

Pre-Algebra Topics COMPASS Review - revised Summer 2013

You will be allowed to use a calculator on the COMPASS test. Acceptable calculators are basic calculators, scientific calculators, and approved graphing calculators. For more information, see the JCCC Testing Services website at <http://www.jccc.edu/testing/> or call 913-469-4439.

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. A blouse that sold for \$59 was reduced 30%. After 6 months it was raised 30%. What was the last price of the blouse?

- a. \$59 b. \$53.69 c. \$41.30 d. \$17.7 e. \$30.09

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

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

7. 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

8. 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. \$94.50

9. A clothing store purchased dresses for \$70.00. The dresses were marked up 50% and later reduced 30%. Compared to the original cost, what is the overall % change?

- a. 20% b. 5% c. 15% d. 30% e. 35%

10. The amount for food at a local restaurant is \$32.45. If tax is $6\frac{1}{2}\%$, what is the total bill without the tip?
- a. \$21.09 b. \$53.54 c. \$32.52 d. \$2.11 e. \$34.56
11. 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
12. Sam bought thirty books from a book dealer for \$2.00 each, and as a promotion, the dealer gave him five free copies. Sam then sold all the books he got from the dealer for \$5.00 each. What was the profit Sam made?
- a. \$3.00 b. \$105 c. \$115 d. \$90 e. \$175
13. Complete the following: 4320 min = _____ days
- a. 3 days b. 6 days c. 12 days d. 18 days e. 5 days
14. 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
15. 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
16. Find 50% of 80% of 1000.
- a. 300 b. 400 c. 1300 d. 40 e. 30
17. Three points A, B, C lie on a straight line. If B is equidistant from A and C, write the ratio of the distance from A to B to the distance from A to C.
- a. 1:1 b. 2:1 c. 2:1 d. 1:2 e. 2:2
18. Dale loves betting on horses. In the first race, he loses 20% of his \$100 on Sleepy Child. In the second race, he bets his remaining money on Sir Speedy who wins. What percent gain does Dale need to receive from his winning to recover his loss in the first race?
- a. 125% b. 25% c. 20% d. 80% e. 100%
19. 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. $\frac{11}{9}$
20. In an office building, 3 out of 5 employees drink coffee. If 360 employees drink coffee, how many employees are there?
- a. 6000 b. 600 c. 216 d. 1800 e. 400

21. 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
22. It takes 60 oz of grass seed to seed 3000 sq ft of lawn. What is the rate in ounces per square foot?
- a. $\frac{2oz.}{sq.ft.}$ b. 180,000 oz. c. $\frac{50sq.ft.}{oz.}$ d. $\frac{0.02oz.}{sq.ft.}$ e. $\frac{60oz.}{sq.ft.}$
23. 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%
24. 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
25. 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°
26. 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}
27. 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. $\frac{nx}{y}$
28. In a history class, 3 out of 8 students are male. If there are 40 students in the class, how many more female than male students are there?
- a. 15 b. 10 c. 25 d. 5 e. 20
29. 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
30. 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%
31. 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

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

- a. -5 b. $\frac{19}{23}$ c. $\frac{3}{14}$ d. $\frac{9}{21}$ e. 3

33. 120 students: Freshman, Sophomores, Juniors and Seniors were in an auditorium. 50% of these students were Freshman and 20% of the students were Sophomores. The number of Juniors was the same as the number of Sophomores. What percent of the students were Seniors?

- a. 10% b. 36% c. 12% d. 30% e. 40%

34. Bryne took an English exam involving 30 reading and 20 writing questions. She got 80% of the reading questions correct and 60% of the writing correct. What percent did she get correct of the 50 total questions on the exam?

- a. 36% b. 70% c. 75% d. 72% e. 45%

35. In a meeting between Republican and Democratic politicians on Capitol Hill, there were 60 Democrats. If this represented 40% of the politicians present, then how many Republicans were in the meeting?

- a. 90 b. 36 c. 150 d. 24 e. 40

36. The price to ride in a taxi in NYC is \$2.00 for the first one-quarter mile and \$1.20 for each additional quarter mile. However after 10:00 p.m. there is a \$2.00 surcharge. How much will it cost (before tip) for Jackie to ride in a taxi one and a half miles at 12:00 noon?

- a. \$12.00 b. \$6.80 c. \$8.00 d. \$10.00 e. \$7.20

Answers to Pre-Algebra Topics COMPASS Review

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|-------|-------|-------|
| 1. d | 13. a | 25. a |
| 2. d | 14. b | 26. b |
| 3. b | 15. d | 27. a |
| 4. c | 16. b | 28. b |
| 5. b | 17. d | 29. e |
| 6. d | 18. b | 30. d |
| 7. b | 19. c | 31. e |
| 8. c | 20. b | 32. b |
| 9. b | 21. c | 33. a |
| 10. e | 22. d | 34. d |
| 11. c | 23. e | 35. a |
| 12. c | 24. d | 36. c |

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: $\frac{4}{5} + \frac{1}{8}$

$$\frac{4}{5} + \frac{1}{8} = \frac{4 \cdot 8}{5 \cdot 8} + \frac{1 \cdot 5}{8 \cdot 5} = \frac{32 + 5}{40} = \frac{37}{40}$$

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

$$\frac{5}{7} \div \frac{3}{14} = \frac{5}{7} \cdot \frac{14}{3} = \frac{5 \cdot 2}{3} \text{ (reduce)} = \frac{10}{3} = 3\frac{1}{3}$$

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

Remember PEMDAS: Parentheses Exponents Multiplication Division Addition Subtraction

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

5. A blouse that sold for \$59 was reduced 30%. After 6 months it was raised 30%. What was the last price of the blouse?

$$59 \times .70 = 41.30$$

$$41.30 \times 1.30 = 53.69 \text{ The last price of the blouse was } \$53.69.$$

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

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

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

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

8. 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

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

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

$$x = \$200$$

9. A clothing store purchased dresses for \$70.00. The dresses were marked up 50% and later reduced 30%. Compared to the original cost, what is the overall % change?

$$50\% \text{ markup: } \$70 \times 1.50 = \$105$$

$$\text{Reduced } 30\%: \$105 \times .70 = 73.50.$$

Subtract: $73.50 - 70.00$ to find the difference between the final cost and the original cost.

$$\text{Divide this difference by the original cost to find the overall percent change: } \frac{3.50}{70} = .05 \rightarrow 5\%$$

10. The amount for food at a local restaurant is \$32.45. If tax is $6\frac{1}{2}\%$, what is the 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.

$$\$32.45 + \$2.11 = \$34.56$$

11. If three pounds of apples cost \$1.80, what is the cost of 12 pounds?

$$\frac{3}{1.80} = \frac{12}{x}$$

$$3x = 12(1.80)$$

$$x = \frac{12(1.80)}{3}$$

$$x = \$7.20$$

12. Sam bought 30 books for \$2.00 each and sold them for \$5.00 each. Sale price – cost = \$3.00 profit for each book.

Profit from 30 books $\rightarrow 30 \times \$3.00 = \90.00

Profit from 5 free books $\rightarrow 5 \times \$5.00 = \25.00

Total profit is $\$90.00 + \$25 = \$115.00$

$$13. \frac{4320 \text{ min}}{1} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ day}}{24 \text{ hrs}} = \frac{4320 \text{ days}}{1440} = 3 \text{ days}$$

14. 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.

$$\text{Total amount removed: } (2)\left(\frac{5}{2}\right) + (4)\left(\frac{13}{4}\right) = 5 + 13 = 18 \text{ yards}$$

(total amount at start) – (total amount removed) = (total amount remaining)

We have 30 yards – 18 yards = 12 yards of material remaining

15. 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)

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

16. Find 50% of 80% of 1000

$$.8 \times 1000 = 800$$

$$800 \times .5 = 400$$

17. B must be the midpoint between A and C, if B is equidistant from both A and C.

$$\frac{A \text{ to } B}{A \text{ to } C} = \frac{1}{2} \text{ or } 1:2$$

18. Dale loses 20% of \$100 $\rightarrow .20(\$100) = \$20.00 \rightarrow \$100 - \$20 = \$80$ left after losing the first race.
To calculate the percent gain, we first need to find a number "x" which will be multiplied by the remaining \$80 to get back to the original \$100.

$$80x = 100$$

$$x = \frac{100}{80} = 1.25; 125\% - 100\% = 25\% \text{ gain}$$

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

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

$$9x = 22$$

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

20. In an office building, 3 out of 5 employees drink coffee. If 360 employees drink coffee, how many employees are there?

Set up a proportion: $\frac{3}{5} = \frac{360}{x}$ *Cross multiply:*

$$3x = (5)(360)$$

$$3x = 1800$$

$$x = 600$$

21. 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: $\frac{800 \text{ miles}}{3 \text{ days}} = \frac{x \text{ miles}}{15 \text{ days}}$

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

$$3x = 12,000$$

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

22. 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.

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

23. 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.

$$\frac{9 - 7.5}{7.5} = 0.2 = 20\%$$

24. 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: $\frac{8 \text{ lbs}}{36 \text{ servings}} = \frac{x \text{ lbs}}{54 \text{ servings}}$

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

$$36x = 432$$

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

25. 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?

$$4 - 2 - 5 - 10 =$$

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

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

$$(-3) + (-10) = -13^\circ \text{ on December 6}$$

26. 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 left and the exponent is positive. To get 4,220,000 you would multiply by 10^6 .

$$= 4.22 \times 10^6$$

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

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

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

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

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

28. In a history class, 3 out of 8 students are male. If there are 40 students in the class, how many more female than male students are there?

Set up a proportion: $\frac{3 \text{ male students}}{8 \text{ total students}} = \frac{x}{40}$

Then cross multiply: $8x = (3)(40)$

$$8x = 120$$

$$x = 15 \text{ male students}$$

There are 15 males are in the history class.

Total number of students – number of males = number of females

$$40 \text{ total students} - 15 \text{ males} = 25 \text{ females}$$

25 females – 15 males gives us 10 more females than males in the class.

29. 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 for the adult tickets.
 $6 \times \$5.00 = \30.00 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.
30. 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?
 $100\% - 10\% = 90\%$ that is left for grades B, C, D, or F.
 $\frac{1}{2}$ of 90% is 45% that received a grade of B.
 $100\% - 10\% - 45\% = 45\%$ remaining for those a C, D, or F.
31. 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?

 $3\frac{1}{2} = 3.5$
 $5\frac{1}{4} = 5.25$
 $2.6 + 3.5 + 5.25 + 4.1 = 15.45$ 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 and 5.25 add up to 7.85 yds, which can be taken from one of the 8 yd. pieces.
 $3.5 + 4.1 = 7.6$ yds, which can be taken from the other 8 yd. piece.
32. $\frac{2^5 - 3^2 - 4}{7^2 - 5^2 - 1^3} =$

 $\frac{2^5 - 3^2 - 4}{7^2 - 5^2 - 1^3} = \frac{32 - 9 - 4}{49 - 25 - 1} = \frac{23 - 4}{24 - 1} = \frac{19}{23}$
33. 120 students: Freshman, Sophomores, Juniors and Seniors were in an auditorium. 50% of these students were Freshman and 20% of the students were Sophomores. The number of Juniors was the same as the number of Sophomores. What percent of the students were Seniors?

 Total number of students \rightarrow 120
 % of Freshmen \rightarrow 50%
 % of Sophomores \rightarrow 20%
 % of Juniors \rightarrow equals % of Sophomores \rightarrow 20%
 % of Seniors \rightarrow ? (n)

 $\% \text{ Freshmen} + \% \text{ Sophomores} + \% \text{ Juniors} + \% \text{ Seniors} = 100\%$
 $50\% + 20\% + 20\% + n = 100\%$
 $90\% + n = 100\%$
 $n = 100\% - 90\%$
 $n = 10\%$
 Thus 10% of the students in the auditorium were Seniors.

34. Bryne took an English exam involving 30 reading and 20 writing questions. She got 80% of the reading questions correct and 60% of the writing correct. What percent did she get correct of the 50 total questions on the exam?

80% of 30 reading questions → 24 correct
60% of 20 writing question → 12 correct
Of the 50 questions total → 36 total correct

% correct of total questions on exam

$$\frac{36}{50} = 0.72 = 72\%$$

35. In a meeting between Republican and Democratic politicians on Capitol Hill, there were 60 Democrats. If this represented 40% of the politicians present, then how many Republicans were in the meeting?

Democrats = 60 politicians
Republicans = ? politicians
Total number of politicians = x

60 Democrats represents 40% of total politicians.

$$60 = .40x$$

$$\frac{60}{.40} = x$$

$$150 = x$$

Number of Republicans → 150 total politicians – 60 Democrats = 90
There were 90 Republicans in the meeting.

36. The price to ride in a taxi in NYC is \$2.00 for the first one-quarter mile and \$1.20 for each additional quarter mile. However after 10:00 p.m. there is a \$2.00 surcharge. How much will it cost (before tip) for Jackie to ride in a taxi one and a half miles at 12:00 noon?

1st quarter mile fare + \$1.20(each additional quarter mile) = total fare
Taxi ride is 1.5 miles, which is equal to 6 quarter miles
Total quarter miles = 6
6 quarter miles – 1st quarter mile = 5 additional quarter miles @ \$1.20 fare.

$$\begin{aligned} \$2.00 + \$1.20 (5) &= \\ \$2.00 + \$6.00 &= \$8.00 \end{aligned}$$

Note: The additional surcharge of \$2.00 did not apply here.