

Pre-Algebra Topics COMPASS Review

You will be allowed to use a calculator on the COMPASS test. Acceptable calculators are: basic calculators, scientific calculators, and graphing calculators up through the level of the TI-86.

Work out the problems with pencil and paper and select the correct answers.

1. Simplify: $22 + (-8) + 32 - (-12) + 8$

- a. -2 b. 54 c. 28 d. 66 e. 45

2. Compute: $\frac{4}{5} + \frac{1}{8}$

- a. $\frac{5}{13}$ b. $\frac{1}{10}$ c. $\frac{5}{40}$ d. $\frac{37}{40}$ e. $\frac{28}{40}$

3. Divide: $\frac{5}{7} \div \frac{3}{14}$

- a. $\frac{15}{68}$ b. $3\frac{1}{3}$ c. $\frac{3}{10}$ d. $1\frac{3}{7}$ e. $2\frac{1}{7}$

4. Simplify: $\frac{2}{5} + \frac{7}{10} \cdot \frac{3}{2} - \frac{4}{15}$

- a. $1\frac{13}{35}$ b. $1\frac{9}{10}$ c. $1\frac{11}{60}$ d. 0 e. $1\frac{16}{45}$

5. Jill is making bookmarks for a fund-raising sale. Each bookmark costs \$1.00 to make. If she sells the bookmarks for \$1.50 each, how many will she have to sell to make a profit of exactly \$20.00?

- a. 10 b. 15 c. 20 d. 25 e. 40

6. What is the average (arithmetic mean) of 11, 8, 4, 6, 7, 3 and 5?

- a. $4\frac{6}{7}$ b. $5\frac{3}{4}$ c. $6\frac{2}{7}$ d. 6.5 e. $7\frac{2}{3}$

7. Simplify: $42 + 6 \div 3 - 4$

- a. 12 b. 36 c. 7 d. 40 e. 48

8. Simplify: $\frac{3^4 - 2^3}{13 - 5}$

- a. $-\frac{1}{4}$ b. $9\frac{1}{8}$ c. $\frac{6}{8}$ d. $\frac{3}{4}$ e. 0

9. John pays \$70 for a new coat, which is 35% of the original cost. What was the original cost?

- a. \$245 b. \$105 c. \$200 d. \$210 e. \$135

10. A dress has been marked down 25% and now sells for \$27. What was the original price?
 a. \$52.00 b. \$45.00 c. \$33.75 d. \$40.75 e. \$36.00
11. The amount for food at a local restaurant is \$32.45. If tax is $6\frac{1}{2}\%$, what is your total bill without the tip?
 a. \$21.09 b. \$53.54 c. \$32.52 d. \$2.11 e. \$34.56
12. If three pounds of apples cost \$1.80, what is the cost of 12 pounds?
 a. \$21.60 b. \$15.40 c. \$7.20 d. \$12.60 e. \$5.40
13. The largest prime factor of 80 is:
 a. 2 b. 3 c. 5 d. 8 e. 11
14. What is the least common multiple of 6, 8 and 18?
 a. 12 b. 18 c. 24 d. 72 e. 144
15. How many yards of material remain from a 30-yard length after two pieces, each $2\frac{1}{2}$ yards long, and four pieces, each $3\frac{1}{4}$ yards long, are removed?
 a. $5\frac{3}{4}$ yards b. 12 yards c. $12\frac{1}{4}$ yards d. 24 yards e. 18 yards
16. Ben is making wooden toys for an arts and crafts sale. Each toy costs Ben \$1.80 to make. If he sells the toys for \$3.00 each, how many will he have to sell to make a profit of \$36.00?
 a. \$1.20 b. 12 c. 20 d. 30 e. 40
17. What is the meaning of 5^3 ?
 a. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$ b. 15 c. $3 \cdot 5$ d. $5 \cdot 5 \cdot 5$ e. $\frac{3}{5}$
18. Multiply (1.8)(8.5)
 a. 1.43 b. 153 c. 0.153 d. 1.53 e. 15.3
19. What is 40% of 90?
 a. 18 b. 50 c. 24 d. 36 e. 45
20. Five pieces of wire are cut from a length of wire that is 50 feet long. One of the pieces is $12\frac{2}{3}$ feet long. Two of the pieces are $5\frac{1}{4}$ feet long each. Two of the pieces are $6\frac{1}{2}$ feet long each. How many feet of wire are left from the original length?
 a. $36\frac{1}{6}$ feet b. $35\frac{3}{5}$ feet c. $13\frac{5}{6}$ feet d. $14\frac{2}{5}$ feet e. 14 feet

21. Find the missing number, x , that makes this proportion true. $\frac{2}{9} = \frac{x}{11}$
- a. 4 b. $\frac{9}{22}$ c. $2\frac{4}{9}$ d. 13 e. $\frac{11}{9}$
22. A man, 6 feet tall, is standing 24 feet from a street light. The length of his shadow produced by the street light is 4 feet. Find the height of the street light.
- a. 16 feet b. 24 feet c. 42 feet d. 96 feet e. 168 feet
23. Donna drives her delivery van 800 miles in 3 days. At this rate, how far will she drive in 15 days?
- a. 53.3 miles b. 12,000 miles c. 4000 miles d. 266.7 miles e. 160 miles
24. It takes 60 oz of grass seed to seed 3000 sq ft of lawn. What is the rate in ounces per square foot?
- a. $\frac{2\text{oz}}{\text{sq ft}}$ b. 180,000 oz c. $\frac{50\text{ sq ft}}{\text{oz}}$ d. $\frac{0.02\text{oz}}{\text{sq ft}}$ e. $\frac{60\text{oz}}{\text{sq ft}}$
25. According to the 1980 census, the population of Los Angeles County was approximately 7.5 million. In 1990 the population was approximately 9 million. Find the percent of increase of the population.
- a. 1.5 million b. 83.3% c. 16.7% d. 0.2% e. 20%
26. An 8-lb turkey breast contains 36 servings of meat. How many pounds of turkey breast would be needed for 54 servings?
- a. 6.75 lbs b. 4.5 lbs c. 432 lbs d. 12 lbs e. 5.33 lbs
27. The temperature in Minneapolis was 4° on December 3. In the next 3 days, the temperature dropped 2° , then dropped 5° , and then dropped 10° . What was the temperature on December 6?
- a. -13° b. -10° c. -7° d. 21° e. 25°
28. Add these 2 numbers and give the result in scientific notation: 3,470,000 and 750,000
- a. 42.2×10^5 b. 4.22×10^6 c. 2.72×10^6 d. 4.22×10^{-6} e. 2.72×10^{-6}
29. If x pairs of shoes cost n dollars, how much will y pairs cost?
- a. $\frac{ny}{x}$ b. nx c. ny d. $\frac{xy}{n}$ e. $\frac{nx}{y}$
30. What is the least common denominator of these fractions: $\frac{4}{5}, \frac{1}{2}, \frac{7}{10}, \frac{3}{8}$?
- a. 2 b. 10 c. 80 d. 800 e. 40
31. Four adult tickets to a show cost \$8.00 each. Six child tickets cost \$5.00 each. What was the average cost of the tickets?
- a. \$6.50 b. \$62.00 c. \$31.00 d. \$7.00 e. \$6.20

32. 10% of a class received an A on a test. Half of those remaining received a B on the test. What percent of the class received a C, D, or F?
- a. 95% b. 40% c. 60% d. 45% e. 55%
33. Four specific and complete lengths of fabric are needed for a project:
 2.6 yds., $3\frac{1}{2}$ yds., $5\frac{1}{4}$ yds., 4.1 yds.
 If the fabric comes in only 8 yd. lengths, how many of the 8 yd. lengths should be purchased?
- a. 18.45 b. 24 c. 4 d. 17 e. 2
34. $\frac{2^5 - 3^2 - 4}{7^2 - 5^2 - 1^3} =$
- a. -5 b. $\frac{19}{23}$ c. $\frac{3}{14}$ d. $\frac{9}{21}$ e. 3

Answers to Pre-Algebra Topics COMPASS Review

- | | | |
|-------|-------|-------|
| 1. d | 13. c | 25. e |
| 2. d | 14. d | 26. d |
| 3. b | 15. b | 27. a |
| 4. c | 16. d | 28. b |
| 5. e | 17. d | 29. a |
| 6. c | 18. e | 30. e |
| 7. d | 19. d | 31. e |
| 8. b | 20. c | 32. d |
| 9. c | 21. c | 33. e |
| 10. e | 22. c | 34. b |
| 11. e | 23. c | |
| 12. c | 24. d | |

Solutions to Pre-Algebra Topics COMPASS review

1. Simplify: $22 + (-8) + 32 - (-12) + 8$

$$22 + (-8) + 32 - (-12) + 8 = 14 + 32 - (-12) + 8 = 14 + 32 + 12 + 8 = 46 + 12 + 8 = 58 + 8 = 66$$

2. Compute: $\frac{4}{5} + \frac{1}{8}$

$$\frac{4}{5} + \frac{1}{8} = \frac{4}{5} \cdot \frac{8}{8} + \frac{1}{8} \cdot \frac{5}{5} = \frac{24+5}{40} = \frac{29}{40}$$

3. Divide: $\frac{5}{7} \div \frac{3}{14}$

$$\frac{5}{7} \div \frac{3}{14} = \frac{5}{7} \cdot \frac{14}{3} = \frac{5 \cdot 2}{3} = \frac{10}{3} = 3\frac{1}{3}$$

4. Simplify: $\frac{2}{5} + \frac{7}{10} \cdot \frac{3}{2} - \frac{4}{15}$

Remember PEMDAS: Parentheses Exponents Multiplication Division Addition Subtraction

$$\frac{2}{5} + \frac{7}{10} \cdot \frac{3}{2} - \frac{4}{15} = \frac{2}{5} + \frac{21}{20} - \frac{4}{15} = \frac{2}{5} \cdot \frac{12}{12} + \frac{21}{20} \cdot \frac{3}{3} - \frac{4}{15} \cdot \frac{4}{4} = \frac{24+63-16}{60} = \frac{71}{60} = 1\frac{11}{60}$$

5. Jill is making bookmarks for a fund-raising sale. Each bookmark costs \$1.00 to make. If she sells the bookmarks for \$1.50 each, how many will she have to sell to make a profit of exactly \$20.00?

Jill makes \$.50 profit per bookmark. $\frac{\$20.00}{\$0.50} = 40$

6. What is the average (arithmetic mean) of 11, 8, 4, 6, 7, 3 and 5?

$$\frac{11+8+4+6+7+3+5}{7} = \frac{44}{7} = 6\frac{2}{7}$$

7. Simplify: $42 + 6 \div 3 - 4$

$$42 + 6 \div 3 - 4 = 42 + 2 - 4 = 44 - 4 = 40$$

8. Simplify: $\frac{3^4 - 2^3}{13 - 5}$

$$\frac{3^4 - 2^3}{13 - 5} = \frac{81 - 8}{8} = \frac{73}{8} = 9\frac{1}{8}$$

9. John pays \$70 for a new coat, which is 35% of the original cost. What was the original cost?

Percent equation: $70 = 35\%$ of x

$$70 = (0.35)(x)$$

$$\frac{70}{.35} = x$$

$$x = 200$$

10. A dress has been marked down 25% and now sells for \$27. What was the original price?
 If the dress has been marked down 25%, that means the current selling price is 75% of the original price.
 Therefore \$27 is 75% of what number?
 $27 = 75\% \text{ of } x$
 $27 = (0.75)(x)$
 $\frac{27}{.75} = x$
 $x = \$36.00$

11. The amount for food at a local restaurant is \$32.45. If tax is $6\frac{1}{2}\%$, what is your total bill without the tip?
 The amount of tax is $(32.45)(.065) = 2.10925$ or \$2.11
 Total bill is: amount for the food + tax.
 $\$32.45 + \$2.11 = \$34.56$

12. If three pounds of apples cost \$1.80, what is the cost of 12 pounds?
 $\frac{3}{1.80} = \frac{12}{x}$
 $3x = 12(1.80)$
 $x = \frac{12(1.80)}{3}$
 $x = \$7.20$

13. The largest prime factor of 80 is:
 Write 80 as a product of prime factors: $2 \times 2 \times 2 \times 2 \times 5$. Five is the largest prime factor.

14. What is the least common multiple of 6, 8 and 18?
 Write each number as a product of prime factors.
 $6 = 2 \times 3$
 $8 = 2 \times 2 \times 2$
 $18 = 2 \times 3 \times 3$
 The factors of each number, 6, 8 and 18 must be represented in the least common multiple. The least common multiple is $2 \times 2 \times 2 \times 3 \times 3 = 72$.

15. How many yards of material remain from a 30-yard length after two pieces, each $2\frac{1}{2}$ yards long, and four pieces, each $3\frac{1}{4}$ yards long, are removed? Total amount to start with is 30 yards.
 Total amount removed: $(2)\left(\frac{5}{2}\right) + (4)\left(\frac{13}{4}\right) = 5 + 13 = 18$
 (total amount at start) – (total amount removed) = (total amount remaining)
 $30 \text{ yards} - 18 \text{ yards} = 12 \text{ yards}$

16. Ben is making wooden toys for an arts and crafts sale. Each toy costs Ben \$1.80 to make. If he sells the toys for \$3.00 each, how many will he have to sell to make a profit of \$36.00?

For each toy, Ben makes \$1.20 (\$3.00 - \$1.80)

$$\frac{\text{Profit desired}}{\text{profit per toy}} = \text{number of toys} \Rightarrow \frac{\$36.00}{\$1.20} = 30$$

17. What is the meaning of 5^3 ?

Repeat 5 three times as a factor: $5 \times 5 \times 5$.

18. Multiply (1.8)(8.5)

15.3

19. What is 40% of 90?

$$x = (.40)(90)$$

$$x = 36$$

20. Five pieces of wire are cut from a length of wire that is 50 feet long. One of the pieces is $12\frac{2}{3}$ ft. long. Two

of the pieces are $5\frac{1}{4}$ feet long each. Two of the pieces are $6\frac{1}{2}$ feet long each. How many feet of wire are

left from the original length?

(Total amount at start) – (total amount of pieces) = amount left

$$\text{Total amount of pieces} = \frac{38}{3} + (2)\left(\frac{21}{4}\right) + (2)\left(\frac{13}{2}\right) =$$

$$\frac{38}{3} + \frac{21}{2} + \frac{26}{2} = \frac{38}{3} \cdot \frac{2}{2} + \frac{21}{2} \cdot \frac{3}{3} + \frac{26}{2} \cdot \frac{3}{3} = \frac{76+63+78}{6} = \frac{217}{6} = 36\frac{1}{6}$$

(Total amount at start) – (total amount of pieces) = amount left

$$50 \text{ feet} - 36\frac{1}{6} \text{ feet} = 13\frac{5}{6} \text{ feet}$$

21. Find the missing number, x, that makes this proportion true. $\frac{2}{9} = \frac{x}{11}$

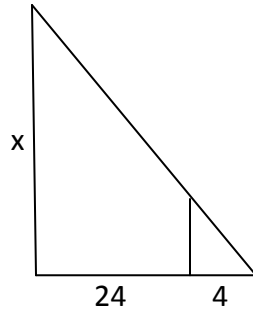
Cross multiply: $9x = (2)(11)$

$$9x = 22$$

$$x = \frac{22}{9}$$

$$\frac{22}{9} = 2\frac{4}{9}$$

22. A man, 6 feet tall, is standing 24 feet from a street light. The length of his shadow produced by the street light is 4 feet. Find the height of the street light.



Use similar triangles and set up a proportion:

$$\frac{\text{height of street light}}{\text{total length}} = \frac{\text{height of man}}{\text{length of shadow}}$$

$$\frac{x}{28} = \frac{6}{4}$$

$$4x = (6)(28)$$

$$4x = 168$$

$$x = \frac{168}{4}$$

$$x = 42 \text{ feet}$$

23. Donna drives her delivery van 800 miles in 3 days. At this rate, how far will she drive in 15 days?

Set up a proportion: $\frac{800 \text{ miles}}{3 \text{ days}} = \frac{x \text{ miles}}{15 \text{ days}}$

$$3x = (800)(15)$$

$$3x = 12,000$$

$$x = 4000 \text{ miles}$$

24. It takes 60 oz of grass seed to seed 3000 sq ft of lawn. What is the rate in ounces per square foot?

To find the rate, set up the ratio with proper units of measurement in the numerator and denominator and divide so the numerical value in the denominator is 1.

$$\frac{60\text{oz.}}{3000\text{sq.ft.}} \Rightarrow \frac{\frac{60}{3000}}{\frac{3000}{3000}} \Rightarrow \frac{.02\text{oz.}}{1\text{sq.ft.}}$$

25. According to the 1980 census, the population of Los Angeles County was approximately 7.5 million. In 1990 the population was approximately 9 million. Find the percent of increase of the population.

To find the percent of increase calculate $\frac{\text{new value} - \text{old value}}{\text{old value}}$ and then change the decimal answer to a percent.

$$\frac{9 - 7.5}{7.5} = .2 = 20\%$$

26. An 8-lb turkey breast contains 36 servings of meat. How many pounds of turkey breast would be needed for 54 servings?

Set up a proportion: $\frac{8 \text{ lbs}}{36 \text{ servings}} = \frac{x \text{ lbs}}{54 \text{ servings}}$

$$36x = (8)(54)$$

$$36x = 432$$

$$x = 12 \text{ lbs}$$

27. The temperature in Minneapolis was 4° on December 3. In the next 3 days, the temperature dropped 2° , then dropped 5° , and then dropped 10° . What was the temperature on December 6?

$$4 - 2 - 5 - 10$$

$$4 + (-2) + (-5) + (-10)$$

$$2 + (-5) + (-10)$$

$$(-3) + (-10)$$

$$-13$$

28. Add these 2 numbers and give the result in scientific notation: 3,470,000 and 750,000

$$3,470,000 + 750,000 = 4,220,000$$

To put the number into scientific notation, place the decimal point after the first non-zero digit, 4.

That means that the decimal point would move 6 places to the right to get 4,220,000. So, multiply by 10^6 .

$$= 4.22 \times 10^6$$

29. If x pairs of shoes cost n dollars, how much will y pairs cost?

$$\frac{x}{n} = \frac{y}{?}$$

$$(x) (?) = (n) (y)$$

$$? = \frac{(n)(y)}{x}$$

$$? = \frac{ny}{x}$$

30. What is the least common denominator of these fractions?

$$\frac{4}{5}, \frac{1}{2}, \frac{7}{10}, \frac{3}{8}$$

State each denominator as the product of prime factors:

$$5 = 5, \quad 2 = 2, \quad 10 = 2 \times 5, \quad 8 = 2 \times 2 \times 2$$

The least common denominator must contain each of the prime factors. Each prime factor must be included as many times as necessary to be sure that each denominator is fully represented:

There need to be three 2's. There needs to be one 5.

$$2 \times 2 \times 2 \times 5$$

$$8 \times 5$$

40 is the least common denominator.

31. Four adult tickets to a show cost \$8.00 each. Six child tickets cost \$5.00 each. What was the average cost of the tickets?

$$4 \times \$8.00 = \$32.00 \text{ for the adult tickets.}$$

$$6 \times \$5.00 = \$30.00 \text{ for the child tickets.}$$

$$\$32.00 + \$30.00 = \$62.00$$

Divide \$62.00 by the ten people who have tickets, to get \$6.20. This is the average cost of the tickets.

32. 10% of a class received an A on a test. Half of those remaining received a B on the test. What percent of the class received a C, D, or F?

$$100\% - 10\% = 90\% \text{ that is left for grades B, C, D, or F.}$$

$$\frac{1}{2} \text{ of } 90\% \text{ is } 45\% \text{ that received a grade of B.}$$

$$100\% - 10\% - 45\% = 45\% \text{ remaining for those a C, D, or F.}$$

33. Four specific and complete lengths of fabric are needed for a project:

$$2.6 \text{ yds., } 3\frac{1}{2} \text{ yds., } 5\frac{1}{4} \text{ yds., } 4.1 \text{ yds.}$$

If the fabric comes in only 8 yd. lengths, how many of the 8 yd. lengths should be purchased?

$$3\frac{1}{2} = 3.5$$

$$5\frac{1}{4} = 5.25$$

$$2.6 + 3.5 + 5.25 + 4.1 = 15.45 \text{ yds are needed all together.}$$

Since 2 of the 8 yd. lengths = 16 yds, it appears that 2 lengths are necessary.

Also check to be sure that each of the 4 pieces of fabric will be complete:

$$2.6 \text{ and } 5.25 \text{ add up to } 7.85 \text{ yds, which can be taken from one of the } 8 \text{ yd. pieces.}$$

$$3.5 + 4.1 = 7.6 \text{ yds, which can be taken from the other } 8 \text{ yd. piece.}$$

$$34. \frac{2^5 - 3^2 - 4}{7^2 - 5^2 - 1^3} =$$

$$\frac{2^5 - 3^2 - 4}{7^2 - 5^2 - 1^3} = \frac{32 - 9 - 4}{49 - 25 - 1} = \frac{23 - 4}{24 - 1} = \frac{19}{23}$$