THE BEST ACT PREP COURSE EVER

DATA ANALYSIS

ACT Math: Problem Set

Use the following information to answer questions 1- 3.

The local coffee shop is selling various packs of coffee beans from different countries in various weights. The shop is taking inventory off all of its packs of coffee beans. The table below gives the numbers for the different packs of coffee. All the packs except the **2**lb packs of Vietnamese coffee have been counted.

Coffee Countries	Number of 2lb packs	Number of 5lb packs	Number of 8lb packs
Indonedia	**50**	**20**	**0**
Colombia	**0**	**20**	**25**
Brazil	**30**	**30**	**10**
Vietnam	**?**	**0**	**20**

1. If the shop has the same total pounds of Vietnamese and Colombian coffee, how many more **2**lb packs than **8**lb pound packs of Vietnamese coffee does the shop have?

A. 50
B. 40
C. 35
D. 25
E. 10

2. Due to slow sales, the shop decides to sell the **2**lb packs of Vietnamese coffee as **6**lb bundles at a discount price. If each bundle will sell for **$30**, how much money can the shop make if they sell all of their **6**lb bundles?

A. $330
B. $460
C. $590
D. $690
E. $700

3. Britney buys $\frac{1}{4}$ of the **5**lb packs of Indonesian coffee for **$60**. How much did she pay per pound of Indonesian coffee?

A. $12
B. $2.40
C. $0.60
D. $0.96
E. $1.60

Use the following information to answer questions 4 and 5.

The table below gives the prices for Magic Carpet carpet cleaning.

Size of house	Steam clean	Steam clean + protective finish
One-story	**$40**	**$65**
Two-story	**$60**	**$85**

4. Huang owns **12** houses that need to have their carpets steam cleaned with a protective finish before he can rent them out. Huang pays a total of **$840**. How many two-story houses did he clean?

A. 0
B. 2
C. 3
D. 8
E. 9

5. Huang has also had the carpet in his personal residence (two stories) steam cleaned **5** times without the protective finish. He received a special offer for being a loyal customer, so the **5th** cleaning was at a **20%** discount. How much did Huang pay, on average, for **5** steam cleanings?

A. $81.60
B. $72.00
C. $62.40
D. $61.60
E. $57.60

Use the following information to answer questions 6 - 8.

Pete's Printer Shop sells different types of printer toner. The table below shows the number of prints and the price for three different toner cartridges.

Type of toner	Maximum number of pages that can be pinted	Price per toner cartridge
A	500	$14.00
B	400	$12.50
C	325	$9.00

6. Which of the following is closest to the average price per sheet printed for Toner B?

A. $0.03
B. $12.50
C. $14.00
D. $32
E. $35.71

7. Pete's Printer Shop has **40** type A toners, **50** type B toners, and **25** type C toners. If Pete picks two toners at random, what is the probability, to the nearest hundredth, that both are type C?

A. 0.04
B. 0.05
C. 0.06
D. 0.22
E. 0.43

8. **3** months ago, customers bought 4 times fewer type A toners than type C toners and 3 times fewer type A toners than type B toners. If Pete's Printer Shop sold 160 toner cartridges, how much did the shop make?

A. $3200.00
B. $2050.00
C. $1893.33
D. $1820.00
E. $1750

Use the following information to answer questions 9 and 10.

Every day, Robert and Aubrey run from one end of their neighborhood to the other. There is a **2** kilometer-long street that runs the length of the neighborhood that they run up and down once daily.

9. One day, Robert is feeling ambitious and attempts to complete his daily run in **20** minutes. Aubrey is a faster runner than Robert, and can run a kilometer **30** seconds faster than Robert. How long will Aubrey's run take that day?

A. 9 minutes
B. 18 minutes
C. 19 minutes
D. 19.5 minutes
E. 38 minutes

10. After a year of running, Aubrey has improved his time. He can complete his daily run in **16** minutes. What is Aubrey's speed, to the nearest tenth, in meters per second?

A. 2.08
B. 4.17
C. 8
D. 0.24
E. 125

Use the following information to answer questions 11 and 12.

Windy City Wireless has new cell phone plans that include unlimited calling and texting with different plans for cellular data. The following graphic advertises the plans:

Windy City Wireless Cell Phone Plans

500 megabytes for **$59.99** per month ∴
1000 megabytes for **$74.99** per month ∴
3000 megabytes for **$109.99** per month ∴

All plans include unlimited calling and texting services
∴ For each additional megabyte, there is a charge of $1.10

11. If Windy City Wireless has a basic plan with unlimited calling and texting but no cellular data that costs **$39.99**, how much does each megabyte cost on the **$59.99** plan?

A. $0.12
B. $0.08
C. $0.04
D. $18.18
E. $0.002

12. Brandon was unsure of how many megabytes of data he would use per month so he bought the **$74.99** plan. Unfortunately, he underestimated his data usage and often has to pay extra for each additional megabyte over his plan's allowance. For July, if Brandon uses m megabytes where $m > 1000$, which of the following expressionsgives the amount on his bill?

A. $1.1(74.99m - 1000)$
B. $1.1(74.99 - m)$
C. $74.99 + 1.10(m - 74.99)$
D. $74.99 + 1.10m$
E. $74.99 + 1.10(m - 1000)$

Use the following information to answer questions 13 and 14.

The table below shows the old and new rates for a taxi-alternative service. The total cost of a trip is equal to the flat rate plus the cost of the distance travelled.

Flate rate per trip	Old Rate	New Rate
	$8.50	**$10.00**
Cost per mile First **5** miles Every additional miles	**$0.35** per mile **$0.50** per mile	**$0.50** per mile **$0.60** per mile

13. Ricardo is going to use the DriveMeAroundTown service to go to the museum. He knows it is more than **5** miles from his house, but he does not know exactly how far it is. Using the new rates, which of the following expressions shows how much Ricardo will have topay for his trip? (Use *d* as the variable for distance to the museum)

A. $8.50+0.35(5)+0.5d$

B. $10.00+0.5(5)+0.6d$

C. $10.00+0.5(5)+0.6(d-5)$

D. $8.50+0.35(5)+0.5(d-5)$

E. $0.5(5)+0.6(d-5)$

14. How much more is a **13**-mile trip with the new rates than the old rates?

A. $3.05
B. $1.50
C. $1.55
D. $14.55
E. $17.30

Use the following information to answer questions 15 - 17.

The Junior Soccer League team of Forrest Hills is raising money for an end-of-the-year pizza party. They need to raise **$600**, and they have two options for fundraising.

Option 1: The kids can sell cookies in the community. There is a **$20** startup fee, and there is a cost of **$0.20** in baking supplies per box. The cookies sell for **$3.00** per box, and there are **15** cookies per box.

Option 2: The kids can wash cars in the community. After a startup fee of **$40**, the kids can wash cars for **$7.00** with a cost of **$2.00** per car for washing supplies.

15. How many cars must the kids wash to meet half of their goal?

A. 64
B. 68
C. 56
D. 52
E. 62

16. If the kids choose the cookie option, how many total cookies will be sold to meet their goal?

A. 3625
B. 3750
C. 3885
D. 11625
E. 10875

17. There are **16** kids on the team. If **75%** of the kids donate **$10** to the team, how many boxes of cookies would they have to sell to meet their goal?

A. 209
B. 192
C. 309
D. 167
E. 42

18. Jen asks **150** students questions about travelling.

Questions	Yes	No
1. Have you ever travelled on a train or airplane?	115	35
2. If you answered Yes to Question 1, did you travel on an airplane?	79	36
3. If you answered Yes to Question 1, did you travel on a train?	48	67

How many students have been on both a train and an airplane?

A. 31
B. 103
C. 127
D. 12
E. 13

19. A teacher asked all of the students in the freshman about the number of siblings and/or pets they had. The results are given on the table below. How many students answered that they had 1 or more pets?

	1 or more pets?		
1 or more siblings?		yes	no
	yes	**53**	**87**
	no	**73**	**45**

A. 140
B. 136
C. 126
D. 73
E. 53

ANSWERS

1.A **2.**D **3.**B **4.**C **5.**E **6.**A **7.**B **8.**E **9.**B **10.**B **11.**C **12.**E **13.**C **14.**A **15.**B **16.**C **17.**A **18.**D **19.**C

ANSWER EXPLANATIONS

1. **A.** The shop has the same amount of Vietnamese and Colombian coffee, and the total number of pounds of Colombian coffee is $20(5)+25(8)=300$ lb. This means there are also **300** lb of Vietnamese coffee. So, we can write the total number of pounds of Vietnamese coffee as $300=20(8)+2x$ where x is equal to the number of **2**lb packs. Simplifying this equation, we get $300=160+2x \rightarrow 140=2x \rightarrow x=70$ packs of **2**lb Vietnamese coffee. There are **20** packs of **8**lb Vietnamese coffee, so there are $70-20=50$ more **2**lb packs than **8**lb packs of Vietnamese coffee.

2. **D.** There are **70** packs of **2**lb Vietnamese coffee, so the shop can make $\frac{70}{3}=23.33=$ at most **23** packs of **6**lb Vietnamese coffee. If each bundle sells for $\$30$, then the shop can make $23(30)=690$ dollars.

3. **B.** There are **20** packs of **5**lb Indonesia coffee, so if Britney bought $\frac{1}{4}$ of the **20** packs, she bought $20\left(\frac{1}{4}\right)=5$ **5**lb packs for $\$60$. This means she bought a total of $5(5)=25$ pounds and spent $\frac{60}{25}=2.4$ dollars for each pound.

4. **C.** We look at the second column because Huang needs steam cleaning and protective finishing for all **12** houses. We can represent the amount of money he spent on the one-story houses as $65x$ and the amount of money he spent on the two-story houses as $85y$ where $x=$ the number of one-story houses he has and $y=$ the number of two-story houses he has. He pays a total of **840**, which means $840=65x+85y$. We also know that he owns a total of **12** houses, so $x+y=12$. We can now subtract y on both sides and write $x=12-y$. Substituting this in for x in the equation $840=65x+85y$, we get $840=65(12-y)+85y$. This simplifies to $840=780-65y+85y \rightarrow 840=780+20y \rightarrow 60=20y \rightarrow y=3$. So, Huang has **3** two-story houses.

5. **E.** Huang is only getting steam cleaning for his two-story house, so we are looking at the bottom-left cell in the table. For his first **4** cleanings, he pays the regular fee of **$60**, and on the **5th** cleaning, he gets 20% off the **60** dollars, which means he pays $0.8(60)=48$ dollars. So, in total he paid $60(4)+48=288$ for the **5** cleanings. This means he paid an average of $\frac{288}{5}=57.6$ dollars per cleaning.

6. **A.** We look at the second row for the data regarding Toner B. It tells us that a maximum of **400** pages can be printed for a cartridge that costs $\$12.50$. This means that the cost per page is $\frac{12.50}{400}=\$0.03$.

7. **B.** Pete's Printer Shop has a total of $40+50+25=115$ toners. **25** of these are type C toners. So, there is a $\frac{25}{115}$ chance that one of the toners he picks is type C. Then, there is a $\frac{24}{114}$ chance that he picks a second toner that is also type C since he already picked a type C toner out without replacement. So, the probability of both events happening (he picks two toners that are both type C) is $\frac{25}{115}\left(\frac{24}{114}\right)=0.0458\approx 0.05$.

8. **E.** Pete's Printer Shop sold a total of **160** toners, so $A+B+C=160$ where $A=$ number of type A toners sold, $B=$ number of type B toners sold, and $C=$ number of type C toners sold. He sold **4** times fewer type A toners than type C toners, so $C=4A,$ and he sold **3** times fewer type A toners than type B toners, so $B=3A.$ Substituting in $C=4A$ and $B=3A$ into the equation $A+B+C=160,$ we get $A+3A+4A=160\rightarrow 8A=160\rightarrow A=20.$ This means $B=3A=3(20)=60$ and $C=4A=4(20)=80.$ So, looking at the table for the prices of the respective toners, we find the total amount of money the shop made was $20(14)+60(12.5)+80(9)=280+750+720=1750.$

9. **B.** Since Aubrey can run a kilometer **30** seconds faster than Robert, and the length of the daily run is $2(2km)=4km,$ Aubrey can run the trip $4(30)=120$ seconds faster than Robert can. Robert's time is **20** minutes, so Aubrey's time is **20** minutes – 120 seconds = 18 minutes.

10. **B.** The run is **4** km long and Aubrey can run it in **16** minutes, so $\frac{4km}{1}*\frac{1000m}{1km}*\frac{1}{16min}*\frac{1min}{60sec}=4.17\ \frac{m}{sec}.$

11. **C.** The difference between the $\$59.99$ plan with **500** megabytes of data and the $\$39.99$ plan without cellular data is $59.99-39.99=20.00.$ This means that each megabyte in the $\$59.99$ plan costs $\frac{\$20.00}{500}=\$0.04.$

12. **E.** Brandon's cellular data usage under **1000** megabytes is covered in his **$74.99** plan, so we only need to add the amount that he needs to pay for his usage over **1000** megabytes. We are given that he uses m megabytes, so he uses $m-1000$ megabytes of data that his plan does not cover. For each additional megabyte, there is a charge of $\$1.10$, so he must pay $\$1.1(m-1000)$ in addition to his $\$74.99$ plan. That means he has to pay a total of $74.99+1.10(m-1000)$ dollars.

13. **C.** Since $d>5,$ we can represent the additional miles after the first **5** miles as $d-5.$ So, Ricardo will have to pay the flat rate plus 0.50 per mile for the first **5** miles plus 0.60 per mile for every additional mile. Looking at the column on the right for the new taxi rates, we calculate that he has to pay $10.00+0.50(5)+0.60(d-5)$ for his trip.

14. **A.** For a **13** mile trip with the old rates, one would have to pay $8.50+0.35(5)+0.50(13-5)=8.50+1.75+4=14.25.$ For a **13** mile trip with the new rates, one would have to pay $10.00+0.50(5)+0.60(13-5)=10.00+2.50+4.8=17.3.$ So, the difference between the old and new rates for a **13** mile trip is $17.3-14.25=\$3.05.$

15. **B.** Half of their goal is $\frac{600}{2}=300$ dollars. So, if they wash cars, they will need to make $300+40=340$ to reach half of their goal and cover the expense of the $\$40$ startup fee. The kids can wash cars for $\$7$ with a cost of $\$2$ per car for washing supplies, which means they make $\$(7-2)=\$5$ per car wash. So, in order to make **$340**, they must wash $\frac{340}{5}=68$ cars to meet half their goal.

16. **C.** Their goal is **$600** and if they sell cookies, there is a **$20** startup fee, so they need to make $600+20=620$ in order to reach their goal and cover the startup fee. Each box sells for **$3** and the kids get to keep **$0.80** for every dollar they earn, so for each box they sell, they profit $3(0.80)=2.40$ dollars. Dividing their goal of **$620** by **$2.40** yields **258.33**. However, since they sell the boxes in whole numbers, they must sell **259** boxes. There are **15** cookies per box, so the total number of cookies is **259*15=3885** cookies.

17. **A.** 75% of 16 kids is $0.75(16)=12$ kids. So, **12** kids donate **$10**, which means they have a total of $12(10)=120$ in donations. If they want to sell cookies, they must make a total of $600+20=620$ to reach their goal and cover the startup fee of **$20**. Since they already have **$120** in donations, the total amount they have to make decreases to $\$610-\$120=500.$ Each box of cookies sells for **$3** and the kids get to keep **$0.80** for every dollar they earn, so for each box they sell, they profit $3(0.80)=2.40$ dollars. This means they would have to sell at least $\frac{500}{2.4}=208.33$ boxes. So, they must sell **209** boxes to reach their goal.

18. **D.** **79** students responded yes to airplanes and **48** students responded yes to trains, and $79+48=127.$ However, we were given that only **115** students responded yes to either airplanes or trains. So, we know that $127-115=12$ must be the number of students who have been counted twice in questions **2** and **3** since they have been on both airplanes and trains.

19. **C.** We look at the "yes" column under "**1** or more pets" and see that there are two values, 53 and $73.$ Since we only want to know how many students answered yes to having one or more pets, the number of siblings they have is irrelevant. So, we add up both values under the "yes" column. So, $53+73=126$ students have one or more pets.