

Basic solving for x
If you can easily do

11. If $2x - 3 = 12$, then $x = ?$

- A. 2.0
- B. 4.5
- C. 7.5
- D. 9.0
- E. 15.0

in your head,
do so
 $2x = 15$
 $x = 7.5$

12. Vivian made 63 free throws out of 89 attempts during the basketball season. What percentage, to the nearest percent, of her free throws did she make during this season?

- A. 41%
- B. 63%
- C. 71%
- D. 89%
- E. 98%

$\% \text{ made} = \frac{\# \text{ Made}}{\text{Attempts}} = \frac{63}{89}$
 $63 \div 89 = 0.707865$
NEED TO ROUND UP TO 71%

13. Karen spent $\frac{2}{3}$ of her allowance on clothes and $\frac{1}{5}$ of her allowance on cassettes. What is the difference (larger minus smaller) between the portions spent on clothes and on cassettes?

- A. $\frac{2}{15}$
- B. $\frac{7}{15}$
- C. $\frac{9}{15}$
- D. $\frac{11}{15}$
- E. $\frac{13}{15}$

Difference means subtraction
 $\frac{2}{3} - \frac{1}{5} = \frac{10-3}{15} = \frac{7}{15}$

14. Koko has \$250 to spend on photo equipment. How much money would she have left if she buys a \$140.00 camera and must also pay 8.2% of the \$140 in sales tax?

- F. \$ 98.52
- G. \$101.80
- H. \$110.00
- J. \$119.02
- K. \$130.05

$\$140 \times 1.082 = 151.48$
 $250 - 151.48 = 98.52$

15. A rock group gets 30% of the money from sales of their newest compact disc. That 30% is split equally among the 5 group members. If the disc generates \$1,000,000 in sales, how much does one group member receive?

- A. \$ 30,000
- B. \$ 50,000
- C. \$ 60,000
- D. \$200,000
- E. \$300,000

30% of 1 million equals
\$300,000
 $\$300,000 \div 5 = \$60,000$

Probabilities are always between 0 and 1

0 = NEVER 1 = ALWAYS

16. If the probability that it will rain tomorrow is 0.7, what is the probability that it will NOT rain tomorrow?

- * A. 0.0
- B. 0.1
- C. 0.3
- D. 1.0
- E. 1.7

chance occurring + chance NOT occurring = 1
 $0.7 + x = 1$
 $x = 0.3$

17. Which of the following arranges ascending order?

- * F. $\frac{5}{8} < \frac{5}{7} < \frac{4}{13}$
- G. $\frac{5}{7} < \frac{4}{13} < \frac{5}{8}$
- H. $\frac{5}{8} < \frac{4}{13} < \frac{5}{7}$
- J. $\frac{5}{7} < \frac{5}{8} < \frac{4}{13}$
- K. $\frac{4}{13} < \frac{5}{8} < \frac{5}{7}$

ASCENDING Low → High
Higher denominator
SMALLER AMT.
 $\frac{4}{13}$ is smallest

18. What is the average of $\frac{3}{8}$ and 0.065?

- A. 0.05125
- B. 0.1825
- C. 0.22
- D. 0.375
- E. 0.5125

$\frac{3}{8} = 0.375$
 $\frac{0.375 + 0.065}{2} = 0.22$

19. You have been asked to make punch for a wedding reception. The punch recipe calls for 6 parts fruit juices to 2 parts soda. To make 24 quarts of this punch, how many quarts of soda should you use?

- A. 3
- B. 5
- C. 6
- D. 12
- E. 20

Parts Fruit Juice = 6
whole Punch = 6+2 = 8
 $\frac{6}{8}$ of 24 = 18
soda = $\frac{2}{8} = \frac{1}{4}$ of 24 = 6

20. If c is a positive integer that divides both 75 and 90, but divides neither 18 nor 10, what should you get when you add the digits in c ?

- A. 1
- B. 5
- C. 6
- D. 7
- E. 8

Need to find common factors of 75 and 90
 $75 \mid 3, 5, 15, 25$
 $90 \mid 2, 3, 5, 6, 15, 18, 30, 45$
3, 5 and 15 divide into 75 and 90. 3 divides into 18 and 5 divides into 10. 15 is the factor $1+5=6$

ACT ARITHMETIC PROBLEMS I

FRACTIONS, DECIMALS, PERCENTS, AVERAGES, VARIATION, ETC.

$100\% + 18\% = 118\% = 1.18$

1. To keep up with rising expenses, a motel manager needs to raise the \$30.00 room rate by 18%. What will be the new rate?

$\$30 \times 1.18 = \35.40

- F. \$30.18
G. \$31.80

Long way

- H. \$33.00

$\$30 \times .18 = \5.40

- J. \$35.40

- K. \$48.00

$\$30 + \$5.40 = \$35.40$

2. Contributions to a charity are made by each of 5 companies as indicated in the table below.

Company	A	B	C	D	E
Contribution in dollars	0	300	300	180	270

What is the average of the contributions made by the 5 companies?

$AV = \frac{\text{Sum of ENTRIES}}{\text{Number of ENTRIES}}$

- A. \$187.50

- B. \$210.00

- C. \$250.00

- D. \$262.50

- E. \$350.00

$AV = \frac{0 + 300 + 300 + 180 + 270}{5}$

$AV = 1050 \div 5 = 210$

3. For a party, you've purchased 3 kinds of cheeses: 3 pounds of Colby cheese at \$1.50 per pound, 4 pounds of cheddar cheese at \$2.00 per pound, and you've forgotten how many pounds of Monterey Jack cheese at \$2.50 per pound. You have a nacho recipe that calls for 1 pound of Monterey Jack cheese, and you want to know how much nacho cheese sauce you can make. If your cheese purchase totaled \$22.50 (without tax), how many pounds of Monterey Jack cheese did you buy?

Weird Q because you don't normally think like this

F. 4	22.50	$\frac{\$10.00}{2.50} = 4$
G. 5	-4.50	
H. 9	18.00	
J. 11	-8.00	
K. 15	10.00	

4. On Saturday Sid received his pay and spent $\frac{1}{2}$ of it. On Sunday he spent $\frac{1}{2}$ of the remaining money, and on Monday he spent $\frac{1}{2}$ of what remained from Sunday. If \$4 then remained, how much pay did he receive originally?

$x = \text{Pay}$
 $\left(\left(x \cdot \frac{1}{2}\right) \cdot \frac{1}{2}\right) \cdot \frac{1}{2} = 4$

- A. \$12
B. \$16
C. \$24

- D. \$32
E. \$64

You can also work backwards
 $\frac{1}{8}x = 4$
 $x = 32$
 $4 \times 2 \times 2 \times 2 = 32$

Do Absolute Value 1st

5. $|3 - 7| - |4 - 1| = ?$ Treat similar to

\rightarrow A. 1
B. 5
C. 7
D. 15
E. -7

Parentheses.
 $| -4 | - | 3 |$
 $4 - 3 = 1$

6. Mario bought 1 compact disc for \$8.95 and 3 others for \$7.99 each. What was the average price per disc he paid for these 4 compact discs?

- F. $\frac{\$8.95 + \$7.99}{3}$

- G. $\frac{\$8.95 + \$7.99}{4}$

- H. $\frac{\$8.95 + \$7.99}{2}$

- J. $\frac{\$8.95 + \$7.99}{4}$

- \rightarrow K. $\frac{\$8.95 + 3(\$7.99)}{4}$

Weighted Average
The worth, frequency or likelihood of each element is considered.

7. The price of a pumpkin is directly proportional to its weight. If a pumpkin that weighs 15.0 pounds costs \$3.25, how much will an 11.4-pound pumpkin cost?

- F. \$0.95

- G. \$1.23

- H. \$1.95

- \rightarrow J. \$2.47

- K. \$4.28

EASIEST $\left(\frac{\$3.25}{15}\right) 11.4 = \2.47
or
set up Proportion $15x = (3.25)11.4$
 $\frac{3.25}{15} = \frac{x}{11.4} \Rightarrow x = 2.47$

8. What is the greatest prime factor of 520?

- A. 5

- B. 7

- C. 11

- \rightarrow D. 13

- E. 17

SINCE you're looking for greatest START with Largest choice
 $520/17 \neq \text{integer}$
 $\frac{520}{13} = 40$

9. In scientific notation, 2,450,000,000 = ?

- A. $(2 \times 10^7) + 450$

- B. 2.45×10^7

- C. $(2 \times 10^9) + 450$

- \rightarrow D. 2.45×10^9

- E. 2.45×10^{10}

9 decimal PLACES

10. A box of cereal contains $18\frac{3}{4}$ cups of cereal. At most, how many persons can you serve from this box of cereal if each serving must be at least $\frac{3}{4}$ cup?

- F. 14

- G. 18

- H. 19

- J. 24

- \rightarrow K. 25

$\frac{18.75}{0.75} = 25$
When you divide by fraction the result is larger than dividend.

ACT ARITHMETIC PROBLEMS I
FRACTIONS, DECIMALS, PERCENTS, AVERAGES, VARIATION, ETC.

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- F. \$30.18
G. \$31.80
H. \$33.00
J. \$35.40
K. \$48.00

$\frac{x-30}{30} = 0.18$
 $x-30 = 5.40$
 $x = 35.40$
EASIER $30 \times 1.18 = 35.40$

2. Contributions to a charity are made by each of 5 companies as indicated in the table below.

Company	A	B	C	D	E
Contribution in dollars	0	300	300	180	270

What is the average of the contributions made by the 5 companies?

- A. \$187.50
B. \$210.00
C. \$250.00
D. \$262.50
E. \$350.00

$0 + 300 + 300 + 180 + 270$
 $\underline{\hspace{10em}}$
 5
 $1050 \div 5 = 210$

3. For a party, you've purchased 3 kinds of cheeses: 3 pounds of Colby cheese at \$1.50 per pound, 4 pounds of cheddar cheese at \$2.00 per pound, and you've forgotten how many pounds of Monterey Jack cheese at \$2.50 per pound. You have a nacho recipe that calls for 1 pound of Monterey Jack cheese, and you want to know how much nacho cheese sauce you can make. If your cheese purchase totaled \$22.50 (without tax), how many pounds of Monterey Jack cheese did you buy?

- F. 4
G. 5
H. 9
J. 11
K. 15

Weird question because you don't normally think like this.
 $\$22.50 - [3(1.50) + 4(2)] = 10$
 $\$10 \div 2.50 = 4$

4. On Saturday Sid received his pay and spent 1/2 of it. On Sunday he spent 1/2 of the remaining money, and on Monday he spent 1/2 of what remained from Sunday. If \$4 then remained, how much pay did he receive originally?

- A. \$12
B. \$16
C. \$24
D. \$32
E. \$64

Work back wards

Sat. Sun M Tues
 $32 = 2 * 16 = 2 * 8 = 2 * 4$



OR $\frac{1}{8}$ of $x = 4$

$8 \div 2 = 4$
 $8 = 2 \times 4$

5. $|3 - 7| - |4 - 1| = ?$

- A. 1
B. 5
C. 7
D. 15
E. -7

Do Absolute Value 1st
TREAT SIMILAR TO PARENTHESIS
 $1 - 4 = -3$
 $4 - 3 = 1$

6. Mario bought 1 compact disc for \$8.95 and 3 others for \$7.99 each. What was the average price per disc he paid for these 4 compact discs?

- F. $\frac{\$8.95 + \$7.99}{3}$
G. $\frac{\$8.95 + \$7.99}{4 \cdot 3}$
H. $\frac{\$8.95 + \$7.99}{2}$
J. $\frac{\$8.95 + \$7.99}{4}$
K. $\frac{\$8.95 + 3(\$7.99)}{4}$

Weighted Average
Frequency, worth, or likelihood of elements are considered.
grades

7. The price of a pumpkin is directly proportional to its weight. If a pumpkin that weighs 15.0 pounds costs \$3.25, how much will an 11.4-pound pumpkin cost?

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G. \$1.23
H. \$1.95
J. \$2.47
K. \$4.28

$\frac{15}{3.25} = \frac{11.4}{x}$
OR you can estimate
OR $\frac{11.4}{15} \times 3.25 = 2.47$

8. What is the greatest prime factor of 520?

- A. 5
B. 7
C. 11
D. 13
E. 17

Work from largest choice. 17 is not divisible, but 13 is

9. In scientific notation, 2,450,000,000 = ?

- A. $(2 \times 10^7) + 450$
B. 2.45×10^7
C. $(2 \times 10^9) + 450$
D. 2.45×10^9
E. 2.45×10^{10}

of place values

10. A box of cereal contains $18\frac{3}{4}$ cups of cereal. At most, how many persons can you serve from this box of cereal if each serving must be at least $\frac{3}{4}$ cup?

- F. 14
G. 18
H. 19
J. 24
K. 25

$\frac{18.75}{0.75} = 25$

When you divide by decimal fraction, the quotient is larger

11. If $2x - 3 = 12$, then $x = ?$

- A. 2.0
- B. 4.5
- C. 7.5
- D. 9.0
- E. 15.0

$2x = 15$
 $x = 7.5$

12. Vivian made 63 free throws out of 89 attempts during the basketball season. What percentage, to the nearest percent, of her free throws did she make during this season?

- A. 41%
- B. 63%
- C. 71%
- D. 89%
- E. 98%

$\frac{63}{89} = 0.707865$
Need to Round up to 71%

13. Karen spent $\frac{2}{3}$ of her allowance on clothes and $\frac{1}{5}$ of her allowance on cassettes. What is the difference (larger minus smaller) between the portions spent on clothes and on cassettes?

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- B. $\frac{7}{15}$
- C. $\frac{9}{15}$
- D. $\frac{11}{15}$
- E. $\frac{13}{15}$

Difference is subtraction
 $\frac{2}{3} - \frac{1}{5} = \frac{10}{15} - \frac{3}{15} = \frac{7}{15}$

14. Koko has \$250 to spend on photo equipment. How much money would she have left if she buys a \$140.00 camera and must also pay 8.2% of the \$140 in sales tax?

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$140.00 \times 1.082 = 151.48$
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15. A rock group gets 30% of the money from sales of their newest compact disc. That 30% is split equally among the 5 group members. If the disc generates \$1,000,000 in sales, how much does one group member receive?

- A. \$ 30,000
- B. \$ 50,000
- C. \$ 60,000
- D. \$200,000
- E. \$300,000

30% of 1 million is 300,000
 $\$300,000 \div 5 = 60,000$

16. If the probability that it will rain tomorrow is 0.7, what is the probability that it will NOT rain tomorrow?

- A. 0.0
- B. 0.1
- C. 0.3
- D. 1.0
- E. 1.7

Probabilities are always between 0 NEVER and 1 Always

17. Which of the following arranges ascending order?

- F. $\frac{5}{8} < \frac{5}{7} < \frac{4}{13}$ - NO
- G. $\frac{5}{7} < \frac{4}{13} < \frac{5}{8}$ - NO
- H. $\frac{5}{8} < \frac{4}{13} < \frac{5}{7}$ - NO
- I. $\frac{5}{7} < \frac{5}{8} < \frac{4}{13}$ - NO
- K. $\frac{4}{13} < \frac{5}{8} < \frac{5}{7}$

The same Three Fractions turn into decimals

Ascending lowest to highest
Make 1st over have denominators close to 13

18. What is the average of $\frac{3}{8}$ and 0.065?

- A. 0.05125
- B. 0.1825
- C. 0.22
- D. 0.375
- E. 0.5125

use calculator
 $\frac{3}{8} = 0.375$
 $+ 0.065$
 $\hline 0.440 \div 2 = 0.22$

19. You have been asked to make punch for a wedding reception. The punch recipe calls for 6 parts fruit juices to 2 parts soda. To make 24 quarts of this punch, how many quarts of soda should you use?

- A. 3
- B. 5
- C. 6
- D. 12
- E. 20

$\frac{1}{4}$ of 24 is 6

Parts to whole
 $\frac{\text{Fruit Juice}}{\text{Whole}} = \frac{6}{6+2} = \frac{6}{8}$
 $\frac{\text{Soda}}{\text{Whole}} = \frac{2}{6+2} = \frac{2}{8} = \frac{1}{4}$

20. If c is a positive integer that divides both 75 and 90, but divides neither 18 nor 10, what should you get when you add the digits in c ?

- A. 1
- B. 5
- C. 6
- D. 7
- E. 8

$90 \div 15 = 6$
 $75 \div 15 = 5$
75 90
^ ^
3 25 9 10
^ ^
5 5 3 2.5

$c = 15$ divides both 90 + 75, but does NOT divide evenly into 18 or 10.
 $1 + 5 = 6$

ACT ARITHMETIC PROBLEMS II
FRACTIONS, DECIMALS, PERCENTS AVERAGES, VARIATION, ETC.

1. Anne earns \$5.00 per hour, but 25% of her earnings are deducted before she receives her take-home pay. How many hours must she work in order to take home exactly \$60.00?

$$0.75(5x) = \$60.00$$

$$0.75x = 12$$

$$x = 12 \div 0.75 = 16$$

- F. 9
G. 12
 H. 16
J. 36
K. 64

2. A vendor has 14 helium balloons for sale: 9 are yellow, 3 are red, and 2 are green. A balloon is selected at random and sold. If the balloon sold is yellow, what is the probability that the next balloon, selected at random, is also yellow?

$$9 - 1 = 8$$

$$\text{must be } \frac{8}{13}$$

- F. $\frac{8}{13}$
G. $\frac{9}{13}$
H. $\frac{5}{14}$
J. $\frac{8}{14}$
K. $\frac{9}{14}$

These
won't
work

3. For each day on your newspaper route you receive \$10.00 plus a fixed amount for each newspaper you deliver. Currently you are earning \$18.00 per day for delivery of 80 newspapers. Today you are assigned to deliver 20 additional newspapers per day. What will be your new daily earnings?

- A. \$10.00
B. \$18.20
 C. \$19.00
D. \$20.00
E. \$22.50

$$\$8 \div 80 = \$0.10 \text{ extra}$$

$$80 + 20 = 100 \times 0.1 = \$10.00$$

$$\text{But } \$10.00 + 90 = \$19.00$$

4. Two whole numbers have a greatest common factor of 6 and a least common multiple of 36. Which of the following pairs of whole numbers will satisfy the given conditions?

PROCESS of elimination

- F. 4 and 9 → 6 NOT factor of 4
G. 9 and 12 → 6 NOT factor of 9
H. 12 and 15 → 36 NOT multiple of 15
 J. 12 and 18
K. 18 and 24 → 36 NOT multiple of 24

5. Running at a steady pace of 90 seconds per quarter mile, how many minutes would it take to run 2 miles?

- A. 12.0
B. 8.0
C. 7.2
D. 4.5
E. 3.0

$$\frac{90 \text{ secs}}{\frac{1}{4}} \times \frac{4}{4} = \frac{360}{1} \text{ mile}$$

$$360 \times 2 = 720 \div 60 = 12$$

6. Last month, Ellen's commission checks were \$120, \$150, and \$210. In the same month, Bob's commission checks were \$133.67, \$157.89, and \$161.44. Whose commission check average was greater and by how much?

- F. Bob's, by \$27
G. Bob's, by \$23
H. Bob's, by \$8
Ellen's, by \$3
 K. Ellen's, by \$9

wrong

$$480 \div 3 = 160$$

$$453 \div 3 = 151$$

9

7. What is the largest possible product for 2 even integers whose sum is 34?

- F. 64
G. 68
H. 120
J. 240
 K. 288

$$17 + 17 = 34$$

$$18 + 16 = 34$$

$$18 \times 16 = 288$$

8. You want to make a casserole consisting of 1 type of meat, 1 type of cheese, and 1 type of noodle. You have available 4 types of meats, 5 types of cheeses, and 6 types of noodles. How many different types of casserole are possible?

- A. 4
B. 15
C. 30
D. 60
 E. 120

$$4 \times 5 \times 6 = 120$$

9. What is the difference when 1% of 90 is subtracted from the product of 0.1 and 90?

- A. 8.991
B. 8.91
 C. 8.1
D. 0.09
E. 0

$$0.1 \times 90 = 9.0$$

$$0.01 \times 90 = -0.9$$

8.1

10. In a shipment of 1,000 light bulbs, 1/40 of the bulbs were defective. What is the ratio of defective bulbs to non-defective bulbs?

- F. $\frac{1}{25}$
 G. $\frac{1}{39}$
H. $\frac{1}{40}$
J. $\frac{39}{1}$
K. $\frac{40}{1}$

1 Defective

40 whole

Therefore:

$$40 - 1 = 39$$

Non-defective

$$\frac{\text{Defective}}{\text{Non-Defective}} = \frac{1}{39}$$

11. A TV station conducted a telephone poll seeking viewers' reactions to a new show. Of the 750 people who answered, 500 liked the new show, 100 disliked it, and the rest were undecided. What percent of those who answered were undecided about the new show?

- A. 20%
 B. 25%
 C. 66 2/3%
 D. 80%
 E. 150%

$$\frac{750 - 600}{150} = \frac{150}{750} = 0.20$$

12. If 40% of x equals 80, then $x = ?$

- A. 2
 B. 32
 C. 200
 D. 2,000
 E. 3,200

$$0.4x = 80$$

$$x = 80 \div 0.4$$

$$= 200$$

13. The cost of electricity at the local utility company is 10 cents per kilowatt-hour for the first 100 kilowatt-hours used in a month and 7 cents per kilowatt-hour for each additional kilowatt-hour used. What is the cost for 500 kilowatt-hours used in 1 month?

- F. \$28.00
 G. \$35.00
 H. \$38.00
 J. \$50.00
 K. \$85.00

$$100 \times \$0.10 = \$10$$

$$400 \times \$0.07 = \$28$$

$$28 + 10 = 38$$

14. What fraction lies exactly halfway between $2/3$ and $3/4$?

- F. 3/5
 G. 5/6
 H. 7/12
 J. 9/16
 K. 17/24

$$\frac{\frac{2}{3} + \frac{3}{4}}{2} = \frac{\frac{8}{12} + \frac{9}{12}}{2} = \frac{\frac{17}{12}}{2} = \frac{17}{24}$$

15. The specific gravity of a substance is the ratio of the weight of the substance to the weight of an equal volume of water. If 1 cubic foot of water weighs 62.5 pounds, what is the specific gravity of a liquid that weighs 125 pounds per cubic foot?

- A. 1
 B. 1.25
 C. 2
 D. 6.25
 E. 125

$$\frac{1 \text{ cu}}{62.5} = \frac{x}{125}$$

$$2 = x$$

16. You are standing in line at the cash register to pay for a bracelet priced at \$15.99. A sales tax of 8% of the \$15.99 will be added (rounded to the nearest cent) to the price of the bracelet. You have 20 one-dollar bills, but how much will you need in coins if you want to have exact change ready?

- A. 7¢
 B. 8¢
 C. 19¢
 D. 27¢
 E. 63¢

$$\$15.99 \times 1.08 = 17.2692 \approx 17.27$$

17. What is the least common denominator for the fractions $1/12$, $1/18$, and $1/30$?

- A. 6
 B. 60
 C. 90
 D. 180
 E. 6,480

what's the smallest Number that HAS 12 18 & 30 AS Factors

18. The average of a set of five integers is 16. When a sixth number is included in the set, the average of the set increases to 18. What is the sixth number?

- F. 18
 G. 20
 H. 21
 J. 24
 K. 28

$$\frac{x}{5} = 16 \quad x = 80$$

$$\frac{80 + y}{6} = 18$$

$$80 + y = 108$$

19. In 3 fair coin tosses, what is the probability of obtaining exactly 2 tails? (Note: In a fair coin toss the 2 outcomes, heads and tails, are equally likely.)

- F. 1/3
 G. 3/8
 H. 1/2
 J. 2/3
 K. 7/8

① ② ③
 H H H
 H H T
 H T T
 H T H
 T H H
 T H T
 T T H
 T T T

LIST ALL The Possibilities

$$\frac{3}{8}$$

20. How many positive even integers divide into 96 with no remainder?

- F. 8
 G. 9
 H. 10
 J. 11
 K. 12

Factor Rainbow
 LISTS All the factor Pairs. End points are 1 and the Number

1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96

11. A TV station conducted a telephone poll seeking viewers' reactions to a new show. Of the 750 people who answered, 500 liked the new show, 100 disliked it, and the rest were undecided. What percent of those who answered were undecided about the new show?

- A. 20% $\frac{150}{750} = 0.20$
 B. 25%
 C. $66\frac{2}{3}\%$
 D. 80%
 E. 150%
- $0.20 = 20\%$

12. If 40% of x equals 80, then $x = ?$ $of = x$

- * A. 2
 B. 32
 → C. 200
 D. 2,000
 E. 3,200
- $0.4x = 80$
 $x = \frac{80}{0.4} = 200$

13. The cost of electricity at the local utility company is 10 cents per kilowatt-hour for the first 100 kilowatt-hours used in a month and 7 cents per kilowatt-hour for each additional kilowatt-hour used. What is the cost for 500 kilowatt-hours used in 1 month?

- F. \$28.00
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 $10 + 28 = 38$

14. What fraction lies exactly halfway between $\frac{2}{3}$ and $\frac{3}{4}$?

- * A. $\frac{3}{5}$
 B. $\frac{5}{6}$
 H. $\frac{7}{12}$
 J. $\frac{9}{16}$
 → K. $\frac{17}{24}$
- midpoint $\Rightarrow \frac{A+B}{2}$
 $\frac{\frac{2}{3} + \frac{3}{4}}{2} = \frac{\frac{8+9}{12}}{2} = \frac{17}{24}$

15. The specific gravity of a substance is the ratio of the weight of the substance to the weight of an equal volume of water. If 1 cubic foot of water weighs 62.5 pounds, what is the specific gravity of a liquid that weighs 125 pounds per cubic foot?

- A. 1
 B. 1.25
 → C. 2
 D. 6.25
 E. 125
- Ratio is mathematical comparison
 $\frac{1}{62.5} = \frac{x}{125} \quad x=2$
- Quickest way $(1 \div 62.5) 125$ on calculator

16. You are standing in line at the cash register to pay for a bracelet priced at \$15.99. A sales tax of 8% of the \$15.99 will be added (rounded to the nearest cent) to the price of the bracelet. You have 20 one-dollar bills, but how much will you need in coins if you want to have exact change ready?

- A. 7¢
 B. 8¢
 C. 19¢
 D. 27¢
 E. 63¢
- $\$15.99 \times 1.08 = 17.2692$ rounds up to 17.27

17. What is the least common denominator for the fractions $\frac{1}{12}$, $\frac{1}{18}$, and $\frac{1}{30}$? What is the smallest number that has 12, 18 & 30 as factors.

- START WITH A
 A. 6
 B. 60
 C. 90
 → D. 180
 E. 6,480

18. The average of a set of five integers is 16. When a sixth number is included in the set, the average of the set increases to 18. What is the sixth number?

- F. 18
 G. 20
 H. 21
 J. 24
 → K. 28
- $\frac{x}{5} = 16 \quad x=80$
 $\frac{80+y}{6} = 18 \quad 80+y=108$
 $y=28$

19. In 3 fair coin tosses, what is the probability of obtaining exactly 2 tails? (Note: In a fair coin toss the 2 outcomes, heads and tails, are equally likely.)

- F. $\frac{1}{3}$
 → G. $\frac{3}{8}$
 H. $\frac{1}{2}$
 J. $\frac{2}{3}$
 K. $\frac{7}{8}$
- 1st Toss 2nd Toss 3rd Toss
- | | | | | |
|------|---|---|---|---|
| F. | 1 | H | H | H |
| → G. | 3 | H | H | T |
| H. | 1 | H | T | T |
| J. | 2 | T | H | H |
| K. | 7 | T | T | T |
- $\frac{3}{8}$

20. How many positive even integers divide into 96 with no remainder?

- * A. 8
 G. 9
 → H. 10
 J. 11
 K. 12
- FACTOR RAINBOW
 END POINTS are ONE and the number 1 96
- 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96

ACT ARITHMETIC PROBLEMS II
FRACTIONS, DECIMALS, PERCENTS AVERAGES, VARIATION, ETC.

1. Anne earns \$5.00 per hour, but 25% of her earnings are deducted before she receives her take-home pay. How many hours must she work in order to take home exactly \$60.00? *If 25% is taken out,*

- F. 9 *she gets 75%.*
 G. 12 *x = # of hours*
 → H. 16
 J. 36 *\$5x(0.75) = 60.00*
 K. 64 *x = 16*

2. A vendor has 14 helium balloons for sale: 9 are yellow, 3 are red, and 2 are green. A balloon is selected at random and sold. If the balloon sold is yellow, what is the probability that the next balloon, selected at random, is also yellow?

- F. $\frac{8}{13}$ *9 + 3 + 2 = 14*
 G. $\frac{9}{13}$ *-1 -1*
 H. $\frac{5}{14}$ *8 + 3 + 2 = 13*
 J. $\frac{8}{14}$ *only 4*
 K. $\frac{9}{14}$ *8 out of 13 will work are yellow*

3. For each day on your newspaper route you receive \$10.00 plus a fixed amount for each newspaper you deliver. Currently you are earning \$18.00 per day for delivery of 80 newspapers. Today you are assigned to deliver 20 additional newspapers per day. What will be your new daily earnings? *Need to find out how is earned for each newspaper \$18 - 10 = \$8*

- A. \$10.00
 B. \$18.20
 C. \$19.00
 → D. \$20.00 *\$8.00 ÷ 80 = \$0.10 per*
 E. \$22.50 *80 + 20 = 100 × 0.1 = \$10.00*
\$10.00 + 10.00 = 20

4. Two whole numbers have a greatest common factor of 6 and a least common multiple of 36. Which of the following pairs of whole numbers will satisfy the given conditions? *PROCESS OF ELIMINATION*

- F. 4 and 9 - 6 not a factor of both
 G. 9 and 12 - 6 not a factor of 9
 H. 12 and 15 - 36 not a multiple of 15
 → J. 12 and 18
 K. 18 and 24 → 36 not a multiple of 24

5. Running at a steady pace of 90 seconds per quarter mile, how many minutes would it take to run 2 miles?

- A. 12.0 *8 QUARTERS in 2 miles*
 B. 8.0 *90 seconds equals 1.5 min*
 C. 7.2
 D. 4.5
 E. 3.0 *8 × 1.5 = 12*

6. Last month, Ellen's commission checks were \$120, \$150, and \$210. In the same month, Bob's commission checks were \$133.67, \$157.89, and \$161.44. Whose commission check average was greater and by how much?

- F. Bob's, by \$ 27 *E 480 ÷ 3 = 160*
 G. Bob's, by \$ 23
 H. Bob's, by \$ 8 *453 ÷ 3 = 151*
 J. Ellen's, by \$ 3
 → K. Ellen's, by \$ 9

7. What is the largest possible product for 2 even integers whose sum is 34?

- F. 64 *17 + 17 = 34*
 G. 68 *18 + 16 = 34*
 H. 120
 J. 240
 → K. 288 *18 × 16 = 288*

8. You want to make a casserole consisting of 1 type of meat, 1 type of cheese, and 1 type of noodle. You have available 4 types of meats, 5 types of cheeses, and 6 types of noodles. How many different types of casserole are possible?

- A. 4
 B. 15
 C. 30
 D. 60
 → E. 120 *Permutations multiply the elements 4 × 5 × 6 = 120*

9. What is the difference when 1% of 90 is subtracted from the product of 0.1 and 90?

- A. 8.991 *0.1 × 90 = 9.0*
 B. 8.91
 C. 8.1 *0.01 × 90 = 0.9*
 D. 0.09
 E. 0 *8.1*

10. In a shipment of 1,000 light bulbs, 1/40 of the bulbs were defective. What is the ratio of defective bulbs to nondefective bulbs?

- F. $\frac{1}{25}$ *1 defective*
 G. $\frac{1}{39}$ *40 whole*
 → H. $\frac{1}{40}$ *Therefore: 40 - 1 = 39*
 J. $\frac{39}{1}$ *NON-defective*
 K. $\frac{40}{1}$ *Defective*
nondefective = $\frac{1}{39}$