

ANSWERS

- 1) A
- 2) C
- 3) B
- 4) C
- 5) C
- 6) B
- 7) B
- 8) D
- 9) C
- 10) D
- 11) C
- 12) D
- 13) D
- 14) A
- 15) B
- 16) D
- 17) A
- 18) C
- 19) B
- 20) C
- 21) D
- 22) E (34)
- 23) C
- 24) A
- 25) A
- 26) B
- 27) A
- 28) A
- 29) C
- 30) B

PRE-ALGEBRA – NEW ENGLAND SOLUTIONS

- 1) **A.** One day is 24 hours. For 24 hours, Vera will have to pay Company A $20+5(24)$ which is \$140. For the same amount of time, she will have to pay Company B $10+7(24)$ which is \$178. **Thus, she should choose Company A for the cheapest driver.**

- 2) **C.**

VJBNM

VJBMN

VMBJN

VMNJB

VMNBJ

VNJBM

VNMBJ

VBJNM

JBNMV

JBMNV

MNJBV

MNBJV

MBJNV

NJBMV

NMBJV

BJNMV

There are 16 different ways

- 3) **B.** The simple way to get the answer is to use the largest value coins as you can until you reach the target amount. Let's start with the most valuable coins we have, quarters, which are 25 cents each. .25, .50, .75, 1.00, 1.25, 1.50, 1.75, that gives us 7 quarters (and we can't add another one without going over 1.89). The next biggest coin is a dime, ten cents. We can add one without going over 1.89 ($1.75 + .10 = 1.85$). The next biggest coin is a nickel worth five cents. If we add a nickel, we'll go over the limit. Thus, all we can do now is to add four pennies to get from 1.85 to our target of 1.89. 7 quarters, 1 dime and 4 pennies makes **12 coins total.**
- 4) **C.** The first prime number is 2 (1 is not a prime number). Thus A is 10 and B is 2.

PRE-ALGEBRA – NEW ENGLAND SOLUTIONS

$$\begin{aligned}
 & ((A@B)//B) \\
 & = ((10@2)//2) \\
 & 10@2 = (10/2)*2 - 5 = 5*2 - 5 = 10-5 = 5 \\
 & ((10@2)//2) = (5//2) \\
 & 5//2 = 4(5) + 2 = 22
 \end{aligned}$$

There are 22 K-pop songs in the playlist- that is C.

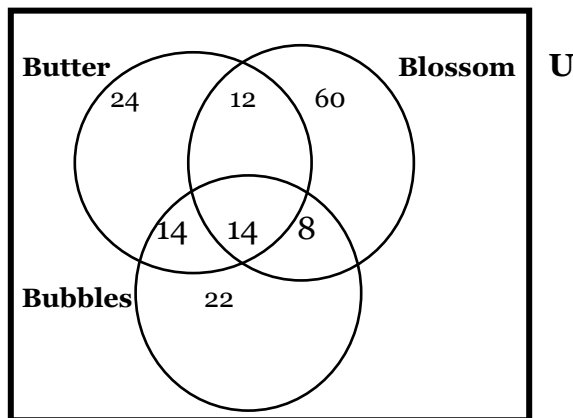
- 5) **C.** To get the number of outfits just multiply the number of pants times the number of shirts times the number of jackets times the number of accessories:
 $2 \cdot 3 \cdot 5 \cdot 4 = 120$.
- 6) **B.** The probability that an outfit has the Yale jacket is $\frac{1}{3}$, because every outfit must have a jacket and there are only three jackets, one of which is the Yale jacket.
- 7) **B.** Because the proportions are 3 : 4, we can call the length $3x$ and the width $4x$. Since there are two lengths and two widths, we can use the equation $8x + 6x = 252 \rightarrow 14x = 252 \rightarrow x=18$. So the length is $3*18=54$ and the width is 72 thus the area is $54 \times 72 = 3888 \text{ mi}^2$
- 8) **D.** You can solve this system of equations easily using substitution. First, you isolate y in the first equation. $3x+y=91$ so $y=91-3x$. Then plug in this expression for y in the second equation and solve for x . $y-x=11$ and $y=91-3x$ so $(91-3x)-x=11$, giving us $x=20$. We can then plug this into $y-x=11$ to get $y-20=11$, giving us $y=31$. **$x+y$ is $20+31=51$, the answer.**
- 9) **C.** 9 people are “the rest of the kids that want cake” as in, the kids who want cake who don’t want two pieces. Since 25% of the kids who want cake want two pieces and the rest (9) want one piece, that means 9 is 75% of the total number of kids who want cake.
 $9 = .75(x)$ where x is the number of kids that want cake $\rightarrow x=12$
 How many kids want two pieces? $12-9=3$. So Lindsey will be cutting $3 \cdot 2$ pieces for the kids who want two pieces, plus 9 pieces for the rest of the kids who want cake
 $6 + 9 = 15$.
- 10) **D.** 9.3% is the same as .093.
 9.3% of 1000 is $.093*1000$, which is 93. The answer is **93** students.

PRE-ALGEBRA – NEW ENGLAND SOLUTIONS

- 11) C. Draw a Venn Diagram.

$$24 + 60 + 22 = \mathbf{106}$$

All combinations of 2 powerpuff girls have to subtract the 14 people who like all three (cause of course they'd like 2).



- 12) D. Since the answer is in cubic inches, first we should convert all the measurements to inches. The only measurement not already in inches is the height of 1.5 ft. To convert it to inches we multiply it by 12, giving us 18 inches. The volume is the area of the base times the height, 18 inches. The base of a cylinder is a circle, the area of which is $\pi \cdot r^2$, in this case $2^2 \cdot \pi$ or 4π . Thus, the volume is $4\pi \cdot 18$ or **72π cubic inches**.
- 13) D. One clammo costs $9 \cdot 2.75 = \$24.75$. One chow will cost 4 times the cost of one clammo, or $4 \cdot 24.75 = \$99$. The cost of 3 chows and 3 clammos = $3(99) + 3(24.75) = \mathbf{\$371.25}$. **Yikes!**
- 14) A. **The answer is 1/1000** because the formula for the volume of a sphere is $(4/3)\pi \cdot r^3$. Designating Parul's radius as R and the wheel's radius as r, we can say that $R = 10r$. The ratio of the volumes is then $((4/3)\pi \cdot r^3) / ((4/3)\pi \cdot 10r^3)$ which simplifies to 1/1000.
- 15) B. $d = \# \text{ dabs}$. $d = 4w - 3 = 41 \rightarrow 4w = 44 \rightarrow w = \mathbf{11}$
- 16) D. If Brandon initially saw 6 cars, then two minutes later he would have seen $6+3=9$ cars, then 4 minutes later he would have seen $9+3=12$ cars, and finally, 6 minutes later he would have seen $12+3=15$ blue cars. Therefore, by the end of the 6 minutes, he would have seen a total of $6+9+12+15 = \mathbf{42 \text{ blue cars}}$.
- 17) A. The shortest distance back to the factory can be calculated by using the Pythagorean Theorem. Using the equation $12^2 + 16^2 = c^2$. $144 + 256 = c^2 \rightarrow 400 = c^2 \rightarrow \mathbf{20 = c}$.
- 18) C. A ratio can be set up to solve this question:
 $35 \text{ miles}/1 \text{ hour} = 35 \text{ miles}/60 \text{ minutes}$
 $35 \text{ miles}/60 \text{ minutes} = 25 \text{ miles}/x \text{ minutes} \rightarrow x \approx 42.9$, rounded, **43 minutes**.

PRE-ALGEBRA – NEW ENGLAND SOLUTIONS

19) **B.** At 50 mph, the gang will travel 25 miles in half-an-hour, or **30 minutes.**

20) **C.** $-20 < 4x + 4 \leq 36$
 $-24 < 4x \leq 32$
 $-6 < x \leq 8$

The smallest that makes this statement true is **-5.**

21) **D.** The probability of selecting a chocolate flavored ice cream is $4/(3+4)$, which equals **$4/7$.**

22) **E.** $h=6$

$$w = 2h \rightarrow w = 2(6) \rightarrow w = 12$$

$$l = w + 4 \rightarrow l = 12 + 4 \rightarrow l = 16$$

$$6 + 12 + 16 = \mathbf{34}$$

23) **C.** First, calculate the distance from the Ben and Jerry's factory to the location. This can be found by using the given speed for the first Uber and multiplying by the time it took to get there:

$$(35 \text{ miles} / 60 \text{ minutes})(25 \text{ minutes}) = 175/12 \text{ miles}$$

The second Uber left 10 minutes after the first Uber and still made it at the same time, so that means it took $25 - 10 = 15$ minutes to get there, which is $1/4$ of an hour

Using the formula $\text{speed} = \text{distance} / \text{time}$, you can solve for the speed that the second Uber travelled:

$$D = RT$$

$$D = \frac{175}{12}$$

$$T = \frac{15}{60}$$

$$\frac{175}{12} = R\left(\frac{1}{4}\right)$$

$$4\left(\frac{175}{12}\right) = R$$

$$\mathbf{R = \frac{175}{3}}$$

24) **A.** Set up a proportion to solve this problem:

$$1 \text{ inch} / 2.5 \text{ miles} = x \text{ inches} / 60 \text{ miles}$$

$$\mathbf{x = 24 \text{ inches}}$$

25) **A.** If Jessica wants to reach 35% of the height of the mountain, then she would need to reach an altitude of $.35(4000) = 1400$ feet. Then, set up a ratio to determine how long it will take for her to reach that height:

$$4000/8 = 1400/x$$

$$\mathbf{x = 2.8 \text{ hours}}$$

PRE-ALGEBRA – NEW ENGLAND SOLUTIONS

- 26) **B.** If Brandon ate $\frac{1}{3}$ of the pizza, then he ate $\frac{1}{3}(12) = 4$ slices. If Jason ate $\frac{1}{6}$ of the pizza, then he ate $\frac{1}{6}(12) = 2$ slices. Between Brandon and Jason, 6 slices have been consumed and 6 more remain. If Jessica and Parul eat the same amount of pizza, then they both consume **3 slices each**.
- 27) **A.** If the number is divisible by 12, then it is divisible by 4 and 3 as well. If the last 2 digits are divisible by 4 then the whole number is divisible by 4. If the digits add up to a multiple of 3, then the number is divisible by 3. The only answer choice that meets this require is 2 \rightarrow A.
- 28) **A.** If 2 people wanted to see both places, then $12-2=10$ people only wanted to see Mount Katahdin and $18-2=16$ people only wanted to see Acadia National Park. These means that $16+10+2=28$ people wanted to see either or both of those places and **$30-28=2$ people did not want to see either of those places.**
- 29) **C.** Set up a proportion to solve this question:
 $1 \text{ mile} / 5280 \text{ feet} = 1.7 \text{ miles} / x \text{ feet}$
 $x = 1.7(5280) = 8976 \text{ feet}$
- 30) **B.** If the average number of souvenirs bought was 3, then the sum of all the souvenirs bought divided by 6 (visited 6 states) must equal 3.
 $(3+4+2+1+4+x)/6 = 3$
 $(14+x)/6 = 3$
 $14+x=18$
 $x=4$