

$$\textcircled{1} \quad 8w - 15w = 42$$

$$-7w = 42$$

$$\frac{-7w}{-7} = \frac{42}{-7}$$

$$w = -6$$

Math 410 steps
09/10/21
01/21

$$\textcircled{2} \quad 20 = t + 4t$$

$$20 = 1t + 4t$$

$$20 = 5t$$

$$\frac{20}{5} = \frac{5t}{5}$$

$$4 = t$$

$$\textcircled{3} \quad 4z = 18 - 42$$

$$4z = -24$$

$$\frac{4z}{4} = \frac{-24}{4}$$

$$z = -6$$

$$\textcircled{4} \quad 8 - 18 = \frac{z}{-8}$$

$$-10 = \frac{z}{-8}$$

$$\frac{-10}{1} = \frac{z}{-8}$$

$$-8(-10) = 1(z) \quad \text{Cross}$$

$$80 = 1z \quad \text{mult}$$

$$80 = z$$

$$5) -2x - 2x = 16 - 4$$

$$-4x = 12$$

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

(2)

$$x = -3$$

$$6) \frac{x}{21} = -19 + 16$$

$$\frac{x}{21} = -3$$

$$\frac{x}{21} = \frac{-3}{1}$$

1(x) = 21(-3) cross mult

$$1x = -63$$

$$x = -63$$

$$7) 3(3x - 3) = 10x$$

$$9x - 9 = 10x$$

$$9x - \cancel{9} + \cancel{9} = 10x + 9$$

$$9x = 10x + 9$$

$$9x - 10x = 10x + 9 - 10x$$

$$-1x = 9$$

$$\frac{-1x}{-1} = \frac{9}{-1}$$

$$x = -9$$

8. $17y = 16(y + 9)$
 $17y = 16y + 144$
 $17y - 16y = \cancel{16y} + 144 - \cancel{16y}$
 $1y = 144$
 $y = 144$

3.

9. $73y = 8(9y - 2)$
 $73y = 72y - 16$
 $73y - 72y = \cancel{72y} - 16 - \cancel{72y}$
 $1y = -16$
 $y = -16$

10. $7x + 5 = -5 + 5x + 14$
 $7x + 5 = 5x + 9$
 $7x + \cancel{5} - \cancel{5} = 5x + 9 - 5$
 $7x = 5x + 4$
 $7x - 5x = \cancel{5x} + 4 - \cancel{5x}$
 $2x = 4$
 $\frac{2x}{2} = \frac{4}{2}$
 $x = 2$

$$(11) -3y - 14 = 6y + 13$$

$$-3y - \cancel{14} + \cancel{14} = 6y + 13 + 14$$

$$-3y = 6y + 27$$

$$-3y - 6y = \cancel{6y} + 27 - 6y$$

$$-9y = 27$$

$$\frac{-9y}{-9} = \frac{27}{-9}$$

$$y = -3$$

(4)

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

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

$$2x(1) + 4(1) = -2(1)$$

$$2x + 4 = -2$$

$$2x + \cancel{4} - \cancel{4} = -2 - 4$$

$$2x = -6$$

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

$$x = -3$$

Multiply
LCD = 3

divide

$$(13) \quad \frac{2x}{9} - \frac{1}{3} = -1$$

$$\frac{2x}{9}(9) - \frac{1}{3}(9) = \frac{-1}{1}(9)$$

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

$$2x - 3 = -9$$

$$2x - \cancel{3} + \cancel{3} = -9 + 3$$

$$2x = -6$$

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

$$x = -3$$

Mult by
LCD = 9
divide

$$(14) \quad 0.20x + 0.45(30) = 27.5$$

$$0.20x + 13.50 = 27.5$$

$$0.20x + \cancel{13.50} - \cancel{13.50} = 27.5 - 13.50$$

$$0.20x = 14.00$$

$$\frac{0.20x}{0.20} = \frac{14.00}{0.20}$$

$$x = 70$$

$$(15) \quad 2(5x+3) = 10x+6$$

$$10x+6 = 10x+6$$

$$10x+6-6 = 10x+6-6$$

$$10x = 10x$$

$$10x - 10x = 10x - 10x$$

$$0 = 0$$

The solution is all real numbers.

$$(16) \quad \frac{x}{4} + 2 = \frac{x}{4}$$

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

$$\frac{x}{4}(4) + \frac{2}{1}(4) = \frac{x}{4}(4)$$

$$x(1) + 2(4) = x(1)$$

$$1x + 8 = 1x$$

$$1x + \cancel{8} - \cancel{8} = 1x - 8$$

$$1x = 1x - 8$$

$$1x - 1x = 1x - 8 - 1x$$

$$0 \neq -8$$

There is no solution.

Mult by LCD=4

divide

17) Find c if

$$P = a + b + c$$

$$P = 31, a = 5, b = 11$$

①

$$(31) = (5) + (11) + c$$

$$31 = 5 + 11 + c$$

$$31 = 16 + c$$

$$31 - 16 = 16 + c - 16$$

$$15 = c$$

18) Find r if

$$C = 2\pi r$$

$$C = 28.3 \quad \pi = 3.14$$

$$28.3 = 2(3.14)r$$

$$28.3 = 6.28r$$

$$\frac{28.3}{6.28} = \frac{6.28r}{6.28}$$

$$4.5063694268 = r$$

OR

approx

round

$$4.5 = r$$

19. Find A

$$V = A Q^{\$}$$

$$\frac{V}{Q^{\$}} = \frac{A Q^{\$}}{Q^{\$}}$$

$$\frac{V}{Q^{\$}} = A$$

20. Solve for y.

$$8x + y = 5$$

$$8x + y - 8x = 5 - 8x$$

$$y = 5 - 8x$$

OR

$$y = -8x + 5$$

21. Find r

$$A = P + Prt$$

$$A - P = P + Prt - P$$

$$A - P = Prt$$

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

Pt

Pt

$$\frac{A - P}{Pt} = r$$

8.

22) Find V

$$V = \frac{4}{3}\pi r^3 \quad r = 3.2 \quad \pi = 3.1415926536$$

$$V = \frac{4}{3}(3.1415926536)(3.2)^3$$

$$V = \frac{4}{3}(3.1415926536)(3.2)(3.2)(3.2)$$

$$V = \frac{4}{3}(3.1415926536)(32.768)$$

$$V = \frac{4}{3}(102.9437081)$$

$$V = \frac{411.7748323}{3}$$

$$V = 137.2582774 \quad \text{OR}$$

$$V = 137.3 \quad \text{Round}$$

23)

$$7x - 5 > 6x - 4$$

$$7x - 5 + 5 > 6x - 4 + 5$$

$$7x > 6x + 1$$

$$7x - 6x > 6x + 1 - 6x$$

$$1x > 1$$

$$x > 1$$

$$(1, +\infty)$$



24.

$$2x - 4 \leq 3x - 2x$$

$$2x - 4 \leq 1x$$

$$2x - \cancel{4} + \cancel{4} \leq 1x + 4$$

$$2x \leq 1x + 4$$

$$2x - 1x \leq 1x + 4 - 1x$$

$$1x \leq 4$$

$$x \leq 4$$



$$(-\infty, 4]$$

25.

$$4x < -24$$

$$\frac{4x}{4} < \frac{-24}{4}$$

divide by a positive 4 and do not turn the alligator

$$x < -6$$



$$(-\infty, -6)$$

26.

$$-8x \leq 24$$

$$\frac{-8x}{-8} \geq \frac{24}{-8}$$

divide by -8 and turn the alligator around

$$x \geq -3$$



$$[-3, +\infty)$$

27. graph

$$y = -2x + 2$$

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

$$y = 0 + 2$$

$$y = 2$$

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

$$y = -2 + 2$$

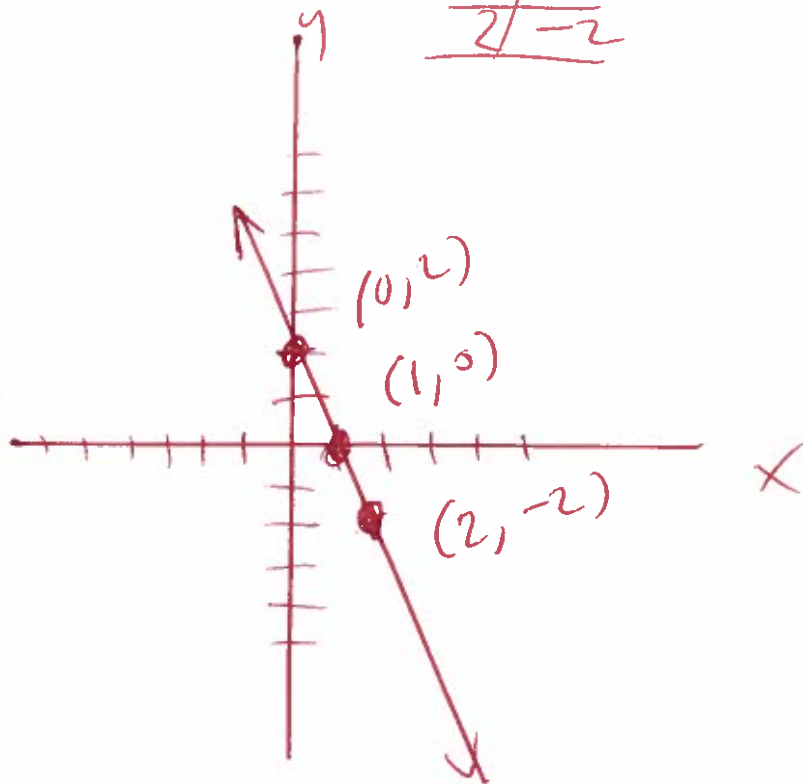
$$y = 0$$

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

$$y = -4 + 2$$

$$y = -2$$

x	y
0	2
1	0
2	-2



11

28. graph

$$y = 3x + 6$$

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

$$y = 0 + 6$$

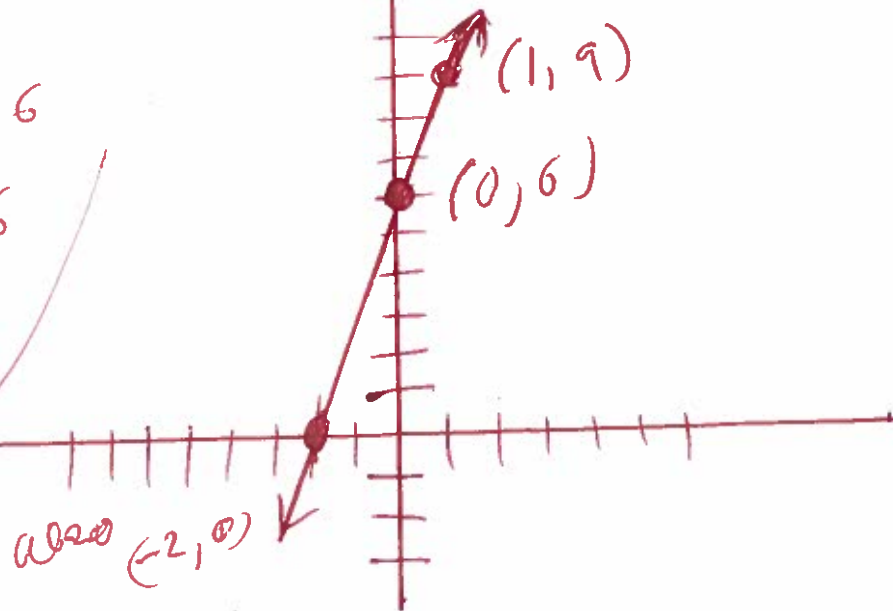
$$y = 6$$

$$y = 3(1) + 6$$

$$y = 3 + 6$$

$$y = 9$$

x	y
0	6
1	9



29. Graph

$$y = 2x + 4$$

$$y = 2(0) + 4$$

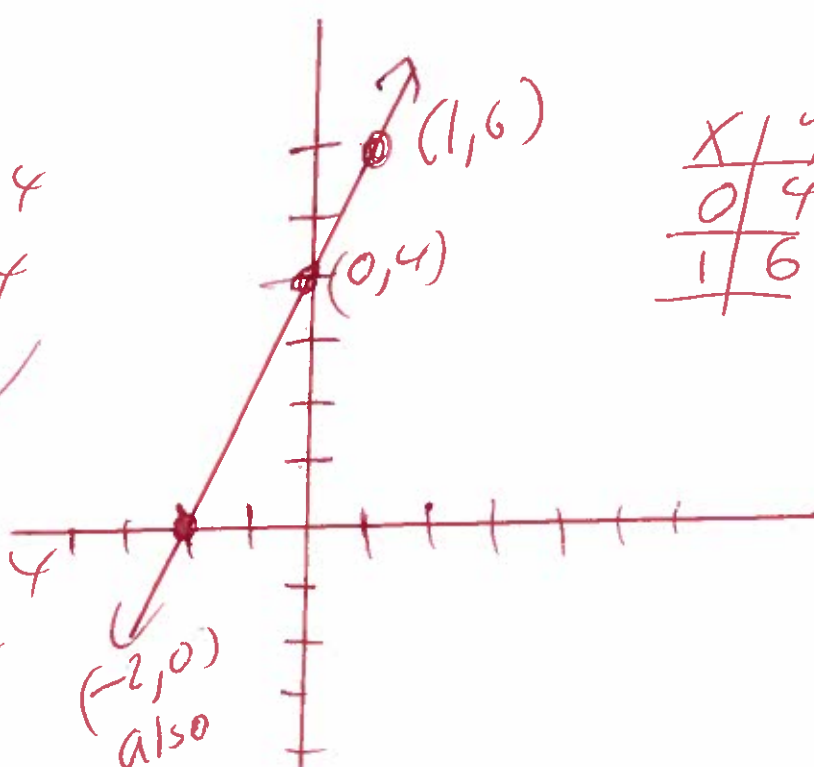
$$y = 0 + 4$$

$$y = 4$$

$$y = 2(1) + 4$$

$$y = 2 + 4$$

$$y = 6$$



12

30. Find the slope of the line that goes through the given points.

$$\begin{matrix} (-3, 8) & \text{and} & (-5, -4) \\ x_1 & y_1 & x_2 & y_2 \end{matrix}$$

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

$$m = \frac{(8) - (-4)}{(-3) - (-5)}$$

$$m = \frac{8 + 4}{-3 + 5}$$

$$m = \frac{12}{2}$$

$$m = 6$$

31) Find the slope of the line that goes through the given points

$(-2, 6)$ and $(-2, 3)$

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

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

$$m = \frac{(6) - (3)}{(-2) - (-2)}$$

$$m = \frac{6 - 3}{-2 + 2}$$

$$m = \frac{3}{0} \text{ undefined}$$

32) Find the slope of the line that goes through the given points.

$(10, -9)$ and $(-4, -8)$

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

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

$$m = \frac{(-9) - (-8)}{(10) - (-4)}$$

$$m = \frac{-9 + 8}{10 + 4}$$

$$m = \frac{-1}{14}$$

33 Find the slope of the line that goes through the given points.

$$(3, 8) \text{ and } (-6, 8)$$
$$x_1 \quad y_1 \qquad x_2 \quad y_2$$

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

$$m = \frac{(8) - (8)}{(3) - (-6)}$$

$$m = \frac{8 - 8}{3 + 6}$$

$$m = \frac{0}{9}$$

$$m = 0$$

(14)

34 Determine whether the pair of lines are parallel, perpendicular, or neither

$$y = \frac{7}{4}x + 1$$

$$y = -\frac{7}{4}x$$

$$m_1 = \frac{7}{4} \quad m_2 = -\frac{7}{4} \quad \text{slopes}$$

$m_1 \neq m_2$ not parallel

$m_1 = \frac{7}{4}$ and $m_2 \neq -\frac{4}{7}$ not perpendicular

Answer Neither

35 Determine whether the pair of lines is parallel, perpendicular, or neither.

$$x - 2y = -3$$

$$y = 9x - 5$$

$$x - 2y = -3$$

$$\cancel{x} - 2y - \cancel{x} = -3 - x$$

$$-2y = -3 - x$$

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

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

$$y = \frac{1}{2}x + \frac{3}{2} \quad m_1 = \frac{1}{2}$$

Other line $y = 9x - 5$ $m_2 = 9$

Since $m_1 \neq m_2$ not parallel

Since $m_1 = \frac{1}{2}$ and $m_2 \neq -\frac{2}{1}$ not perpendicular

Neither

15.

36 Find the equation of the line

$m = 8$, point = $(2, 2)$ Write $AX + BY = C$
 x_1, y_1

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

$$y - (2) = 8(x - (2))$$

$$y - 2 = 8(x - 2)$$

$$y - 2 = 8x - 16$$

$$y - 2 + 2 = 8x - 16 + 2$$

$$y = 8x - 14$$

$$y - 8x = 8x - 14 - 8x$$

$$y - 8x = -14$$

$$-8x + y = -14$$

$$AX + BY = C$$

37 Find the equation of the line

$m = -7$ and y -intercept $(0, 8)$
 x_1, y_1

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

$$y - (8) = -7(x - (0))$$

$$y - 8 = -7(x - 0)$$

$$y - 8 = -7(x)$$

$$y - 8 = -7x$$

$$y - 8 + 8 = -7x + 8$$

$$y = -7x + 8$$

38 Find the value of $x^2 - 4x + 1$
for $x = -3$

$$x^2 - 4x + 1 =$$

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

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

$$9 + 12 + 1 =$$

$$21 + 1 =$$

$$22 =$$

39 Determine whether order pair is a solution:

$$x + y = 8$$

$$3x + 4y = 28$$

$$(x, y) = (6, 2) \quad \text{NO}$$

$$(6) + (2) = 8$$

$$6 + 2 = 8$$

$$8 = 8 \quad \checkmark \text{ good}$$

$$3(6) + 4(2) = 28$$

$$18 + 8 = 28$$

$$26 \neq 28 \quad \text{bad} \quad \times$$

$$x + y = 8$$

$$3x + 4y = 28$$

$$(x, y) = (4, 4)$$

$$x, y$$

yes

$$(4) + (4) = 8$$

$$4 + 4 = 8$$

$$8 = 8 \quad \checkmark \text{ good}$$

$$3(4) + 4(4) = 28$$

$$12 + 16 = 28$$

$$28 = 28 \quad \text{good}$$

40 Determine whether each ordered pair is a solution of the system of linear equations.

$$x + y = 5$$

$$2x + 5y = 22$$

$$(x, y) = \begin{matrix} (2, 3) \\ x \quad y \end{matrix}$$

18

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

$$2 + 3 = 5$$

$$5 = 5 \quad \checkmark$$

yes

$$2(2) + 5(3) = 22$$

$$4 + 15 = 22$$

$$19 \neq 22 \quad \text{NO}$$

X

NO

$$x + y = 5$$

$$2x + 5y = 22$$

$$(x, y) = \begin{matrix} (1, 4) \\ x \quad y \end{matrix}$$

$$(1) + (4) = 5$$

$$1 + 4 = 5$$

$$5 = 5 \quad \checkmark$$

yes

$$2(1) + 5(4) = 22$$

$$2 + 20 = 22 \quad \checkmark$$

$$22 = 22 \quad \text{yes}$$

YES

(41) Determine whether each ordered pair is a solution of the system of linear equations.

$$2x - y = 4$$

$$x + 4y = 11$$

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

$x \quad y$

(19)

$$2(3) - (2) = 4$$

$$6 - 2 = 4$$

$$4 = 4 \quad \checkmark \quad \text{yes}$$

YES

$$(3) + 4(2) = 11$$

$$3 + 8 = 11$$

$$11 = 11 \quad \text{yes}$$

$$2x - y = 4$$

$$x + 4y = 11$$

$$(x, y) = (6, 8)$$

$x \quad y$

$$2(6) - (8) = 4$$

$$12 - 8 = 4$$

$$4 = 4 \quad \checkmark \quad \text{yes}$$

NO

$$(6) + 4(8) = 11$$

$$6 + 32 = 11$$

$$38 \neq 11$$

NO

42. Solve if $x=2$

$$y=2x$$

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

$y=2(2)$ Subst

$$y=4$$

$$(x, y) = (2, 4)$$

43. Solve by Substitution

$$x+y=8$$

$$x=3y$$

$(3y)+y=8$ Subst \rightarrow Subst

$$3y+y=8$$

$$4y=8$$

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

$$y=2$$

$$x=3y$$

$$x=3(2)$$

$$x=6$$

$$(x, y) = (6, 2)$$

44. Solve by substitution.

$$3x - 4y = 3$$

$$y = x - 1$$

$$3x - 4(x - 1) = 3$$

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

$$-1x + 4 = 3$$

$$-1x + \cancel{x} - \cancel{4} = 3 - 4$$

$$-1x = -1$$

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

$$x = 1$$

$$(x, y) = (1, 0)$$

Subs

$$y = x - 1$$

$$y = (1) - 1$$

$$y = 1 - 1$$

$$y = 0$$

21.

45. Solve by substitution

$$4x + y = 19$$

$$5x - 2y = 14$$

$$4x + y - 4x = 19 - 4x$$

$$y = 19 - 4x$$

Subst next

$$5x - 2(19 - 4x) = 14$$

$$5x - 38 + 8x = 14$$

$$13x - 38 = 14$$

$$13x - \cancel{38} + \cancel{38} = 14 + 38$$

$$13x = 52$$

$$\frac{13x}{13} = \frac{52}{13}$$

$$x = 4$$

Subst

$$4(4) + y = 19$$

$$16 + y = 19$$

$$16 + y - 16 = 19 - 16$$

$$y = 3$$

$$(x, y) = (4, 3)$$

46 Solve by substitution

$$4x + y = 7$$

$$6x + 3y = 3$$

(22)

$$4x + y - 4x = 7 - 4x$$

$$y = 7 - 4x$$

$$6x + 3(7 - 4x) = 3$$

$$6x + 21 - 12x = 3$$

$$-6x + 21 = 3$$

$$-6x + 2x - 21 = 3 - 21$$

$$-6x = -18$$

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

$$x = 3$$

Subs

$$y = 7 - 4x$$

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

$$y = 7 - 12$$

$$y = -5$$

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

47 Solve by substitution

$$5x - y = 2$$

$$5x - 2y = 9$$

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

$$-y = 2 - 5x$$

$$-1(-y) = -1(2 - 5x)$$

$$y = -2 + 5x$$

$$-5x + 4 - 4 = 9 - 4$$

$$-5x = 5$$

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

$$x = -1$$

$$y = -2 + 5x$$

$$y = -2 + 5(-1)$$

$$y = -2 - 5$$

$$y = -7$$

$$5x - 2(-2 + 5x) = 9$$

$$5x + 4 - 10x = 9$$

$$-5x + 4 = 9$$

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

48. Solve by Substitution

$$3x + 6y = 15$$

$$2x + 12y = 18$$

(23)

$$\frac{3x}{3} + \frac{6y}{3} = \frac{15}{3}$$

$$x + 2y = 5$$

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

$$x = 5 - 2y$$

Subs

$$2(5 - 2y) + 12y = 18$$

$$10 - 4y + 12y = 18$$

$$10 + 8y = 18$$

$$10 + 8y - 10 = 18 - 10$$

$$8y = 8$$

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

$$y = 1$$

subst

$$x = 5 - 2y$$

$$x = 5 - 2(1)$$

$$x = 5 - 2$$

$$x = 3$$

$$(x, y) = (3, 1)$$

49 Solve by substitution

$$5x + 15y = 35$$

$$4x + 12y = 36$$

$$\frac{5x}{5} + \frac{15y}{5} = \frac{35}{5}$$

$$x + 3y = 7$$

$$x + 3y - 3y = 7 - 3y$$

$$x = 7 - 3y$$

Subst

$$4(7 - 3y) + 12y = 36$$

$$28 - 12y + 12y = 36$$

$$28 \neq 36$$

No Solution



29

50 Solve by addition method

$$4x + y = -6$$

$$-8x - 2y = 12$$

(25)

$$(4x + y = -6) \quad (2)$$

$$(-8x - 2y = 12) \quad (1)$$

$$8x + 2y = -12$$

$$-8x - 2y = 12$$

$$0 + 0 = 0$$

$$0 = 0$$

Always

There are infinitely many solutions.

$$\{(x, y) \mid 4x + y = -6\} \quad \underline{\text{OR}} \quad \{(x, y) \mid -8x - 2y = 12\}$$

$$\textcircled{51.} \left(\frac{-4xz^2}{y^4} \right)^2 =$$

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

$$\frac{(-4)^{1(2)} x^{1(2)} z^{2(2)}}{y^{4(2)}} =$$

$$\frac{(-4)^2 x^2 z^4}{y^8} =$$

$$\frac{(-4)(-4) x^2 z^4}{y^8} =$$

$$\frac{16 x^2 z^4}{y^8} =$$

29

$$52 \quad (-7b^5c^7)(2bc^4) =$$

$$(-7b^5c^7)(2b^1c^2) =$$

$$-14b^{5+1}c^{7+2} =$$

$$-14b^6c^9 =$$

(21)

$$53 \quad (-5xyz^3)^2 =$$

$$(-5)^1x^1y^1z^3)^2 =$$

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

$$(-5)^2x^2y^2z^6 =$$

$$(-5)(-5)x^2y^2z^6 =$$

$$25x^2y^2z^6 =$$

$$\textcircled{54} \quad \frac{5x^4y^2z}{x^2yz} =$$

$$\frac{5x^4y^2z^1}{x^2y^1z^1} =$$

$$5x^{4-2}y^{2-1} =$$

$$5x^2y^1 =$$

$$5x^2y =$$

(28)

$$\textcircled{55} \quad P(x) = x^2 + x + 1$$

$$P(6) = (6)^2 + (6) + 1$$

$$P(6) = (6)(6) + 6 + 1$$

$$P(6) = 36 + 6 + 1$$

$$P(6) = 42 + 1$$

$$P(6) = 43$$

56 $f(t) = -16t^2 + 1170$ find $f(1)$

$$f(1) = -16(1)^2 + 1170$$

$$f(1) = -16(1)(1) + 1170$$

$$f(1) = -16(1) + 1170$$

$$f(1) = -16 + 1170$$

$$f(1) = 1154$$

29

57 $P(x) = -24x^2 + 332x - 134$ find $P(6)$

$$P(6) = -24(6)^2 + 332(6) - 134$$

$$P(6) = -24(6)(6) + 332(6) - 134$$

$$P(6) = -24(36) + 332(6) - 134$$

$$P(6) = -864 + 1992 - 134$$

$$P(6) = 1128 - 134$$

$$P(6) = 994$$

$$\begin{aligned} 58. \quad & (2y^2 + 8y - 5) - (-6y + 6) = \\ & 2y^2 + 8y - 5 + 6y - 6 = \\ & 2y^2 + 14y - 11 = \end{aligned}$$

30

$$\begin{aligned} 59. \quad & (x+5)(x+2) = \\ & x^2 + 2x + 5x + 10 = \\ & x^2 + 7x + 10 = \end{aligned}$$

$$\begin{aligned} 60. \quad & (a+5)(a-8) = \\ & a^2 - 8a + 5a - 40 = \\ & a^2 - 3a - 40 = \end{aligned}$$

$$\begin{aligned} 61. \quad & (7y-8)^2 = \\ & (7y-8)(7y-8) = \\ & 49y^2 - 56y - 56y + 64 = \\ & 49y^2 - 112y + 64 = \end{aligned}$$

$$\begin{aligned} 62. \quad (3x-7)(4x+4) &= \\ 12x^2 + 12x - 28x - 28 &= \\ 12x^2 - 16x - 28 &= \end{aligned}$$

31

$$\begin{aligned} 63. \quad (4x-13)(5x+1) &= \\ 20x^2 + 4x - 65x - 13 &= \\ 20x^2 - 61x - 13 &= \end{aligned}$$

$$\begin{aligned} 64. \quad (5x+1)(4x^2+4x-1) &= \\ 20x^3 + 20x^2 - 5x + 4x^2 + 4x - 1 &= \\ 20x^3 + 24x^2 - 1x - 1 &= \\ 20x^3 + 24x^2 - x - 1 &= \end{aligned}$$

$$\begin{aligned} 65. \quad (z+18)(2z+1) &= \\ 2z^2 + 1z + 36z + 18 &= \\ 2z^2 + 37z + 18 &= \end{aligned}$$

$$\begin{aligned} 66. \quad (a+4)(a^2-8a+8) &= \\ a^3 - 8a^2 + 8a + 4a^2 - 32a + 32 &= \\ a^3 - 4a^2 - 24a + 32 &= \end{aligned}$$

$$(67) (6x-5)^2 =$$

$$(6x-5)(6x-5) =$$

$$36x^2 - 30x - 30x + 25 =$$

$$36x^2 - 60x + 25 =$$

(32)

$$(68) (a-3)(a+3) =$$

$$a^2 + \cancel{3a} - \cancel{3a} - 9 =$$

$$a^2 - 9 =$$

$$(69)$$

$$\frac{p^2 p}{p^{-5}} =$$

$$\frac{p^2 p^1}{p^{-5}} =$$

$$\frac{p^2 p^1 p^5}{1} = \text{rewrite}$$

$$\frac{p^{2+1+5}}{1} =$$

$$\frac{p^8}{1} =$$

$$p^8$$

$$70. (-4x^4y^{-4})(3x^{-1}y^2) =$$

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

(33)

$$\frac{-12x^4y^2}{y^4x^1} =$$

$$\frac{-12x^{4-1}}{y^{4-2}} =$$

$$\frac{-12x^3}{y^2} =$$

$$71. (a^{-9}b^6)^{-3} =$$

$$a^{-9(-3)}b^{6(-3)} =$$

$$a^{27}b^{-18} =$$

$$\frac{a^{27}}{b^{18}} =$$

72.

$$\left(\frac{x^{-1}y^3}{x^2y^6}\right)^3 =$$

$$\left(\frac{y^3}{x^1x^2y^6}\right)^3 =$$

$$\left(\frac{1}{x^{1+2}y^{6-3}}\right)^3 =$$

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

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

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

$$\frac{1}{x^9y^9} =$$

31

73 $\frac{14x^8 + 8x^5}{x} =$

$\frac{14x^8}{x^1} + \frac{8x^5}{x^1} =$

$14x^{8-1} + 8x^{5-1} =$

$14x^7 + 8x^4 =$

35.

74 $\frac{4x^2 + 39x + 27}{x + 9}$

$x + 9 \overline{) 4x^2 + 39x + 27}$
 $\underline{-(4x^2 + 36x)}$

$3x + 27$
 $\underline{-(3x + 27)}$

Long division

OR Synthetic division

$\frac{4x^2 + 39x + 27}{x + 9}$

opp $x + 9$

$-9 \overline{) 4 \quad 39 \quad 27}$
 $\underline{\quad -36 \quad -27}$
 $4 \quad 3 \quad 0$

$4x + 3 =$

0 rem

75. $\frac{5x^2 - 6x + 2}{x - 2}$

$$\begin{array}{r} \\ \frac{10}{x - 2} \\ x - 2 \overline{) 5x^2 - 6x + 2} \\ \underline{-(5x^2 - 10x)} \\ 4x + 2 \\ \underline{-(4x - 8)} \\ 10 \end{array}$$

10 rem

36
Long division

OR Synthetic division

$$\begin{array}{r} \\ \frac{10}{x - 2} \\ \begin{array}{r} \text{opp} \\ \text{opp} \end{array} \\ \begin{array}{r} \text{opp} \\ \text{opp} \end{array} \\ 2 \overline{) 5 \quad -6 \quad 2} \\ \phantom{2 \overline{) 5 \quad -6 \quad 2}} 10 8 \\ \hline 5 \quad 4 \quad \textcircled{10} \text{ rem} \end{array}$$

$$5x + 4 + \frac{10}{x - 2}$$

76 factor
 $x^2 + 7x + 12 =$

$(x+3)(x+4) =$

12.1
6.2
3.4

possible

33

77 factor

$x^2 + 9x + 8 =$

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

8.1
2.4

possible

78 factor

$x^2 - 12x + 32 =$

$(x-4)(x-8) =$

32.1
16.2
8.4

possible

79 factor

$x^2 + 6x + 9 =$

$(x+3)(x+3) =$

9.1
3.3

possible

80 factor

$x^2 - 2x - 24 =$

$(x+4)(x-6) =$

24.1
12.2
6.4
3.8

possible

81. factor
 $x^2 + 2x - 3 =$

3.1 possible

38

$(x-1)(x+3) =$

82. factor
 $a^2 - 11ab + 24b^2 =$

$(a-3b)(a-8b) =$

24.1
12.2
6.4
3.8 possible

83. factor
factor
GCF
 $4x^2 + 20x + 24 =$

$4(x^2 + 5x + 6) =$

$4(x+2)(x+3) =$

6.1
2.3 possible

84. factor
 $r^2 - 10r + 21 =$

$(r-3)(r-7) =$

21.1
7.3

85. factor
GCF
 $5x^2 + 45x - 50 =$
 $5(x^2 + 9x - 10) =$

$5(x-1)(x+10) =$

10.1
2.5

86. factor

$$x^2 - 2x - 48 =$$

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

48.1

2x.2

12.4

6.8

16.3

Possible

39

87.

factor

$$x^2 - 81 =$$

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

$$(x+9)(x-9) =$$

formula

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

88.

factor

$$25x^2 - 36 =$$

$$(5x)^2 - (6)^2 =$$

$$(5x+6)(5x-6) =$$

formula

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

89.

factor

$$36x^2 - (11y)^2 =$$

$$(6x)^2 - (11y)^2 =$$

$$(6x+11y)(6x-11y) =$$

formula

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

90.

Solve

$$(x-1)(x-6)=0$$

but $x-1=0$ OR $x-6=0$

$$x-\cancel{x}+1=0+1 \text{ OR } x-\cancel{6}+\cancel{6}=0+6$$

$x=1$ OR $x=6$

40

91.

Solve

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

but $x-8=0$ OR $x+6=0$

$$x-\cancel{8}+\cancel{8}=0+8 \text{ OR } x+\cancel{6}-\cancel{6}=0-6$$

$x=8$ OR $x=-6$

92.

Solve

$$7x(x-6)=0$$

but $7x=0$ OR $x-6=0$

$$\frac{7x}{7} = \frac{0}{7} \text{ OR } x-\cancel{6}+\cancel{6}=0+6$$

$x=0$ OR $x=6$

93

Solve

$$(4x-9)(8x+5)=0$$

41

but $4x-9=0$ OR $8x+5=0$

$$4x-9+9=0+9 \text{ OR } 8x+5-5=0-5$$

$$4x=9 \text{ OR } 8x=-5$$

$$\frac{4x}{4} = \frac{9}{4} \text{ OR } \frac{8x}{8} = \frac{-5}{8}$$

$$x = \frac{9}{4}$$

OR

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

94

Solve

$$x^2-13x+36=0$$

$$(x-4)(x-9)=0$$

but $x-4=0$ OR $x-9=0$

$$x-4+4=0+4 \text{ OR } x-9+9=0+9$$

$$x=4$$

$$\text{OR } x=9$$

- 36.1
- 18.2
- 12.3
- 4.9

possible

95

Solve

$$x^2+3x-10=0$$

$$(x-2)(x+5)=0$$

but $x-2=0$ OR $x+5=0$

$$x-2+2=0+2 \text{ OR } x+5-5=0-5$$

$$x=2$$

OR

$$x=-5$$

- 10.1
- 2.5

96

Solve

$$x^2 - 4x = 21$$

$$x^2 - 4x - 21 = 21 - 21$$

$$x^2 - 4x - 21 = 0$$

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

$$\text{but } x+3=0 \quad \text{OR} \quad x-7=0$$

$$x+3-3=0-3 \quad \text{OR} \quad x-7+7=0+7$$

$$x = -3 \quad \text{OR} \quad x = 7$$

21.1
3.7

92

97

Solve

$$x^2 = 100$$

$$\sqrt{x^2} = \pm \sqrt{100}$$

$$x = \pm 10$$

$$x = -10 \quad \text{OR} \quad x = 10$$

OR

use formula
 $a^2 - b^2 = (a+b)(a-b)$

$$x^2 = 100$$

$$x^2 - 100 = 100 - 100$$

$$x^2 - 100 = 0$$

$$(x)^2 - (10)^2 = 0$$

$$(x+10)(x-10) = 0$$

$$\text{but } x+10=0 \quad \text{OR} \quad x-10=0$$

$$x+10-10=0-10 \quad \text{OR} \quad x-10+10=0+10$$

$$x = -10 \quad \text{OR} \quad x = 10$$

98

Solve

$$4x^2 - 25 = 0$$

$$(2x)^2 - (5)^2 = 0$$

$$(2x+5)(2x-5) = 0$$

Let $2x+5=0$ OR $2x-5=0$

$$2x+5-5=0-5 \quad \text{OR} \quad 2x-5+5=0+5$$

$$2x = -5$$

$$\frac{2x}{2} = \frac{-5}{2} \quad \text{OR} \quad 2x = 5$$

$$x = \frac{-5}{2} \quad \text{OR} \quad \frac{2x}{2} = \frac{5}{2}$$

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

use formula

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

43.

99

Solve

$$3x^2 - 7x - 20 = 0$$

$$(3x+5)(x-4) = 0$$

Let $3x+5=0$ OR $x-4=0$

$$3x+5-5=0-5 \quad \text{OR} \quad x-4+4=0+4$$

$$3x = -5$$

OR

$$x = 4$$

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

OR

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

3.1

20.1

10.2

5.4