Solutions

Question #1

(A,0) = the x intercept of $3x+2y=-4 \Rightarrow = 3x+2(0)=3x=-4 \Rightarrow x=\frac{-4}{3}=A$

(0,B) = the y intercept of $y=(x+3)^2-5. \Rightarrow y=(0+3)^2-5=9-5=4=B$

(0,C) = the y intercept of $y=\sqrt{25-x}+7. \Rightarrow y=\sqrt{25-0}+7=5+7=12=C$

$$\frac{A+B}{C}=\frac{\frac{-4}{3}+4}{12}=\frac{\frac{-4+12}{3}}{12}=\frac{\frac{8}{3}}{12}=\frac{8}{36}=\frac{2}{9}$$

Question #2

10, 2, 9, 3, 12, 4, 9, 7, 2, 3, 7, 9, 2, 12, 17, 9, 7, 20

mean+median+mode = 8 + 8 + 9 = 25

Question #3

Use two equations dependent on time, $y=-5t+4000$, $x=70t$. The plane will land when the altitude is zero.

$0=-5t+4000 \Rightarrow 5t=4000 \Rightarrow t=800$. Substitute 800 into horizontal equation $x=70\cdot 800=56000m$

Question #4

(A,B) = point of intersection of $9y-7x=27$ and $y=\frac{5}{3}x-5$ Substitute 2nd eq'n into 1st.

$9(\frac{5}{3}x-5)-7x=15x-45-7x=8x-45=27 \Rightarrow 8x=72 \Rightarrow x=9 \Rightarrow y=\frac{5}{3}(9)-5=10 \Rightarrow (A,B)=(9,1($

$(2,256)$ = vertex of $y=-C(x-B)(x+6) \Rightarrow 256=-C(2-10)(2+6)=-C(-64) \Rightarrow C=4$

(D,E) = vertex of $y=5-\left|\frac{1}{2}x-3\right|$. By graphing calculator, $(D,E)=(6,5)$

$(0,F)$ = y intercept of $y=(x+2)(x-4)(x+E)(x-7)=(2)(-4)(5)(-7)=280=F$

$A\times B\times C-D\times E-F=9\times 10\times 4-6\times 5-280=50$

Question #5

Use the eq'n $f(x)=4x-1$, giving number of newly infected students as a function of time.

$\langle A=f(7)=27\rangle, \langle B=f(17)=67\rangle, \langle C=f(70)=279\rangle, \langle 199=f(D)=4D-1 \Rightarrow D=50\rangle$

$$\frac{C-D}{A-B}=\frac{279-50}{27-67}=-5.725$$

Question #6

Solve by finding the pts of intersection on graphing calculator gives:

$(x,y)=(-40,-27)\ \&\ (a,b)=(2,0)\ \&\ (m,n)=(-3,3)$

$x+y+a+b+m+n=-40-27+2+0-3+3=-65$

Question #7

Using graphing calculator, pts of intersection are (2.4,-1.2) (.96,.72) (2.88,2.16) (4.32,.24). Slopes of lines are negative reciprocals or equal, so lines are perpendicular or parallel. The region is rectangular. Find distance between 1st & 2nd and then 2nd and 3rd pts of intersection. d1=2.4 d2=2.4 Mult the two lengths to find area of 5.76 sq units.

Question #8

Model 1st situation on cordinate plane: top of 30-ft pole = (0,30) bottom of 20 ft pole = (10,0) guy wire represented by y=-3x+30 top of 20-ft pole = (10,20) bottom of 30-ft pole = (0,0) 2nd guy wire represented by y=2x. Use graphing calculator to find pt of intersection (6,12) so H_1=12ft. Repeat the process for the next two situations: y=3x+30 and y=5/2x to get H_2=12ft & y=3x+30 and y=10x to get H_3=12ft. Therefore $H_1 + H_2 + H_3$=12ft+12ft+12ft=36ft

Question #9

Let $f(x)=2x+5$, $g(x)=x^2$, $h(x)=\sqrt{x}-4$

$f(3)=11, g(11)=121, h(121)=7 \Rightarrow A=h(g(f(3)))=7$

$f(2)=9, h(9)=-1, g(-1)=1 \Rightarrow B=g(h(f(2)))=1$

$g(-2)=4, h(4)=-2, f(-2)=1 \Rightarrow C=f(h(g(-2)))=1$

$h(36)=2, f(2)=9, g(9)=81 \Rightarrow D=g(f(h(36)))=81$

$A+B+C+D=7+1+1+81=90$

Question #10

A = probability of rolling a prime number on a single die=0.5
B = the number of months in a non-leap year with 28 days=12
C = probability of having a one syllable birth month=.25
A+B+C=12.75

Question #11

$f(x)+g(x)+h(x)=(5x-2)(-7x-4)+5(x-7)^2-6+-3x^2+4x+8$

$=-35x^2-20x+14x+8+5(x^2-14x+49)-6+-3x^2+4x+8$

$=-35x^2-20x+14x+8+5x^2-70x+245-6+-3x^2+4x+8$

$=-33x^2-72x+255 \Rightarrow a=-33, b=-72, c=255$

discriminant: $b^2-4ac=(-72)^2-4(-33)(255)=38844$.

Question #12

Given two sides of a right triangle with sides of length 5 and 13, find the exact product of all possible lengths of the third side.

Using the pythagorean thm, $5^2+13^2=x^2 \Rightarrow x=\sqrt{294}=7\sqrt{6}$ or $5^2+x^2=13^2 \Rightarrow x=12$

so $7\sqrt{6}\times 12=84\sqrt{6}$

Question #13

$y=12(x+5)+3(7-4x)=12x+60+21-12x=81$ is a horizontal line with slope = 0. All other lines are non-vertical. $A\times B\times C\times D\times 0=0$.

Question #14

365 divided by 7 leaves a remainder of 1, so 12/25 should move forward one day of the week every subsequent year if leap years were not taken into account. So 12/25 should fall on Sunday in 7 years or 2001. The next leap years would occur in 1996, 2000, 2004, 2008, etc. In those years a day is added, so 12/25 is forwarded an extra day. So 12/25 should progress according to the following schedule:

1994 - Sunday, 1995 - Monday, 1996 - Wednesday, 1997 - Thursday, 1998 - Friday, 1999 - Saturday, 2000 - Monday, 2001 - Tuesday, 2002 - Wednesday, 2003 - Thursday, 2004 - Saturday, 2005 - Sunday.

Question #15

A = 2 $x^3+64=(x+4)(x^2-4x+16)$.

B = 1 $-3x^2+4x-48=unfactorable$

C = 2 $x^2-13=(x+\sqrt{13})(x-\sqrt{13})$

D = 4 $x^8-256=(x^4+16)(x^2+4)(x+2)(x-2)$

$A+B-C\times D=2+1-2\times 4=3-8=-5$.