$-2x \quad -2x$

$-3y = 6 - 2x$

$\frac{-3y}{-3} = \frac{6}{-3} - \frac{2x}{-3}$

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

$y = \frac{2x}{3} - 2$ ← $y = mx + b$ form

$y = \frac{2}{3}(0) - 2$

$y = 0 - 2$

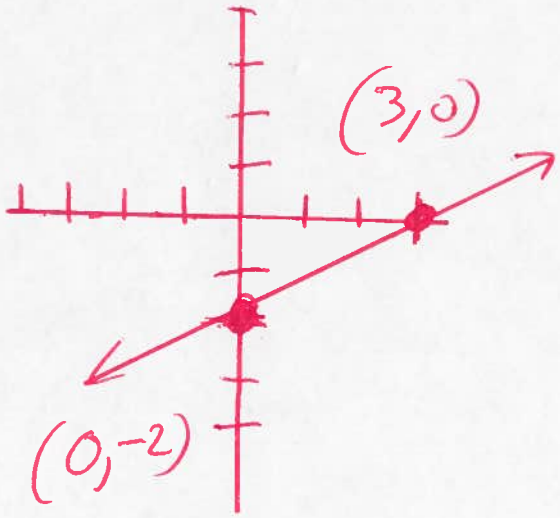
$y = -2$

x	y
0	-2
3	0

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

$y = 2 - 2$

$y = 0$



Second Method OR Graph by Intercept Method

$2x-3y=6$

Let $x=0$

$2(0)-3y=6$

$0-3y=6$

$-3y=6$

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

$y=-2$

$(0,-2)$

Let $y=0$

$2x-3(0)=6$

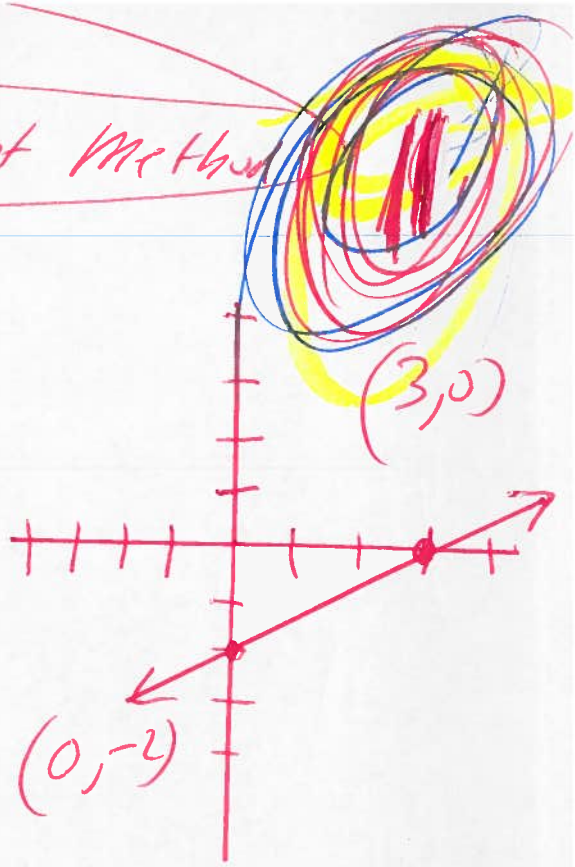
$2x-0=6$

$2x=6$

$\frac{2x}{2}=\frac{6}{2}$

$x=3$

$(3,0)$



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(22) Graph $y=2x-6$

$y=2(0)-6$

$y=0-6$

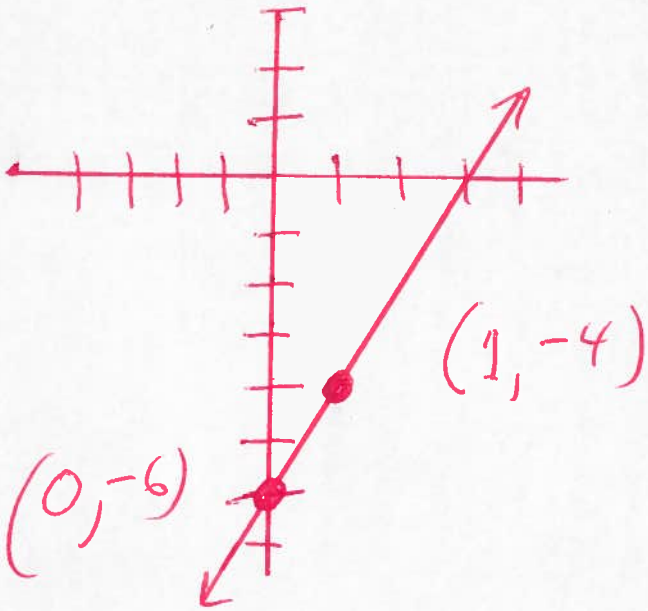
$y=-6$

$y=2(1)-6$

$y=2-6$

$y=-4$

x	y
0	-6
1	-4



(23) Find the slope of the straight line through the two points $(8, 3)$ and $(-4, 4)$

$x_1 \quad y_1 \qquad x_2 \quad y_2$

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$ Slope formula

$$m = \frac{(3)-(4)}{(8)-(-4)}$$

$$m = \frac{3-4}{8+4}$$

$$m = \frac{-1}{12}$$

Find the slope and the y-intercept

(24) $y = 4x - 5$ $\quad y = mx + b$

Slope $= m = 4$ and y-intercept $= (0, -5)$ ✓

Find the Slope and the y-intercept

(25) $-2x + 5y = 5$

$-2x + 5y + 2x = 5 + 2x$

$5y = 5 + 2x$

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

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

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

$y = mx + b$

Slope $= m = \frac{2}{5}$ ✓

and

y-intercept $(0, 1)$ ✓

(26.) Find the equation of the line with slope $= m = 3$ and point $(-3, 6)$.

$x_1 \quad y_1$

$y - y_1 = m(x - x_1)$ ← Point Slope Formula

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

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

$y - 6 = 3x + 9$

$y - 6 + 6 = 3x + 9 + 6$

$y = 3x + 15$

(27.) Determine if the pair of lines is parallel, perpendicular, or neither.

$y_1 = 6x - 8$

$y_2 = -\frac{1}{6}x - 1$

$m_1 = 6$, $m_2 = -\frac{1}{6}$

$m_1 \cdot m_2 =$ ← Slopes

$(6)(-\frac{1}{6}) =$

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

$-1 =$ lines are perpendicular

(28) Determine if the pair of lines is parallel, perpendicular, or neither.

$Y_1 = 9X - 6$ $\quad m_1 = 9$

$Y_2 = 9X + 4$ $\quad m_2 = 9$

Slopes

$m_1 = m_2$

$9 = 9$ ← lines are parallel

(29) Determine if the pair of lines is parallel, perpendicular, or neither.

$Y_1 = 5X - 4$ $\quad m_1 = 5$

$Y_2 = -5X - 8$ $\quad m_2 = -5$

Slopes

$m_1 \neq m_2$

$5 \neq -5$ ↙ NOT Parallel

$m_1 \cdot m_2 =$

$(5)(-5) =$ ↙ NOT Perpendicular

$-25 \neq -1$

Neither

(30.) Determine if the pair of lines is parallel, perpendicular, or neither.

$2y = -x + 6$

$x + 2y = -10$

$2y = -x + 6$ Solve for y

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

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

$x + 2y = -10$ Solve for y

$x + 2y - x = -10 - x$

$2y = -10 - x$

$\frac{2y}{2} = \frac{-10}{2} - \frac{x}{2}$

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

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

$m_1 = -\frac{1}{2}$ $m_2 = -\frac{1}{2}$ and $m_1 = m_2 = -\frac{1}{2} = -\frac{1}{2}$

Parallel lines

(31) $f(x) = -2x + 20$ find $f(9)$

$f(9) = -2(9) + 20$

$f(9) = -18 + 20$

$f(9) = 2$ (9, 2)

(32) $f(x) = 3x^2 + 4x - 1$ find $f(-3)$

$f(-3) = 3(-3)^2 + 4(-3) - 1$

$f(-3) = 3(-3)(-3) + 4(-3) - 1$

$f(-3) = 3(9) + 4(-3) - 1$

$f(-3) = 27 - 12 - 1$

$f(-3) = 15 - 1$

$f(-3) = 14$ (-3, 14)

(33) $f(x) = |x + 4|$ find $f(6)$

$f(6) = |(6) + 4|$

$f(6) = |6 + 4|$

$f(6) = |10|$

$f(6) = 10$ (6, 10)

(34) $h(x) = \frac{x^2 - 3}{x}$ find $h(3)$

$$h(3) = \frac{(3)^2 - 3}{(3)}$$

$$h(3) = \frac{(3)(3) - 3}{3}$$

$$h(3) = \frac{9 - 3}{3}$$

$$h(3) = \frac{6}{3}$$

$$h(3) = 2$$

$(3, 2)$

18

(35.) $x+2y=9$
$2x+6y=12$

$(x+2y=9)(-6)$
$(2x+6y=12)(2)$

$-6x-12y=-54$
$4x+12y=24$

$-2x = -30$

$\frac{-2x}{-2} = \frac{-30}{-2}$

$x=15$

Subst
$x+2y=9$

$(15)+2y=9$
$15+2y-15=9-15$
$2y=-6$
$\frac{2y}{2} = \frac{-6}{2}$
$y=-3$

$(x,y)=(15,-3)$

(36.) $x+3y=7$
$3x+9y=21$

$(x+3y=7)(-9)$
$(3x+9y=21)(3)$

$-9x-27y=-63$
$9x+27y=63$

$0=0$

Infinite # of solutions

OR
$\{(x,y) \mid x+3y=7\}$
OR
$\{(x,y) \mid 3x+9y=21\}$

37. $8x - 4y = 8$
$2x - y = 5$

$(8x - 4y = 8)\ (-1)$
$(2x - y = 5)\ (4)$

$-8x + 4y = -8$
$8x - 4y = 20$

$0 \neq 12$

No solution

$\emptyset$

$\{\ \}$

19

38. $3x - 4y = 6$
$4x - 4y = 4$

$(3x - 4y = 6)\ (-4)$
$(4x - 4y = 4)\ (4)$

$-12x + 16y = -24$
$16x - 16y = 16$

$4x = -8$

$\frac{4x}{4} = \frac{-8}{4}$

$x = -2$

Subst

$3x - 4y = 6$
$3(-2) - 4y = 6$
$-6 - 4y = 6$
$-6 - 4y + 6 = 6 + 6$
$-4y = 12$
$\frac{-4y}{-4} = \frac{12}{-4}$

$y = -3$

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

39. Find two integers whose sum is -8 and whose difference is 6.

$$x+y=-8$$
$$x-y=6$$

$$2x+0=-2$$

$$2x=-2$$

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

$$x=-1$$

Subst

$$x+y=-8$$
$$(-1)+y=-8$$
$$-1+y=-8$$
$$-1+y+1=-8+1$$

$$y=-7$$

$$(x, y)=(-1, -7)$$

(40.) Find two numbers such that the first is four more than the second and two times the first is 6 more than four times the second.

$x = y + 4$

Solve by Substitution

$2x = 4y + 6$

$2(y+4) = 4y+6$

$2y + 8 = 4y + 6$

$2y + 8 - 8 = 4y + 6 - 8$

$2y = 4y - 2$

$2y - 4y = 4y - 2 - 4y$

$-2y = -2$

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

$y = 1$

$x = y + 4$

$x = (1) + 4$

$x = 1 + 4$

$x = 5$

Subst

First # Second #

$(x, y) = (5, 1)$

(41) Adam has 63 dimes and nickels. The total value of the coins is $5.00. Find the number of each type of coin.

$$x + y = 63$$
$$.10x + .05y = 5.00$$

$(x + y = 63)(-.05)$ Mult

$(.10x + .05y = 5.00)(1)$

$$-.05x - .05y = -3.15$$
$$.10x + .05y = 5.00$$

$$.05x + 0 = 1.85$$
$$.05x = 1.85$$
$$\frac{.05x}{.05} = \frac{1.85}{.05}$$
$$x = 37$$

Subst $(x, y) = (37, 26)$

$$x + y = 63$$
$$(37) + y = 63$$
$$37 + y = 63$$
$$37 + y - 37 = 63 - 37$$
$$y = 26$$

26 nickels

37 dimes

$(4x^8y^{-5}z)^{-4} =$

(42) $(4^1x^8y^{-5}z^1)^{-4} =$

$4^{1(-4)}x^{8(-4)}y^{-5(-4)}z^{1(-4)} =$

$4^{-4}x^{-32}y^{20}z^{-4} =$

$\frac{y^{20}}{4^4x^{32}z^4} =$

$\frac{y^{20}}{4*4*4*4x^{32}z^4} =$

$\frac{y^{20}}{256x^{32}z^4} =$

(43) $\left(\frac{5^1x^3y^4}{7^1z^8}\right)^2 =$

$\frac{5^{1(2)}x^{3(2)}y^{4(2)}}{7^{1(2)}z^{8(2)}} =$

$\frac{5^2x^6y^8}{7^2z^{16}} =$

$\frac{5*5x^6y^8}{7*7z^{16}} =$

$\frac{25x^6y^8}{49z^{16}}$

(49) $\left(\frac{2x^3y^{-3}}{x^{-3}y^2}\right)^{-5} =$

$\left(\frac{2^1x^3y^{-3}}{x^{-3}y^2}\right)^{-5} =$

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

$\frac{2^{-5}x^{-15}y^{15}}{x^{15}y^{-10}} =$

$\frac{y^{15}y^{10}}{2^5x^{15}x^{15}} =$

$\frac{y^{15+10}}{2\cdot2\cdot2\cdot2\cdot2\,x^{15+15}} =$

$\frac{y^{25}}{32x^{30}} =$

45. $(9B+4)+(B^2-B-5)=$ foil

$9B+4+B^2-1B-5=$ foil

$B^2+8B-1=$

46. $(7x^2-3x+20)-(4x^2+5x-40)=$

$7x^2-3x+20-4x^2-5x+40=$

$3x^2-8x+60=$

47. $(4x+5)(-2x-1)=$ foil

$-8x^2-4x-10x-5=$

$-8x^2-14x-5=$

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

48. $x^3-x^2+1x+x^2-1x+1=$ foil

$x^3+1=$

$(9a-11)^2=$

49. $(9a-11)(9a-11)=$ foil

$81a^2-99a-99a+121=$

$81a^2-198a+121=$

(50) $(12a+7b)(12a-7b) =$ foil

$144a^2 - 84b + 84b - 49b^2 =$

$144a^2 - 49b^2 =$

26

(51.) $(5x^2-11x-1) \div (x-3)$ use long division

$$x-3 \;\overline{)\; 5x^2-11x-1}$$

$5x + 4 + \frac{11}{x-3}$ ← answer

$-(5x^2 \pm 15x)$

$4x - 1$

$-(4x \pm 12)$

11 rem

OR use synthetic division

$(5x^2-11x-1) \div (x-3)$

OPP

3	5	−11	−1
		15	12
	5	4	(11) rem

$5x + 4 + \frac{11}{x-3}$ ← answer

Factor by Groupings

(52) $r^2 - 8r + rt - 8t =$

$(r^2 - 8r) + (rt - 8t) =$

$r(r-8) + t(r-8) =$

$(r-8)(r+t) =$

(53) $4k^2 - 121m^2 =$

$(2k)^2 - (11m)^2 =$

$(2k+11m)(2k-11m) =$

Factor

$A^2 - B^2 = (A+B)(A-B)$

(54) $27x^3 - 8 =$

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

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

$(3x-2)(9x^2 + 6x + 4) =$

Factor

$A^3 - B^3 = (A-B)(A^2 + AB + B^2)$

(55) $27a^3 + 64b^3$

$(3a)^3 + (4b)^3 =$

$(3a+4b)((3a)^2 - (3a)(4b) + (4b)^2) =$

$(3a+4b)(9a^2 - 12ab + 16b^2) =$

Factor

$A^3 + B^3 = (A+B)(A^2 - AB + B^2)$

Factor

56) $x^2 - 3x - 88$

$(x+8)(x-11) =$

Ck $(x+8)(x-11) =$

$x^2 - 11x + 8x - 88 =$

$x^2 - 3x - 88 =$ ✓

88 · 1
8 · 11
4 · 22
2 · 44

Solve by factoring

57) $x^2 - x = 6$

$x^2 - x - 6 = 6 - 6$

$x^2 - x - 6 = 0$

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

6 · 1
2 · 3

Set $x+2=0$ OR $x-3=0$

$x+2-2=0-2$ OR $x-3+3=0+3$

$x = -2$ OR $x = 3$

Solve by factoring

58) $20B^2 + 23B - 6 = -12$

$20B^2 + 23B - 6 + 12 = -12 + 12$

$20B^2 + 23B + 6 = 0$

$(4B+3)(5B+2) = 0$

20 · 1
10 · 2
4 · 5

6 · 1
2 · 3

$\left\{-\frac{3}{4}, -\frac{2}{5}\right\}$

Set $4B+3=0$ OR $5B+2=0$

$4B+3-3=0-3$ OR $5B+2-2=0-2$ ✓

$4B = -3$ ✓ OR $5B = -2$

$\frac{4B}{4} = \frac{-3}{4}$ $\quad B = -\frac{3}{4}$ $\qquad \frac{5B}{5} = \frac{-2}{5}$ $\quad B = -\frac{2}{5}$

(59) $\dfrac{m^2-4}{m^2+6m-16} \div \dfrac{m^2-6m-16}{m-2} =$ Simplify

$\dfrac{m^2-4}{m^2+6m-16} \cdot \dfrac{m-2}{m^2-6m-16} =$

$\dfrac{(m+2)(m-2)}{(m-2)(m+8)} \cdot \dfrac{(m-2)}{(m+2)(m-8)} =$

$\dfrac{(m-2)}{(m+8)(m-8)} =$

(60) $\dfrac{y^2+15y}{y+14} + \dfrac{y^2+13y}{y+14} =$ Simplify

$\dfrac{(y^2+15y)+(y^2+13y)}{y+14} =$

$\dfrac{y^2+15y+y^2+13y}{y+14} =$

$\dfrac{2y^2+28y}{y+14} =$

$\dfrac{2y(y+14)}{y+14} =$

$2y =$