

Question #1

a.)  $9770 \div 19$

$$\begin{array}{r} 514 \\ 19 \overline{) 9770} \\ \underline{-95} \phantom{0} \\ 27 \phantom{0} \\ \underline{-19} \phantom{0} \\ 80 \\ \underline{-76} \\ 4 \end{array}$$

$514 r 4$

b.)  $10836 \div 28$

$$\begin{array}{r} 387 \\ 28 \overline{) 10836} \\ \underline{-84} \phantom{00} \\ 243 \phantom{0} \\ \underline{-224} \phantom{0} \\ 196 \\ \underline{-196} \\ 0 \end{array}$$

$387$

c.)  $235600 \div 124$

$$\begin{array}{r} 1900 \\ 124 \overline{) 235600} \\ \underline{-124} \phantom{00} \\ 1116 \phantom{0} \\ \underline{-1116} \\ 000 \end{array}$$

$1900$

d.)  $4760 \div 0 = \text{undefined}$

e.)  $0 \div 65872 = 0$

f.)  $0 \div 0 = \text{indeterminant}$

g.)  $-5 + (-75) + 43 + 26 + (-4)$

$$\begin{array}{l} \underline{-80} + 43 + 26 + (-4) \\ \underline{-37} + 26 + (-4) \\ \underline{-11} + (-4) \\ \underline{-15} \end{array}$$

h.)  $-7 - 8 - (-62) - (-12) - 42$

$$\begin{array}{l} \underline{-7} + (-8) \\ \underline{-15} - (-62) - (-12) - 42 \\ \underline{-15} + 62 \end{array}$$

$47 - (-12) - 42$

$$\begin{array}{l} 47 + 12 \\ 59 - 42 \\ \underline{17} \end{array}$$

i.)  $(-4)^2 = (-4)(-4) = 16$

j.)  $-4^2 = -(4 \cdot 4) = -16$

k.)  $\sqrt{-100} = \text{Not a real number}$

l.)  $(6)(-4)(3)$

$$\begin{array}{l} \underline{-24}(3) \\ \underline{-72} \end{array}$$

m.)  $(-40) \div 10 = -4$

Question #2

a.)  $2^6 - 18 \div 3 \cdot 5 - \sqrt{100}$

$2^6 - 18 \div 3 \cdot 5 - 10$

$64 - 18 \div 3 \cdot 5 - 10$

$64 - 6 \cdot 5 - 10$

$64 - 30 - 10$

$34 - 10$

$24$

b.)  $2(7-4) + 8^2 - (16+5) \div 7$

$2 \cdot 3 + 8^2 - (16+5) \div 7$

$2 \cdot 3 + 8^2 - 21 \div 7$

$2 \cdot 3 + 64 - 21 \div 7$

$6 + 64 - 21 \div 7$

$6 + 64 - 3$

$70 - 3$

$67$

c.)  $31 - 3[(20-6) - 3 \cdot 2] + 2^4$

$31 - 3[14 - 3 \cdot 2] + 2^4$

$31 - 3[14 - 6] + 2^4$

$31 - 3 \cdot 8 + 2^4$

$31 - 3 \cdot 8 + 16$

$31 - 24 + 16$

$7 + 16$

$23$

Question #2 continued

$$\begin{aligned}
 d.) \quad & \{18 - 4[21 \div (3+4)]\} + 2\sqrt{16 \cdot 4} \\
 & \{18 - 4[21 \div 7]\} + 2\sqrt{16 \cdot 4} \\
 & \{18 - 4 \cdot 3\} + 2\sqrt{16 \cdot 4} \\
 & \{18 - 12\} + 2\sqrt{16 \cdot 4} \\
 & 6 + 2\sqrt{16 \cdot 4} \\
 & 6 + 2\sqrt{64} \\
 & 6 + 2 \cdot 8 \\
 & 6 + 16 \\
 & \boxed{22}
 \end{aligned}$$

$$\begin{aligned}
 g.) \quad & 39 \div 3 + (24 - 30) - 5^2 + (-21 - (-13)) \\
 & 39 \div 3 + (-6) - 5^2 + (-21 - (-13)) \\
 & 39 \div 3 + (-6) - 5^2 + (-8) \\
 & 39 \div 3 + (-6) - 25 + (-8) \\
 & 13 + (-6) - 25 + (-8) \\
 & 7 - 25 + (-8) \\
 & 7 + (-25) \\
 & -18 + (-8) \\
 & \boxed{-26}
 \end{aligned}$$

$$\begin{aligned}
 e.) \quad & 4\{[25 - (19+2)] \cdot (3+1)\} - (3+5)^2 \\
 & 4\{[25 - 21] \cdot (3+1)\} - (3+5)^2 \\
 & 4\{4 \cdot (3+1)\} - (3+5)^2 \\
 & 4\{4 \cdot 4\} - (3+5)^2 \\
 & 4 \cdot 16 - (3+5)^2 \\
 & 4 \cdot 16 - (8)^2 \\
 & 4 \cdot 16 - 64 \\
 & 64 - 64 \\
 & \boxed{0}
 \end{aligned}$$

$$\begin{aligned}
 h.) \quad & [19(-2) - (-18)] \div [15 - 5(2 - (-1))] \\
 & [-38 - (-18)] \div [15 - 5(2 - (-1))] \\
 & -38 + 18 \\
 & -20 \div [15 - 5(2 - (-1))] \\
 & -20 \div [15 - 5 \cdot 3] \\
 & -20 \div [15 - 15] \\
 & -20 \div 0 \\
 & \boxed{\text{undefined}}
 \end{aligned}$$

$$f.) \quad \frac{(12-5)^2 + 2^3}{10 \div 2 - (11-9)} = \frac{57}{3} = \boxed{19}$$

$$\begin{array}{r}
 (12-5)^2 + 2^3 \\
 \underline{7^2 + 2^3} \\
 49 + 2^3 \\
 \underline{49 + 8} \\
 57
 \end{array}
 \qquad
 \begin{array}{r}
 10 \div 2 - (11-9) \\
 \underline{10 \div 2 - 2} \\
 5 - 2 \\
 \underline{3}
 \end{array}$$



Question #2 continued

$$m) \frac{-3\{[2-7(3-4)]+4^2\}}{5[28+4(2-9)]^3} = \frac{-75}{0} = \text{undefined}$$

$$-3\{[2-7(3-4)]+4^2\}$$

$$5[28+4(2-9)]^3$$

$$-3\{[2-7(-1)]+4^2\}$$

$$5[28+4(-7)]^3$$

$$-3\{[2-(-7)]+4^2\}$$

$$5[28+(-28)]^3$$

$$-3\{9+4^2\}$$

$$5 \cdot 0^3$$

$$-3\{9+16\}$$

$$5 \cdot 0$$

$$-3 \cdot 25$$

$$0$$

$$-75$$

Question #3

$$\begin{array}{r} 2400 \\ 7 \overline{)16800} \\ \underline{-14} \phantom{00} \\ 28 \phantom{00} \\ \underline{-28} \phantom{00} \\ 000 \end{array}$$

$\$2400$  is put into each investment

Question #5

$$\$5 = 500 \phi$$

$$\begin{array}{r} 26 \\ 19 \overline{)500} \\ \underline{-38} \phantom{0} \\ 120 \\ \underline{-114} \\ 6 \end{array}$$

You can talk for 26 minutes

Question #4

$$\begin{array}{r} 421000 \\ 13 \overline{)5473000} \\ \underline{-52} \phantom{000} \\ 27 \phantom{000} \\ \underline{-26} \phantom{000} \\ 13 \phantom{000} \\ \underline{-13} \phantom{000} \\ 0000 \end{array}$$

Each college receives  $\$421,000$

Question #6

$$A = bh$$

$$399 = b \cdot 19$$

$$b = 21$$

The base is 21 ft

Question #7

$$A = bh$$

$$\frac{2408}{56} = \frac{56 \cdot h}{56}$$

$$h = 43$$

$$\begin{array}{r} 43 \\ 56 \overline{)2408} \\ \underline{-224} \phantom{00} \\ 168 \\ \underline{-168} \\ 0 \end{array}$$

The height is 43 cm

Question #9

$$V = lwh$$

$$30600 = 60 \cdot w \cdot 15$$

$$\frac{30600}{900} = \frac{900 \cdot w}{900}$$

$$w = 34$$

$$\begin{array}{r} 34 \\ 900 \overline{)30600} \\ \underline{-2700} \phantom{00} \\ 3600 \\ \underline{-3600} \\ 0 \end{array}$$

The width is 34 cm

Question #8

$$V = lwh$$

$$1368 = l \cdot 19 \cdot 3$$

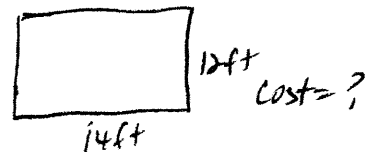
$$\frac{1368}{57} = \frac{l \cdot 57}{57}$$

$$l = 24$$

$$\begin{array}{r} 24 \\ 57 \overline{)1368} \\ \underline{-114} \phantom{00} \\ 228 \\ \underline{-228} \\ 0 \end{array}$$

The length is 24 m

Question #10

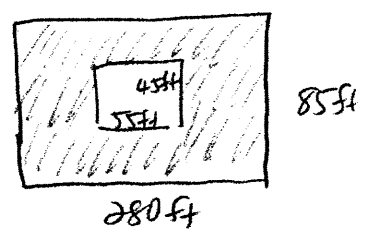


$$P = 2l + 2w \quad \$2 \text{ per ft}$$

$$\begin{aligned} P &= 2(14) + 2(12) \\ &= 28 + 2(12) \\ &= 28 + 24 \\ &= 52 \end{aligned} \quad \begin{array}{l} 52 \\ \times 2 \\ \hline 104 \end{array}$$

The cost is \$104

Question #11



Area of large rectangle:

$$A = lw$$

$$A = (280)(85)$$

$$\begin{array}{r} 280 \\ \times 85 \\ \hline 1400 \\ + 2240 \\ \hline 23800 \text{ ft}^2 \end{array}$$

Area of small rectangle:

$$A = lw$$

$$A = (55)(45)$$

$$\begin{array}{r} 55 \\ \times 45 \\ \hline 275 \\ + 220 \\ \hline 2475 \text{ ft}^2 \end{array}$$

Area of shaded region:

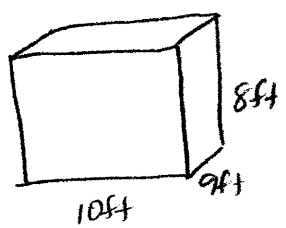
$$\begin{array}{r} 23800 \\ - 2475 \\ \hline 21325 \end{array}$$

The area is 21,325 ft<sup>2</sup>

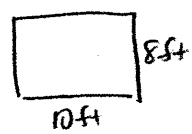
Question #12

Same as Question #10

Question #13



a) Front/Back walls

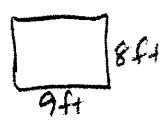


$$A = lw$$

$$= (10)(8) = 80 \text{ ft}^2 \text{ Front}$$

$$80 \text{ ft}^2 \text{ Back}$$

Left/Right walls



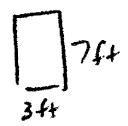
$$A = lw$$

$$= (9)(8) = 72 \text{ ft}^2 \text{ Left}$$

$$72 \text{ ft}^2 \text{ Right}$$

$$80 + 80 + 72 + 72 = 304 \text{ ft}^2$$

Doorway

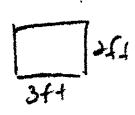


$$A = lw$$

$$= (7)(3)$$

$$= 21 \text{ ft}^2$$

Window



$$A = lw$$

$$= (3)(2)$$

$$= 6 \text{ ft}^2$$

$$21 + 6 = 27 \text{ ft}^2$$

$$304 - 27 = 277 \text{ ft}^2$$

$$\begin{array}{r} \times 9 \text{ offices} \\ \hline 2493 \end{array}$$

The area is 2493 ft<sup>2</sup>

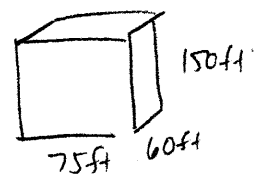
$$b) \begin{array}{r} 6 \\ 400 \overline{) 2493} \\ \underline{-2400} \\ 93 \end{array}$$

7 cans are needed

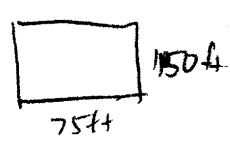
$$c) \begin{array}{r} 14 \\ \times 7 \\ \hline 98 \end{array}$$

\$98 is the cost

Question #14



Front/Back

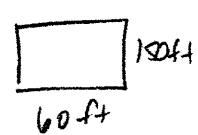


$$A = lw$$

$$A = (150)(75)$$

$$= 11250 \text{ ft}^2$$

Left/Right



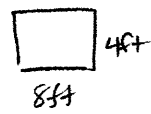
$$A = lw$$

$$= (150)(60)$$

$$= 9000 \text{ ft}^2$$

$$\text{Total: } 11250 + 9000 = 20250 \text{ ft}^2$$

Glass panel



$$A = lw$$

$$= (8)(4) = 32 \text{ ft}^2$$

$$\begin{array}{r} 632 \text{ r } 26 \\ 32 \overline{) 20250} \\ \underline{-192} \\ 105 \\ \underline{-96} \\ 90 \\ \underline{-64} \end{array}$$

633 glass panels are needed

Question #15

$$\begin{array}{r} 86 - 585 \\ 86 + (-585) \\ \hline -99 \end{array}$$

His balance is -\$99

Question #16

$$\begin{array}{r} 19 - (-27) \\ \hline 19 + 27 = 46 \end{array}$$

The temperature difference is 46°F

Question #17

$$(-450)(3) = -1350$$

The depth is -1350 ft

Question #18

$$\text{Net} = \text{Revenue} - \text{Cost}$$

$$\text{Revenue} = 80560$$

$$\text{Cost} = 4500 + 71484 = 75984$$

$$\text{Net} = 80560 - 75984$$

$$= 4576$$

The net is \$4576

It is a profit

Question #19

$$d = r \cdot t$$

$$\begin{array}{r} 968 = r \cdot 44 \\ \hline 44 \quad \hline 44 \end{array}$$

$$r = 22$$

$$\begin{array}{r} 22 \\ 44 \overline{) 968} \\ \underline{-88} \phantom{0} \\ 88 \\ \underline{-88} \\ 0 \end{array}$$

The average rate is 22 ft/sec

Question #20

$$d = r \cdot t$$

$$\begin{aligned} d &= 7 \cdot 29 \\ &= 203 \end{aligned}$$

The distance is 203 ft

Question #21

See next page.

Question #22

a)  $3y - 5(y + 2)$ ;  $y = 4$

$$3(4) - 5(4 + 2)$$

$$3(4) - 5(6)$$

$$12 - 5(6)$$

$$12 - 30$$

$$\boxed{-18}$$

b.)  $3t^2 - 4u + 1$   $t = -2, u = 4$

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

$$3 \cdot 4 - 4 \cdot 4 + 1$$

$$12 - 4 \cdot 4 + 1$$

$$12 - 16 + 1$$

$$-4 + 1$$

$$\boxed{-3}$$

c.)  $b^2 - 4ac$   $b = 3, a = -5, c = -1$

$$(3)^2 - 4(-5)(-1)$$

$$9 - 4(-5)(-1)$$

$$9 - (-20)(-1)$$

$$9 - 20$$

$$\boxed{-11}$$

d.)  $-|5x| + |y^3|$   $x = 6, y = -3$

$$-|5(6)| + |(-3)^3|$$

$$-|30| + |(-3)^3|$$

$$-30 + |(-3)^3|$$

$$-30 + |-27|$$

$$-30 + 27$$

$$\boxed{-3}$$

Question #20

e)  $\sqrt{m} + \sqrt{n}$       $m=144, n=25$

$$\sqrt{144} + \sqrt{25}$$

$$12 + \sqrt{25}$$

$$12 + 5$$

$$\boxed{17}$$

f.)  $\sqrt{x^2 + y^2}$       $x=-3, y=4$

$$\sqrt{(-3)^2 + (4)^2}$$

$$\sqrt{9 + (4)^2}$$

$$\sqrt{9 + 16}$$

$$\sqrt{25}$$

$$\boxed{5}$$

g.)  $3xy - 2\sqrt{5x+y}$       $x=2, y=-1$

$$3(2)(-1) - 2\sqrt{5(2)+(-1)}$$

$$3(2)(-1) - 2\sqrt{10+(-1)}$$

$$3(2)(-1) - 2\sqrt{9}$$

$$3(2)(-1) - 2 \cdot 3$$

$$6(-1) - 2 \cdot 3$$

$$-6 - 2 \cdot 3$$

$$-6 - 6$$

$$-6 + (-6)$$

$$\boxed{-12}$$

h.)  $\frac{-6uv+14}{3u-v^2}$       $u=-1, v=4$

$$\frac{-6(-1)(4)+14}{3(-1)-(4)^2} = \frac{38}{-19} = \boxed{-2}$$

$$-6(-1)(4)+14$$

$$6(4)+14$$

$$24+14$$

$$38$$

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

$$3(-1)-16$$

$$-3-16$$

$$-3+(-16)$$

$$-19$$

Question #21

a.)  $-5a+19=9$  check  $a=2$

$$-5(2)+19=9$$

$$-10+19=9$$

$$9=9 \checkmark$$

It is a solution

b.)  $18-7n=2n$  check  $n=-2$

$$18-7(-2)=2(-2)$$

$$18-(-14)=-4$$

$$18+14=-4$$

$$32 \neq -4$$

It is not a solution

c.)  $b^2=5b+6$  check  $b=-1$

$$(-1)^2=5(-1)+6$$

$$1=-5+6$$

$$1=1 \checkmark$$

It is a solution

d.)  $3(x-5)-1=11-2(x+1)$  check  $x=5$

$$3(5-5)-1=11-2(5+1)$$

$$3 \cdot 0 - 1 = 11 - 2 \cdot 6$$

$$0 - 1 = 11 - 12$$

$$-1 = -1 \checkmark$$

It is a solution





Question #24 continued

g.) The product of eight and  $x$

$$8x$$

h.) Forty less than the product of three and  $y$

$$3y - 40$$

i.) Six times  $x$  plus five times the difference of  $x$  and seven

$$6x + 5(x - 7)$$

j.) Nineteen minus the sum of  $x$  and six

$$19 - (x + 6)$$

k.) Twice  $r$  subtracted from seven times the sum of  $r$  and one

$$7(r + 1) - 2r$$

l.) Three times the difference of  $r$  and five

$$3(r - 5)$$

m.) The sum of  $n$  and three subtracted from twelve times  $n$

$$12 - (n + 3)$$

n.) Negative eleven plus the product of 2 and the difference of  $n$  and five

$$-11 + 2(n - 5)$$

Question #25

$$a.) (-2b^6 + 3b^4 - b^2) + (b^6 + 2b^4 + 2b^2)$$

$$\boxed{-b^6 + 5b^4 + b^2}$$

$$b.) (x^5 + 9x^4 - 18x^3 - 5x^2 + 6x + 9) + (-2x^5 - 3x^4 + 4x^3 - x^2 + 6x + 8)$$

$$\boxed{-x^5 + 6x^4 - 14x^3 - 6x^2 + 17}$$

$$c.) (5x^2y - 2xy + 9xy^2) - (8x^2y + 13xy + 12xy^2)$$

$$(5x^2y - 2xy + 9xy^2) + (-8x^2y - 13xy - 12xy^2)$$

$$\boxed{-3x^2y - 15xy - 3xy^2}$$

$$d.) (-5x^4 + 6x^3 - 9x^2 + 12x + 13) - (3x^4 + 6x^3 + 2x^2 - 8x + 2)$$

$$(-5x^4 + 6x^3 - 9x^2 + 12x + 13) + (-3x^4 - 6x^3 - 2x^2 + 8x - 2)$$

$$\boxed{-8x^4 - 11x^2 + 20x + 11}$$