5 Arithmetic with Percent Dec 2019 (You may use Calculators)

3 pts 1. What percent is $\frac{4}{7}$ of $2\frac{2}{7}$?

Ans. _____

4 pts 2. Number N increased by 20% equals $83\frac{1}{3}$. What is N decreased by 20%? Give your answer as a mixed number.

Ans. _____

5 pts 3. Owen, a patient optimist wanted to purchase an item, but felt he could get a better price if he waited. He was right. The item went on sale for 20% off. He waited and sure enough it went on sale again, for 25% off the new price. Then it went on sale again for 33 1/3% off the newest price. Patient Owen waited, but the item went up 25% and then 20%, both based on the price at the time. Patient Owen went into panic mode and bought the item for $960. How much did Owen save from the original price of the item?

Ans. _____

Arithmetic with Percent

1. $\dfrac{\frac{4}{7}}{2\frac{2}{7}} = \dfrac{\frac{4}{7}}{\frac{16}{7}} = \frac{4}{7}\cdot\frac{7}{16} = \frac{1}{4} = 25\%.$ **Ans. 25%**

2. 120% of $N = \frac{6}{5}N = 83\frac{1}{3} \rightarrow \frac{6}{5}N = \frac{250}{3} \rightarrow N = \frac{250}{3}\cdot\frac{5}{6}$. N decreased by 20% $= \frac{4}{5}N$.

Thus $\frac{4}{5}\cdot\frac{250}{3}\cdot\frac{5}{6} = \frac{500}{9} = 55\frac{5}{9}$. **Ans. $55\frac{5}{9}$**

3. Let X be the cost of the item. Then $X\cdot\frac{4}{5}\cdot\frac{3}{4}\cdot\frac{2}{3}\cdot\frac{5}{4}\cdot\frac{6}{5} = 960$ is the results of the decreases and increases of sales in order. Thus $\frac{3}{5}X = 960$ and $X = 1600$. $1600 - 960 = 640$. **Ans. 640**

5 Arithmetic with Percent Dec 2018 (You may use calculators)

3 pts 1. Mark runs 50% faster than Nick. If they start at the starting line on a quarter mile run (1320 ft), how far behind Mark is Nick when Mark crosses the finish line?

Ans. _____

4 pts 2. In a school fundraiser for the senior class, Allen sold 20% more items than Bill. Bill sold 40% less than Curtis. Curtis sold \$120 worth of items. How much money did all three sell for their class altogether.

Ans. _____

5 pts 3. $\frac{2}{3}A=\frac{5}{6}B$, $\frac{5}{7}B=\frac{4}{5}C$ and $\frac{3}{4}C=\frac{9}{5}D$. If $\frac{9}{7}A=kD$, find k.

Ans. _____

Arithmetic with Percent

1. Since Nick takes 50% more time to cover the 1320 ft, then the distance he covers is $1.50x = 1320$. $x = 1320/1.5 = 880$. He is $1320 - 880 = 440$ ft behind Mark. **Ans. 440 ft**

2. $B = 120 - .4(120) = 72$. $A = 72 + .20(72) = 86.40$. $120 + 72 + 86.40 = 278.40$. **Ans. 278.40**

3. $\frac{2}{3}A=\frac{5}{6}B \rightarrow A=\frac{3}{2}\cdot\frac{5}{6}B=\frac{5}{4}B$. $\frac{5}{7}B=\frac{4}{5}C \rightarrow B=\frac{7}{5}\cdot\frac{4}{5}C=\frac{28}{25}C$. So $A=\frac{5}{4}\cdot\frac{28}{25}C=\frac{7}{5}C$.

$\frac{3}{4}C=\frac{9}{5}D \rightarrow C=\frac{4}{3}\cdot\frac{9}{5}D=\frac{12}{5}D$. So $A=\frac{7}{5}\cdot\frac{12}{5}D$ and $\frac{9}{7}A=\frac{9}{7}\cdot\frac{7}{5}\cdot\frac{12}{5}D=\frac{108}{25}D$. $k=\frac{108}{25}$ **Ans.** $\frac{108}{25}$

5 Arithmetic with Percent Dec 2017 (You may use calculators)

3 pts 1. A discount card offers \$5 off any purchase from \$75 to \$199.99 and \$15 off any purchase of \$200 or more. What is the maximum percent of discount that can be obtained using this card? (one purchase only)

Ans. _____

4 pts 2. Megan has made six of seventeen free-throw attempts. How many consecutive free throws must she make to raise her percentage of free throws made to exactly 50%.

Ans. _____

5 pts 3. A chemist has m ounces of a salt-water solution that is m percent salt. How much salt must be added for the solution to be $2m$ percent salt? Give your answer as a single fraction in terms of m.

Ans. _____

Arithmetic with Percent

1. Best % for \$5 is $\frac{5}{75} = 6\frac{2}{3}\%$. Best for \$15 is $\frac{15}{200} = 7.5\%$. **Ans. 7.5%**

2. $\frac{6+x}{17+x} = \frac{1}{2} \rightarrow 12 + 2x = 17 + x \rightarrow x = 5.$ **Ans. 5**

3. $\frac{m}{100}(m) + \frac{100}{100}(x) = \frac{2m}{100}(m + x) \rightarrow m^2 + 100x = 2m^2 + 2mx \rightarrow 100x - 2mx = m^2 \rightarrow$

$(100 - 2m)x = m^2 \rightarrow x = \frac{m^2}{100-2m}$. **Ans.** $\frac{m^2}{100-2m}$

5 Arithmetic with Percent Dec 2016-17 (You may use calculators)

3 pts 1. Evaluate: 10% of 10 plus 20% of 20 plus 30% of 30 plus … plus 120% of 120.

Ans. _____

4 pts 2. Pete, a financial planner invested $8,000, some in stocks earning 15% annually and the rest in bonds earning 6% annually. The end-of-year investment returns were $930. Determine the amount he invested at 6%.

Ans. _____

5 pts 3. The product of two natural numbers is 28 more than their sum. Find the value of the larger of the two numbers.

Ans. _____

Arithmetic with Percent

1. The numbers form a pattern of squares: $1 + 4 + 9 + 16 + 25 + 36 + 49 + 64 + 81 + 100 + 121 + 144 = 650$. **Ans. 650**

2. $.15x + .06(8000 - x) = 930 \rightarrow 15x + 48000 - 6x = 93000 \rightarrow 9x = 45000$, so $x = 5000$. The amount invested at 6% is $8000 - $5000 = $3000. **Ans. $3,000**

3. Let the two natural numbers be x and y, where $x \leq y$. Then $xy = x + y + 28 \rightarrow x(y - 1) = y + 28 \rightarrow x = \frac{y+28}{y-1} = 1 + \frac{29}{y-1}$. Thus $x - 1 = \frac{29}{y-1}$ or $(x - 1)(y - 1) = 29$. Since 29 is prime, then $y - 1 = 29$, and $x - 1 = 1$. Thus $y = 30$ and $x = 2$. **Ans. 30**

5 Arithmetic with Percent Dec 2015 (You may use calculators)

3 pts 1. Find .78125% of 64.

Ans. _____

4 pts 2. How many liters of water that measure 1.7 ppb (parts per billion) of mercury must be added to 130 liters of water that measures 2.5 ppb of mercury in order to obtain a mixture of water that measures 2 ppb of mercury, the maximum EPA standard for drinking water?

Ans. _____

5 pts 3. The market price of a stock decreases A% one year. The next year it increases Q% as it rebounds to 90% of its original price. Find Q in terms of A. Express your answer as a single-term fraction.

Ans. _____

Arithmetic with Percent

1. $.0078125(64) = .5$ **Ans. .5**

2. $1.7x + 2.5(130) = 2(x + 130) \rightarrow 1.7x + 2.5(130) = 2x + 2(130) \rightarrow .5(130) = .3x$

Therefore $x = \frac{.5(130)}{.3} = \frac{650}{3}$. **Ans.** $\frac{650}{3}$

3. The problem gives $\left(1-\frac{A}{100}\right)\left(1+\frac{Q}{100}\right)=\frac{9}{10} \rightarrow \left(\frac{100-A}{100}\right)\left(\frac{100+Q}{100}\right)=\frac{9}{10} \rightarrow$

$(100 - A)(100 + Q) = 9000 \rightarrow 10000 + 100Q - 100A - AQ = 9000 \rightarrow$

$Q(100 - A) = -1000 + 100A \rightarrow Q = \frac{100A-1000}{100-A}$. **Ans.** $\frac{100A-1000}{100-A}$

5 Arithmetic with Percent Dec 2014 (You may use Calculators)

3 pts 1. A certain article has a price tag of \$24, and with that a state sales tax of 7% of the price tag is attached before the selling price is reached. In another state the article sold at the same selling price, but this state's sales tax rate was $5\frac{1}{2}\%$. What was the price tag on the article in the second state?

Ans. _____

4 pts 2. Find the base 5 value of the expression $243_5 + 314_5 - 323_5$.

Ans. _____

5 pts 3. The budget for a trip includes the following components: Plane Fare – 31.25%, Hotel – 25%, Food – 12.50%, Car Rental – 9.375%, Other – 21.875% for a total of 100.00%. If a way is found to save 25% of the Hotel component and 2/7 of the budgeted Other component, by what fraction (or percent) is the total budget reduced?

Ans. _____

Arithmetic with Percent

1. With 7% sales tax, the cost for the article = 1.07(24) = 25.68. $1.055x = 25.68 \rightarrow$ 25.68/1.055 = 24.34 rounded. **Ans. \$24.34**

2. $243_5 + 314_5 = 1112_5$. $1112_5 - 323_5 = 234_5$. **Ans. 234_5**

3. 25% = ¼. $\frac{1}{4}\cdot\frac{1}{4} = \frac{1}{16}$ (amt. reduced) = .0625%. 21.875% = 7/32. $\frac{7}{32}\cdot\frac{2}{7} = \frac{1}{16}$.
$2\left(\frac{1}{16}\right) = 1/8$. 2(.0625) = .125 = 12.5% **Ans. 1/8 or 12.5%**

5 Arithmetic with Percent Dec 2013 (Calculators allowed)

3 pts 1. If x is 250 percent of y, then what percent of x is $3y$?

Ans. _____

4 pts 2. A square is changed into a rectangle by increasing its length by 20% and decreasing its width by 20%. By what percent is the area changed? Be sure to state percent increase or percent decrease.

Ans. _____

5 pts 3. 60 quarts of an orange juice solution is 70% pure orange juice. How many quarts of pure orange juice should be added to make a solution which is 75% pure orange juice?

Ans. _____

Arithmetic with Percent

1. $x = 2.5\,y$, $\frac{3y}{2.5y} = \frac{6}{5} = 1.2 = 120\%$ **Ans. 120%**

2. Area of square x^2. Area of rectangle $(1.2x)(.8x) = .96x^2$. **Ans. decreased 4%**

3. $.70(60) + 1.00x = .75(60 + x) \rightarrow 70(60) + 100x = 75(60) + 75x \rightarrow 25x = 5(60) \rightarrow 25x = 300$ so $x = 12$. **Ans. 12 qts**

5 Arithmetic with Percent Dec 2012 (You may use calculators)

3 pts 1. 75 is what percent of 60?

Ans. _____

4 pts 2. A certain amount of money was put into stocks and left alone for 4 years. During the first year it made 5% profit. During the second year it made 4% profit. The third year it made 25% profit and the last year it made 10% profit. If at the end of the fourth year there was $90, 090, what was the initial investment?

Ans. _____

5 pts 3. Each of the digits 1 through 9 were all used to do this subtraction example. What is the sum of the possible values for *b*?

$$\begin{array}{r} a\ b\ 9 \\ -\ c\ d\ e \\ \hline 2\ f\ 3 \end{array}$$

Ans. _____

Arithmetic with Percent

1. Let x be the percent: $75 = x(60) \rightarrow x = 75/60 = 5/4 = 125/100 = 125\%$. **Ans. 125%**

2. Let x = Initial investment. $x(1.04)(1.05)(1.25)(1.1) = 90090 \rightarrow x(1.5015) = 90090$.
Using calculator $x = 90090/1.5015 = 60{,}000$. **Ans. 60,000**

3. The digits to fill in for the variables are 1, 4, 5, 7, 8. The logical numbers for a and c are 7 and 5, but 1, 4, and 8 do not fit for b, d, and f. So a and c have to be (7 and 4) or (8 and 5) or (4 and 1). If a = 7 and c is 4, then b, d, and f are 1, 5, and 8, no combination works. If a is 8 and c is 5, that leaves 1, 4, and 7, which works if b = 1, d = 4 and f = 7 or if b = 1, d = 7 and f = 4. If a = 4 and c = 1, that leaves 5, 7, 8, which works if b = 5 and d and f are 7 and 8 respectively or 8 and 7. Thus b can be 1 or 5. Sum = 6. **Ans. 6**

5 Arithmetic with Percent Dec 2011 (You may use calculators)

3 pts 1. The number 58 is 29% of what number?

Ans. _____

4 pts 2. *Percent* is defined as the number of one-hundredths $\left(\frac{1}{100}\right)$. Only 9 unit fractions (meaning the numerator is 1) can be expressed as a whole number percent: $\frac{1}{1}, \frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}, \frac{1}{20}, \frac{1}{25}, \frac{1}{50}$, and $\frac{1}{100}$. How many unit fractions could be expressed as a whole number percentage if *percent* were defined as a number of one-hundred-twentieths $\left(\frac{1}{120}\right)$?

Ans. _____

5 pts 3. Barbara brought a bag of spirit tokens to school one day. She gave 50% to the spirit committee, then 20 to her best friend, then 50% of what she had left to the field hockey captain, then 18 to her worst friend, and then 20% of what was left to Libby. This left her with 12 tokens. How many tokens did Barbara have when she first arrived at school?

Ans. _____

Arithmetic with Percent

1. $\frac{58}{x} = \frac{29}{100}$, $29x = 58(100)$. $x = 200$. **Ans. 200**

2. Since $\frac{1}{n} \cdot 120 = \frac{120}{n}$, n must divide 120 evenly and must therefore be a factor of 120. $120 = 10(12) = 2^3 \cdot 3 \cdot 5$. Thus it has $4 \cdot 2 \cdot 2$ or 16 factors. **Ans. 16**

3. $[(n(\frac{1}{2}) - 20)\frac{1}{2} - 18]\frac{4}{5} = 12 \rightarrow \frac{1}{4}n - 10 - 18 = 15 \rightarrow \frac{1}{4}n = 43, n = 172.$ **Ans. 172**

5 Arithmetic with Percent (You may use calculators) Dec 2010

3 pts 1. The Oldies Club has 27 men. 62.5% of the group is female. How many folks belong to the club altogether?

Ans. _____

4 pts 2. How many natural numbers divide the number 3000 evenly?

Ans. _____

5 pts 3. A merchant has an item originally priced at p. Wanting to make more profit, he raised the price by 25%. Later the store had a store-wide reduction sale of 25%. The item sold well, so he decided to make more profit on the item and raised the price 25% again. Later the store had another store-wide reduction sale of 25%. After all four price adjustments, the price of the item is \$56.25. Find p.

Ans. _____

Arithmetic with percent

1. 37.5% or 3/8 of the group is 27: $\frac{3}{8}x = 27 \rightarrow x = \frac{8}{3}\cdot 27 = 72.$ **Ans. 72**

2. $3000 = 2^3 \cdot 5^3 \cdot 3^1$. Number of factors $= 4 \cdot 4 \cdot 2 = 32.$ **Ans. 32**

3. First increase $= \frac{5}{4}p$. First sale $= \left(\frac{5}{4}p\right)\frac{3}{4} = \frac{15}{16}p$. Second increase $= \left(\frac{15}{16}p\right)\frac{5}{4} = \frac{75}{64}p$.
Second sale $= \left(\frac{75}{64}p\right)\frac{3}{4} = \frac{225}{256}p = 56.25 \rightarrow p = \frac{256}{225}\cdot 56.25 = 256(.25) = 64.$ **Ans. 64**

5 Arithmetic with Percent Dec 09 (You may use calculators)

3 pts 1. Increasing x by y percent gives 12. Decreasing x by y percent gives 8. Find x.

Ans. _____

4 pts 2. The Smiths press carrots by hand to make carrot juice. 25% of the juice is extracted from the first pressing. Each subsequent pressing extracts 25% of the remaining juice from the carrots. What is the least number of times that the carrots need to be pressed to extract at least 66⅔% of the juice?

Ans. _____

5 pts 3. Darren bought supplies for a pumpkin-carving contest, but the receipt went through the wash with his clothes. All that could be read was

72 pumpkins $_67.9_ .

The first and last digits of the total cost were unreadable. Assuming that all pumpkins were the same price, what is the price of a single pumpkin, assuming no quantity discount and no tax was added.

Ans. _____

Arithmetic with Percent

1. $x(1 + \frac{y}{100}) = 12$ ➔ (1) $x + \frac{xy}{100} = 12$. $x(1- \frac{y}{100}) = 8$ ➔ (2) $x - \frac{xy}{100} = 8$. Adding (1) and (2): $2x = 20$, $x = 10$. **Ans. 10**

2. Since 25% of the is extracted each pressing, 75% remains. To extract 66⅔% means to leave 33⅓%. This can be solved by using a calculator by multiplying 0.75 by itself several times until the product is 1/3 or less. **Ans. 4**

3. To be divisible by 72, requires divisibility by 9 and 8. The last three digits being 79_ must be divisible by 8. The last digit must be a 2, because the last three digits must be a multiple of 8. Now you have _67.92 that must be divisible by 9. The first digit must be 3, since the sum of all the digits must be a multiple of 9. 367.92/72 = 5.11. **Ans. $5.11**