Skill Topics   Application Topics   Resources

Math OER

Math 52 Midterm

Name: Date:

*Calculators **are** allowed. Notes **are** allowed.*
Reduce fraction answers. No need to change improper fraction answers to mixed numerals.
Turn in a page with your own numbered step-by-step answers.

1 - §1.1. Reduce the fraction $^{6}/_{15}$

2 - §1.1. Reduce the fraction $^{37.5}/_{325}$

3 - §1.2. Find $^{12}/_{20} \div ^{4}/_{5}$

4 - §1.2. Find $^{27}/_{200} \div ^{0.3}/_{20}$ (For full credit, show the two steps of fraction division. You may use your calculator's fraction key to reduce the answer.)

5 - §1.2. Find the sum of $^{1}/_{4}$, $^{1}/_{6}$, and $^{9}/_{12}$ using common denominators.

6 - §1.3. Write 20.16 as a mixed number.

7 - §2.2. Which decimal is bigger, 0.8879 or 0.8899?

8 - §2.2. Round 8328.8328 to the nearest thousandth.

9 - §2.3. Simplify: $8{,}348.551 \times 10{,}000$

10 - §2.3. Simplify: $8{,}308.531 \div 0.0001$

11 - §2.4. Superbia City has a population of 832,800 people and an area of 3.2 square miles. Find its population density in people per square mile.

12 - §2.4. Brand A costs $33.39 for 16 ounces. Brand B costs $31.17 for 14 ounces. What is the price per ounce for each? Which is the better buy?

13 - §3.1. Simplify: $3 \times (4 + 18 \times 4) + 5 - 3 + 81 \div 3^2 \times 2^3$

14 - §3.4. Simplify: $^{71}/_{14} - [2\,\frac{1}{2} \times (-4\,\frac{1}{3} \div -2\,\frac{1}{3})]$

15 - §4.1. Change the temperature 50 degrees Fahrenheit into degrees Celsius.

16 - §4.1. Your friend is a 19-year-old very active woman who weighs 152 pounds and is 5 feet 9 inches tall. What is her estimated BMR?

17 - §4.1. Continuing the previous problem, what is her estimated DCI?

18 - §4.1. Continuing the previous problem, that same friend bicycles for 1 hour and 33 minutes. Bicycling burns 0.045 calories per pound per minute. How many calories does your friend burn? To how many 50-calorie *York Peppermint Pattie* mini-size candies is this equivalent?

19 - §4.1. Continuing the previous problem, what is that friend's maximum safe heart rate, minimum aerobic exercise heart rate, and maximum aerobic exercise heart rate?

20 - §4.2. Solve: $60 = p \times 3$

21 - §4.2. Solve: $70 \div q = 5$

22 - §4.2. A number divided by 108 equals 12. What is the number?

23 - §4.2. A number minus $^{1}/_{45}$ equals $^{1}/_{9}$. What is the number?

24 - §4.2. Solve: $7w = 3w + 8$

25 - §4.4. Check if this proportion is true or false: *4 to 21* is perhaps proportional to *24 to 126*.

26 - §4.4. Solve: $^{27}/_{10} = ^{n}/_{27}$

27 - §4.5. A car drives 33 miles on 7.3 gallons of gasoline. At this rate, how many gallons are used by a 551 mile trip?

28 - §4.5. The vet gives Jane a 855 ounce bag of dinosaur food containing 30 milligrams of medicine. Jane needs to give her dinosaur a dose of 3.3 milligrams of medicine. How many ounces of that dinosaur food should she feed her dinosaur?

29 - §4.5. A college is expanding from 380 to 1,349 students. It has 20 instructors. How many more instructors must it hire to maintain its student-to-faculty ratio?

30 - §4.5. A rectangular image on a web page has a length of 31 pixels and a width of 64 pixels. It needs to be resized to a length of 87 pixels. What will the new width be?

31 - §4.6. A respiratory therapist is administering oxygen to a patient. Each tank has 1,300 mL of oxygen at a pressure of 700 mmHg. Her equipment reduces the pressure the patient recieves to 300 mmHg. Use Boyle's Law to find the volume provided by each tank.

32 - §4.7. A graph of a line goes through the points (10, 11) and (16, 20). What is the slope of this line?

33 - §5.1. Write 20.551% in decimal format.

34 - §5.1. Write 68.38 in percent format.

35 - §5.1. Write the fraction $\frac{2}{200}$ as a decimal.

36 - §5.1. Write the fraction $\frac{3}{24}$ in percent format.

37 - §5.1. Write $9\frac{2}{5}$ % in fraction format.

38 - §5.2. What is 29% of 571?

39 - §5.2. 224.58 is what percent of 591?

40 - §5.2. 287.17 is 47% of what?

41 - §5.2. 22% of what is 25?

42 - §5.2. A certain car depreciates in value 23% during its first year. That car is worth $11,000 after its first year. What was its original cost?

43 - §5.2. Sally the Wonder Snail crawls 4,320 yards in 45 days. What percentage of a mile is this distance?

44 - §5.2. Sterling pays for a $967 payday loan for 30 days with a post-dated check for $988.46. What was the loan's simple interest rate?

45 - §5.4. Complete this quantity-value table.

Item	Grams	Grams %	Calories	Calories %
Fat	14 grams			
Carbohydrate			76 calories	
Protein	5 grams			

Show Answers

1 - §1.1. Divide both top and bottom by 3 to get $^2/_5$

2 - §1.1. First multiply both top and bottom by 10 to get $^{375}/_{3250}$. Then divide both top and bottom by 125 to get $^3/_{26}$

3 - §1.2. First flip the second fraction change division to multiplication: $^{12}/_{20} \times ^5/_4$

Then cancel the top right and bottom left: $^3/_{20} \times ^5/_1$

Then cancel the bottom right and top left: $^3/_4 \times ^1/_1$

Then multiply the fractions to find the final answer of $^3/_4$.

4 - §1.2. Do fraction division by flipping the second fraction and multiplying: $^{540}/_{60}$. Then reduce to get $^9/_1$.

5 - §1.2. The common denominator is 12. We add $^3/_{12} + ^2/_{12} + ^9/_{12} = ^{14}/_{12}$. The reduced fraction is $^7/_6$.

6 - §1.3. The whole number 20 just hangs out in front as a whole number. The decimal part is 16 *hundredths* so we write it as the fraction $^{16}/_{100}$. Then simplify the fraction part by dividing top and bottom by 4 to get **20** $^4/_{25}$.

7 - §2.2. the second number, **0.8899**

8 - §2.2. 8328.833

9 - §2.3. 4 scoots to the right gives an answer of **83,485,510**

Note: The previous problem is sometimes displayed wrong due to floating point arithmetic.

10 - §2.3. 4 scoots to the right gives an answer of **83,085,310**

11 - §2.4. Rounding to the nearest whole number gives us **260,250 people per square mile**.

12 - §2.4. Brand A costs $2.09 per ounce. Brand B costs $2.23 per ounce. **Brand A** is the better buy.

13 - §3.1. The amount in the parenthesis simplifies to 76. So the first term is $3 \times 76 = 228$.

The second and third terms are plain numbers: add 5 and subtract 3.

The fourth term involves two exponents. The first part becomes $81 \div 9 = 9$. The second exponent equals 8. Then $9 \times 8 = 72$.

Thus the entire list of terms is $228 + 5 - 3 + 72 = \mathbf{302}$.

14 - §3.4. The inner parenthesis becomes $^{13}/_7$ and then the bracket amount becomes $^{65}/_{14}$. The final subraction step results in $\mathbf{^6/_7}$

15 - §4.1. To change from Fahrenheit to Celsius we use the formula $C = (F - 32) \div 1.8$. So 50 degrees Fahrenheit becomes about **10.0 degrees Celsius**.

16 - §4.1. A woman's BMR = (weight × 4.55) + (height × 15.88) − (age × 5) + 5
= (152 × 4.55) + (69 × 15.88) − (19 × 5) + 5 ≈ **1,697 calories per day**.

17 - §4.1. The DCI for a very active woman is BMR × 1.82 ≈ **3,089 calories per day**.

18 - §4.1. 0.045 × 152 pounds × 93 minutes ≈ **636 calories**, equivalent to about 13 *York Peppermint Pattie* mini-size candies.

19 - §4.1. Our friend's maximum safe heart rate = 211 − (0.64 × age) = 211 − (0.64 × 19) = **199 beats per minute**. The upper limit for aerobic exercise = maximum safe heart rate × 0.85 ≈ **169 beats per minute**. The lower limit for aerobic exercise = maximum safe heart rate × 0.5 ≈ **99 beats per minute**

20 - §4.2. Divide both sides by 3 to get $p = \mathbf{20}$

21 - §4.2. Divide both sides by 5 to get $q = \mathbf{14}$

22 - §4.2. Rewrite the word problem as the equation $z \div 108 = 12$. To get z by itself we multiply both sides by 108. The answer is **1296**.

23 - §4.2. First notice that 45 will work as a common denominator. So change the second fraction to get $^1/_{45} + ^5/_{45}$. Then add numerators to get $^6/_{45}$. The reduced fraction is $\mathbf{^2/_{15}}$.

24 - §4.2. Subtract $3w$ from both sides. We get $4w = 8$. Divide both sides by 4 to get $w = \mathbf{2}$.

25 - §4.4. The cross products are 4 × 126 = 504 and 21 × 24 = 504. The proportion is **true**.

26 - §4.4. $n = 27 \times 27 \div 10 \approx$ **72.9**

27 - §4.5. The trip will use **121.9 gallons**.

28 - §4.5. There are 855 ÷ 30 = 28.5 ounces of dinosaur food for each milligram of medicine. So Jane needs to give her dinosaur about 3.3 × 28.5 = **94 ounces** of dinosaur food.

29 - §4.5. The old faculty-to-student ratio is 380 ÷ 20 = 19. The number of students is increasing by 969. So the college must hire 969 ÷ 19 = **51 more instructors**.

30 - §4.5. The scale factor is 2.8, so the new width will be **179 pixels**.

31 - §4.6. The product of the tank's volume and pressure is 1,300 mL × 700 mmHg = 910,000, so the new volume will be that product divided by the new pressure of 300 mmHg, resulting in **3033 mL**.

32 - §4.7. The difference in Y coordinates is 9 and the difference in X coordinates is 6. We divide to find the slope of **1.50**.

33 - §5.1. Use RIP LOP and scoot the decimal point twice to the left to get **0.20551**

34 - §5.1. Use RIP LOP and scoot the decimal point twice to the right to get **6,838%**

35 - §5.1. Do "top ÷ bottom" to get **0.01**.

36 - §5.1. First change the fraction into a decimal by using top ÷ bottom to get 0.125, then use RIP LOP and scoot the decimal point twice to the right to get **12.5%**

37 - §5.1. First change the mixed number into an improper fraction, still in percent format: $\frac{47}{5}$ %. Then replace the **%** symbol with $\times \frac{1}{100}$ and multiply. The result is $\frac{47}{500}$. Reduce if necessary. The answer is $\frac{47}{500}$.

38 - §5.2. Translate the percent sentence as $y = 0.29 \times 571 =$ **165.59**.

39 - §5.2. Translate the percent sentence as $224.58 = y \times 591$. Solve for y by dividing both sides by 591. The answer is **38%**.

40 - §5.2. Translate the percent sentence as $287.17 = 0.47 \times y$. Solve for y by dividing both sides by 0.47. The answer is **611**.

41 - §5.2. Translate the percent sentence as $0.22 \times y = 25$. Solve for y by dividing both sides by 0.22. The answer is about **113.64**.

42 - §5.2. Change the word problem into a percent sentence by asking *$11,000 is 77% of what?* Then translate the percent sentence as $11,000 = 0.77 \times y$. Solve for y by dividing both sides by 0.77 to get an answer of **$14,286**.

43 - §5.2. First multiply by 3 to change the distance to 12,960 feet. Then divide by 5,280 to find the fraction of a mile. The answer is about 2.455 miles. Finally, use RIP LOP to change the decimal into percent format. The rounded answer is **245% of a mile**.

44 - §5.2. Use the simple interest formula.

$$I = P \times r \times t = \$21.46 = \$967 \times r \times (30 \div 365)$$

We can isolate the rate by dividing by $967 and then dividing by $(30 \div 365)$.

Then we use RIP LOP to turn the decimal value into percent format.

Our final answer is $r =$ **27%**.

45 - §5.4. Here is the completed table.

Item	Grams	Grams %	Calories	Calories %
Fat	14 grams	37%	126 calories	57%
Carbohydrate	19 grams	50%	76 calories	34%
Protein	5 grams	13%	20 calories	9%