

Question #1

a) $\frac{6(3^2-1)+8}{3 \cdot 2 - 2} = \frac{56}{4} = \boxed{14}$

$6(3^2-1)+8 \quad 3 \cdot 2 - 2$
 $6(9-1)+8 \quad 6-2$
 $6 \cdot 8 + 8 \quad 4$
 $48+8$
 56

b) $3+2(4-8-2) - (4+5[6-3]^2)$
 $3+2(4-4) - (4+5 \cdot 3^2)$
 $3+2 \cdot 0 - (4+5 \cdot 9)$
 $3+2 \cdot 0 - (4+45)$
 $3+2 \cdot 0 - 49$
 $3+0 - 49$
 $\boxed{-46}$

c) $2+18 \div 3 \cdot 2 - 5$
 $2+6 \cdot 2 - 5$
 $2+12 - 5$
 $14 - 5$
 $\boxed{9}$

d) $\frac{5}{3} + \frac{1}{6} - \frac{1}{2}$
 $\frac{10}{6} + \frac{1}{6} - \frac{3}{6} = \frac{8}{6} = \boxed{\frac{4}{3}}$

e) $2|5-(-3)| - 4(3-6)^2$
 $2|5+3| - 4(-3)^2$
 $2|8| - 4 \cdot 9$
 $2 \cdot 8 - 4 \cdot 9$
 $16 - 36$
 $\boxed{-20}$

Question #2

a) $5x - 3y + 4z$
 $5(3) - 3(7-2) + 4(5)$
 $15 + 6 + 20 = \boxed{41}$

b) $4x^2 - 2y$
 $4(3)^2 - 2(-2)$
 $4 \cdot 9 - 2(-2)$
 $36 + 4$
 $\boxed{40}$

c) $-6x + 5y + z$
 $-6(3) + 5(-2) + 1$
 $-6 \cdot 3 + 5 \cdot (-2) + 1$
 $-18 + 20 + 1$
 $\boxed{2}$

d) $2x^2 - 4y^2 - z^2$
 $2(3)^2 - 4(-2)^2 - (5)^2$
 $2 \cdot 9 - 4 \cdot 4 - 25$
 $18 - 16 - 25$
 $\boxed{-23}$

Question #3

a) $4x + 6 = -(x-2)$
 $4x + 6 = -x + 2$
 $4x + 6 + x = 2$
 $5x + 6 = 2$
 $5x = 2 - 6$
 $5x = -4$
 $\boxed{x = -\frac{4}{5}}$

b) $\frac{3}{5}x - \frac{1}{10}x = x - \frac{5}{2}$
 LCD = 10
 $10(\frac{3}{5}x) - 10(\frac{1}{10}x) = 10(x) - 10(\frac{5}{2})$
 $6x - x = 10x - 25$
 $5x = 10x - 25$
 $5x - 10x = -25$
 $-5x = -25$
 $\frac{-5x}{-5} = \frac{-25}{-5}$
 $\boxed{x = 5}$

c) $11x - 5(x+3) = 6x$
 $11x - 5x - 15 = 6x$
 $6x - 15 = 6x$
 $6x - 15 - 6x = 0$
 $-15 = 0$
 $\boxed{\text{No solution}}$

d) $10(2x-1) = 8(2x+1) + 14$
 $20x - 10 = 16x + 8 + 14$
 $20x - 10 = 16x + 22$
 $20x - 10 - 16x = 22$
 $4x - 10 = 22$
 $4x = 22 + 10$
 $4x = 32$
 $\frac{4x}{4} = \frac{32}{4}$
 $\boxed{x = 8}$

Question #3 continued

e.) $-\frac{5}{6}q - (q - \frac{1}{2}) = \frac{1}{4}(q+1)$

$-\frac{5}{6}q - q + \frac{1}{2} = \frac{1}{4}q + \frac{1}{4}$

LCD = 12

$12(-\frac{5}{6}q) - 12(q) + 12(\frac{1}{2}) = 12(\frac{1}{4}q) + 12(\frac{1}{4})$

$-10q - 12q + 6 = 3q + 3$

$-22q + 6 = 3q + 3$

$-22q + 6 - 3q = 3$

$-25q + 6 = 3$

$-25q = 3 - 6$

$\frac{-25q}{-25} = \frac{-3}{-25}$

$q = \frac{3}{25}$

f.) $\frac{3x-2}{5} = \frac{6x-5}{1}$

$11(3x-2) = 5(6x-5)$

$33x-22 = 30x-25$

$33x-22-30x = -25$

$3x-22 = -25$

$3x = -25+22$

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

$x = -1$

g.) $4(x+3) = 2(2x+8) - 4$

$4x+12 = 4x+16-4$

$4x+12 = 4x+12$

$4x+12-4x = 12$

$12 = 12$

All real numbers

h.) $8(t-3) + 4t = 6(2t+1) - 10$

$8t - 24 + 4t = 12t + 6 - 10$

$12t - 24 = 12t - 4$

$12t - 24 - 12t = -4$

$-24 = -4$

No solution

Question #4

a.) $-p + 10p - 3p - 4 - 5p$

$p - 4$

b.) $-3(2t+4) + 8(2t-4)$

$-6t - 12 + 16t - 32$

$10t - 44$

c.) $-2(3r-4) - (6-r) + 2r - 5$

$-6r + 8 - 6 + r + 2r - 5$

$-3r - 3$

Question #5

a.) $(2x^2y^5)^5$

$2^5(x^2)^5(y^5)^5 = 32x^{10}y^{25}$

b.) $(\frac{6x^3y^9}{z^5})^4 = \frac{(6)^4(x^3)^4(y^9)^4}{(z^5)^4} = \frac{1296x^{12}y^{36}}{z^{20}}$

c.) $(\frac{-2x^4y^{-2}z^{-3}}{3x^{-2}y^6z^{-4}})^{-4} = (\frac{-2x^4x^2z^4}{3y^6y^2z^3})^{-4}$

$= (\frac{-2x^6z}{y^8})^{-4} = \frac{(-2)^{-4}(x^6)^{-4}(z)^{-4}}{(y^8)^{-4}}$

$= \frac{(-2)^{-4}x^{-24}z^{-4}}{y^{-32}} = \frac{y^{32}}{(-2)^4x^{24}z^4} = \frac{y^{32}}{16x^{24}z^4}$

Question #5 continued

$$d.) \frac{(6r^{-1})^2 (2r^{-4})}{r^{-5} (r^2)^{-3}}$$

$$\frac{(6)^2 (r^{-1})^2 (2r^{-4})}{r^{-5} (r^{-6})}$$

$$\frac{(36r^{-2})(2r^{-4})}{(r^{-5})(r^{-6})}$$

$$\frac{72r^{-6}}{r^{-11}}$$

$$\frac{72r^{-6}}{r^{-6}} = \boxed{72r^5}$$

$$e.) \frac{(a^{-2}b^{-3}c^{-4})^{-5}}{(a^2b^3c^4)^5}$$

$$\frac{(a^{-2})^{-5} (b^{-3})^{-5} (c^{-4})^{-5}}{(a^2)^5 (b^3)^5 (c^4)^5}$$

$$\frac{a^{10} b^{15} c^{20}}{a^{10} b^{15} c^{20}} = \boxed{1}$$

$$f.) \frac{(x^{-1}y^2z)^{-2}}{(x^{-3}y^3z)^{-1}}$$

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

$$\frac{x^{-2} y^4 z^{-2}}{x^3 y^{-3} z^{-1}}$$

$$\frac{y^4 y^3 z}{x^3 x^2 z^2} = \frac{y^7 z}{x^5 z^2}$$

$$\boxed{\frac{y^7}{x^5 z}}$$

$$g.) \frac{(x+2y)^{-3}}{(x+2y)^{-5}}$$

$$\frac{(x+2y)^5}{(x+2y)^3}$$

$$\boxed{(x+2y)^2}$$

Question #6

number = n

$$2(3+n) = 2+n$$

$$6+2n = 2+n$$

$$6+2n - n = 2$$

$$6+n = 2$$

$$n = 2-6$$

$$n = -4$$

$$\boxed{\text{The numbers } -4}$$

Question #7

$$7(r+1) - 2r = 3(r-5)$$

$$7r+7-2r = 3r-15$$

$$5r+7 = 3r-15$$

$$5r+7-3r = -15$$

$$2r+7 = -15$$

$$2r = -15-7$$

$$\frac{2r}{2} = \frac{-22}{2}$$

$$r = -11$$

$$\boxed{\text{The number is } -11}$$

Question #8

number = n

$$3n+7+n = -11-2n$$

$$4n+7 = -11-2n$$

$$4n+7+2n = -11$$

$$6n+7 = -11$$

$$6n = -11-7$$

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

$$n = -3$$

$$\boxed{\text{The number is } -3}$$

Question #9

$$\frac{6 \text{ gallons}}{\$4} = \frac{15 \text{ gallons}}{x}$$

$$6x = 60$$

$$x = 10$$

$$\boxed{\text{It will cost } \$10}$$

Question #10

$$12n - (n+3) = -11 + 2(n-5)$$

$$12n - n - 3 = -11 + 2n - 10$$

$$11n - 3 = -21 + 2n$$

$$11n - 3 - 2n = -21$$

$$9n - 3 = -21$$

$$9n = -21+3$$

$$\frac{9n}{9} = \frac{-18}{9}$$

$$n = -2$$

$$\boxed{\text{The number is } -2}$$

Question #11

$$A = \pi r^2$$

diameter = 13ft
radius = 6.5ft

$$A = \pi(6.5)^2$$

$$A \approx 132.665$$

The area is approximately
132.665 ft²

Question #12

$$\frac{\$16 \text{ price}}{\$1.30 \text{ tax}} = \frac{\$100 \text{ price}}{x}$$

$$16x = 158.4$$

$$x = 9.9$$

The sales tax is \$9.90

Question #13

$$\frac{3300 \text{ miles}}{11 \text{ in}} = \frac{7700 \text{ miles}}{x}$$

$$\frac{3300x}{3300} = \frac{84700}{3300}$$

$$x = 25.\bar{6}$$

The distance is 25 $\frac{2}{3}$ inches

Question #14

number = n

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

$$3n-6 = 4+n$$

$$3n-6-n = 4$$

$$2n-6 = 4$$

$$2n = 4+6$$

$$2n = 10$$

$$n = 5$$

The number is 5

Question #15

FedEx = f
AirEx = a
UPS = u

$$f+a+u = 13 \quad f = 3a$$

$$u = a-2$$

$$3a+a+a-2 = 13$$

$$5a-2 = 13$$

$$5a = 13+2$$

$$5a = 15$$

$$a = 3$$

$$f = 3(3) = 9$$

$$u = 3-2 = 1$$

FedEx delivered 9 packages,
Airborne Express delivered 3
packages, and UPS delivered
1 package.

Question #16

1st # = x
2nd # = x+2

$$x + 3(x+2) = 46$$

$$x + 3x + 6 = 46$$

$$4x + 6 = 46$$

$$4x = 46 - 6$$

$$4x = 40$$

$$\frac{4x}{4} = \frac{40}{4}$$

$$x = 10$$

The numbers are 10 and 12

Question #17

1st # = x
2nd # = x+2
3rd # = x+4

$$2(x+4-6) = x+2(x+2) - 23$$

$$2(x-2) = x+2x+4-23$$

$$2x-4 = 3x-19$$

$$-4 = 3x-19-2x$$

$$-4 = x-19$$

$$-4+19 = x$$

$$15 = x$$

The numbers are 15, 17, 19

Question #18

1st # = x
2nd # = x+1

$$x + x + 1 = 137$$

$$2x + 1 = 137$$

$$2x = 137 - 1$$

$$\frac{2x}{2} = \frac{136}{2}$$

$$x = 68$$

The numbers are 68 and 69.

Question #19

%	x	whole	=	portion
50%	x			0.50x
20%	80			16
40%	y			0.40y

$$0.50x + 16 = 0.40y \quad \leftarrow x + 80 = y$$

$$0.50x + 16 = 0.40(x + 80)$$

$$0.50x + 16 = 0.40x + 32$$

$$0.50x - 0.40x = 32 - 16$$

$$0.1x = 16$$

$$0.1x = 16$$

$$\frac{0.1x}{0.1} = \frac{16}{0.1}$$

$$x = 160$$

160 gallons of 50% are needed.

Question #20

% x whole = portion

$$12\% \quad x \quad 0.12x$$

$$20\% \quad y \quad 0.20y$$

$$14\% \quad 10 \quad 1.4$$

$$0.12x + 0.20y = 1.4 \quad \leftarrow \begin{matrix} x + y = 10 \\ y = 10 - x \end{matrix}$$

$$0.12x + 0.20(10 - x) = 1.4$$

$$0.12x + 2 - 0.20x = 1.4$$

$$2 - 0.08x = 1.4$$

$$-0.08x = 1.4 - 2$$

$$-0.08x = -0.6$$

$$\frac{-0.08x}{-0.08} = \frac{-0.6}{-0.08}$$

$$x = 7.5 \quad y = 10 - 7.5$$

$$y = 2.5$$

7.5 gallons of 12% and 2.5 gallons of 20% are needed.

Question #21

\$ x quantity = amount

$$0.10 \quad d \quad 0.10d$$

$$0.05 \quad n \quad 0.05n$$

$$0.10d + 0.05n = 1.70 \quad d = 2 + n$$

$$0.10(2 + n) + 0.05n = 1.70$$

$$0.2 + 0.1n + 0.05n = 1.7$$

$$0.2 + 0.15n = 1.7$$

$$0.15n = 1.7 - 0.2$$

$$\frac{0.15n}{0.15} = \frac{1.5}{0.15}$$

$$n = 10$$

$$d = 2 + 10 = 12$$

$$d = 2 + 10 = 12$$

There are 10 nickels and 12 dimes.

Question #22

Not on exam #1

Question #23

Not on exam #2

Question #24

width = w

length = l

$$2l + 2w = 84 \quad w = l - 4$$

$$2l + 2(l - 4) = 84$$

$$2l + 2l - 8 = 84$$

$$4l - 8 = 84$$

$$4l = 84 + 8$$

$$4l = 92$$

$$\frac{4l}{4} = \frac{92}{4}$$

$$l = 23$$

$$w = 23 - 4 = 19$$

The length is 23ft and the width is 19ft.

Question #25

length = l

width = w

$2l + 2w = 48$ $l = 3w - 4$

$2(3w - 4) + 2w = 48$

$6w - 8 + 2w = 48$

$8w - 8 = 48$

$8w = 48 + 8$

$\frac{8w}{8} = \frac{56}{8}$

$w = 7$ $l = 3(7) - 4$
 $= 21 - 4 = 17$

The length is 17 in and the width is 7 in.

Question #26

$I = Prt$

$P \cdot r \cdot t = I$

3% t 1 $0.03t$

4% f 1 $0.04f$

$0.03t + 0.04f = 5600$ $f = 30000 + 2t$

$0.03t + 0.04(30000 + 2t) = 5600$

$0.03t + 1200 + 0.08t = 5600$

$0.11t + 1200 = 5600$

$0.11t = 5600 - 1200$

$0.11t = 4400$

$t = 40000$

$f = 30000 + 2(40000) = 110000$

He invested \$110,000 at 4% and

\$40,000 at 3%

Question #27

dealer's cost = c

selling price = dealer's cost + markup

$15 = c + 0.25c$

$15 = 1.25c$

$\frac{15}{1.25} = \frac{1.25c}{1.25}$

$c = 12$

The dealer's cost is \$12

Question #28

original price = p

sale price = original price - discount

$246.68 = p - 0.35p$

$246.68 = 0.65p$

$p = 379.51$

The original price was \$379.51

Question #29

$\$ \times \text{quantity} = \text{amount}$

\$5 f $5f$

\$1 n $1n$

$5f + 1n = 50$

$f + n = 22$

$5f + 22 - f = 50$

$n = 22 - f$

$4f + 22 = 50$

$4f = 50 - 22$

$4f = 28$

$f = 7$ $n = 22 - 7 = 15$

There were 7 \$5 bills and 15 \$1 bills