

NO CALCULATORS - DOUBLESIDED

TEAM MEMBER #1 - Operations and Simplifications

Multiple Choice: Select the letter of the most appropriate answer (rounding when appropriate) and shade in the corresponding region on the answer sheet. Assume no variable will cause an expression to be undefined.

Evaluate the expression.

1. $\frac{-6 \cdot 5 + 5 - (7 + 4)}{-6 \cdot 7 + 5}$

A. $\frac{36}{37}$

B. $\frac{71}{72}$

C. $\frac{69}{37}$

D. $\frac{1}{2}$

Evaluate the expression for $x = -2$, $y = 3$, and $a = -4$.

2. $\frac{-(x+3)^2 - 9y}{6 - a}$

A. $\frac{14}{5}$

B. $\frac{13}{5}$

C. -1

D. $-\frac{14}{5}$

Find the product.

3. $(-3x + 9y)(-2x + 10y + 1)$

A. $6x^2 - 18xy - 3x + 90y^2 + 9y$

B. $6x^2 - 48xy - 48y^2$

C. $6x^2 - 48xy - 3x + 90y^2 + 9y$

D. $6x^2 - 30xy - 3x + 90y^2$

Divide.

4. $\frac{64st^5 - 10t^8 + 256st^4}{8st^4}$

A. $8st - \frac{5t^4}{4s} + 32$

B. $8t - \frac{5t^4}{4s} + 32$

C. $8t - st^4 + 32$

D. $8t - \frac{t^4}{s} + 32$

Factor by any method.

5. $27p^3 - 1$

A. $(3p - 1)(9p^2 + 3p + 1)$

B. $(3p + 1)(9p^2 - 3p + 1)$

C. $(27p - 1)(p^2 + 3p + 1)$

D. $(3p - 1)(9p^2 + 1)$

Perform the indicated operations.

6. $\frac{k^2+12k+35}{k^2+15k+56} \cdot \frac{k^2+8k}{k^2+11k+30}$

A. $\frac{k}{k+6}$

B. $\frac{k^2+8k}{k+6}$

C. $\frac{k}{k^2+15k+56}$

D. $\frac{1}{k+6}$

7. $\frac{81x}{2(9x+1)} - \frac{1}{2x(9x+1)} + \frac{32}{x}$

A. $\frac{9(x+7)}{18x^2+2x}$

B. $\frac{9(x+7)}{2x}$

C. $\frac{81x^2+576x+63}{2x}$

D. $\frac{81x^2+576x+63}{18x^2+2x}$

Simplify. Assume all variables represent nonzero real numbers.

8. $\frac{9 + \frac{3}{x}}{\frac{x}{4} + \frac{1}{12}}$

A. $\frac{36}{x}$

B. 36

C. $\frac{x}{36}$

D. 1

Write the expression in lowest terms.

9. $\frac{x^3+125}{x+5}$

A. $x^2 - 25x + 5$

B. $x^2 - 5$

C. $x^2 + 25$

D. $x^2 - 5x + 25$

When done, or time is called, leave test booklet & answer sheet and exit quietly.

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TEAM MEMBER #2 - Exponents and Radicals

Multiple Choice: Select the letter of the most appropriate answer (rounding when appropriate) and shade in the corresponding region on the answer sheet. Assume no variable will cause an expression to be undefined.

Evaluate the expression.

10. $\left(\frac{4}{81}\right)^{-1/2}$

A. $\frac{2}{81}$

B. $\frac{9}{2}$

C. not a real number

D. $\frac{2}{9}$

Perform the indicated operation and write your answer with positive integer exponents.

11. $\frac{(mn)^{-1}}{m^{-2} + n^{-2}}$

A. $\frac{mn}{n+m}$

B. $\frac{m^2 + n^2}{mn}$

C. $\frac{n}{n^2 - m^2}$

D. $\frac{mn}{n^2 + m^2}$

Simplify the rational expression, and assume all variable expressions represent positive real numbers.

12. $\frac{16(x^2 - 2)^3 + 64x(x^2 - 2)^4}{256(x^2 - 2)^3}$

A. $\frac{1 + 4x^3 - 8x}{16}$

B. $\frac{1 - 4x^3 + 8x}{64}$

C. $\frac{1 + 4x^3 + 8x}{16}$

D. $\frac{1 - 4x^3 - 8x}{64}$

Perform the indicated operations. Write the answer using only positive exponents. Assume all variables represent positive real numbers.

13. $\left(\frac{x^{-4/3}}{b^{-8/7}}\right)^2 \left(\frac{b^{1/7}}{x^{1/5}}\right)^{-3}$

A. $\frac{x^{49/15}}{b^{19/7}}$

B. $\frac{b^{19/7}}{x^{49/15}}$

C. $\frac{x^{31/15}}{b^{13/7}}$

D. $\frac{b^{13/7}}{x^{31/15}}$

When done, or time is called, leave test booklet & answer sheet and exit quietly.

Simplify the expression. Assume all variables represent positive real numbers.

14. $\sqrt[5]{x^{17}y^8z^{14}}$

A. $xyz \sqrt[5]{x^2y^3z^4}$

B. $x^{15}y^5z^{10} \sqrt[5]{x^2y^3z^4}$

C. $x^3yz^2 \sqrt[5]{y^3z^4}$

D. $x^3yz^2 \sqrt[5]{x^2y^3z^4}$

15. $\sqrt{\frac{63a^2b}{c^2}}$

A. $\frac{3\sqrt{7a^2b}}{c}$

B. $\frac{9a\sqrt{7b}}{c}$

C. $\frac{a\sqrt{63b}}{c}$

D. $\frac{3a\sqrt{7b}}{c}$

Perform the indicated operations. Simplify.

16. $-4\sqrt{2} + 9\sqrt{8}$

A. $14\sqrt{2}$

B. $-14\sqrt{2}$

C. $5\sqrt{2}$

D. $22\sqrt{2}$

17. $6\sqrt[3]{m^7p^5} - 4m^2p\sqrt[3]{mp^2}$

A. 2

B. cannot be simplified

C. $10mp^2\sqrt[3]{mp^2}$

D. $2m^2p\sqrt[3]{mp^2}$

Rationalize the denominator. Assume that all variables represent nonnegative numbers and that the denominator is not zero.

18. $\frac{\sqrt{x} - \sqrt{y}}{\sqrt{7x} + \sqrt{3y}}$

A. $\frac{\sqrt{7x} - \sqrt{10xy} + \sqrt{3y}}{7x + 3y}$

B. $\frac{x\sqrt{7} - \sqrt{3xy} - \sqrt{7xy} + y\sqrt{3}}{7x - 3y}$

C. $\frac{\sqrt{7x} - \sqrt{10xy} + \sqrt{3y}}{7x - 3y}$

D. $\frac{x\sqrt{7} - \sqrt{3xy} - \sqrt{7xy} + y\sqrt{3}}{7x + 3y}$

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TEAM MEMBER #3 - Equations and Inequalities

Multiple Choice: Select the letter of the most appropriate answer (rounding when appropriate) and shade in the corresponding region on the answer sheet. Assume no variable will cause an expression to be undefined.

Solve the equation.

19. $2x^2 = -18x - 36$

A. $\{6, 3\}$

B. $\{6, -3\}$

C. $\{-3, -6\}$

D. $\{-6, -12\}$

20. $x^2 + 10x = -16$

A. $\{2, 8\}$

B. $\{-2, 8\}$

C. $\{2, -8\}$

D. $\{-2, -8\}$

21. $(2x - 1)(x + 1) = 3$

A. $\left\{\frac{1 \pm \sqrt{33}}{4}\right\}$

B. $\left\{\frac{1 \pm \sqrt{33}}{2}\right\}$

C. $\left\{\frac{-1 \pm \sqrt{33}}{4}\right\}$

D. $\left\{\frac{-1 \pm \sqrt{11}}{2}\right\}$

22. $x^3 + 64 = 0$

A. $\{-4, -2 \pm 2i\sqrt{6}\}$

B. $\{-4, 2 \pm 2i\sqrt{5}\}$

C. $\{-4, 2 \pm 2i\sqrt{3}\}$

D. $\{-4, -2 \pm 2i\}$

Solve the equation for the indicated variable. Assume no denominator is 0.

23. $M = \pi r^2 h d$, for r

A. $r = \frac{\pm \sqrt{M \pi h d}}{\pi h d}$

B. $r = \frac{\pm \sqrt{\pi M h d}}{h d}$

C. $r = \frac{\pm M \sqrt{\pi h d}}{\pi h d}$

D. $r = \pm \sqrt{\pi M h d}$

Solve the quadratic inequality. Write the solution set in interval notation.

24. $-3x^2 + 6x - 5 \leq 0$

A. $\left[-3, -\frac{1}{5}\right]$

B. \emptyset

C. $(-\infty, \infty)$

D. $\left[\frac{1}{3}, 5\right]$

Solve the inequality. Write the solution set in interval notation.

25. $x^3 + 4x^2 - 9x - 36 \geq 0$

A. $[-4, 3]$

B. $[-3, 3] \cup [4, \infty)$

C. $[-4, -3] \cup [3, \infty)$

D. $[-4, \infty)$

When done, or time is called, leave test booklet & answer sheet and exit quietly.

Solve the equation.

26. $|3x+7| - 6 = -10$

A. $\left\{-1, \frac{11}{3}\right\}$

B. $\left\{-\frac{11}{3}\right\}$

C. $\left\{1, -\frac{11}{3}\right\}$

D. \emptyset

Solve the inequality. Write the solution set in interval notation.

27. $|2x+8| < 13$

A. $\left(-\infty, -\frac{21}{2}\right) \cup \left(\frac{5}{2}, \infty\right)$

B. $\left(-\infty, -\frac{21}{2}\right)$

C. $(-\infty, 2)$

D. $\left(-\frac{21}{2}, \frac{5}{2}\right)$

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TEAM MEMBER #4 - Word Problems

Multiple Choice: Select the letter of the most appropriate answer (rounding when appropriate) and shade in the corresponding region on the answer sheet. Assume no variable will cause an expression to be undefined.

Solve the problem.

28. If a rock falls from a height of 90 meters above the ground, the height H (in meters) after x seconds can be approximated using the formula $H = 90 - 4.9x^2$. What is the height of the rock after 4 seconds?

A. -294.16 m B. 11.6 m C. 1361.6 m D. 70.4 m

29. The formula $C = \frac{5}{9}(F - 32)$ expresses the relationship between Fahrenheit temperature, F , and Celsius temperature, C . Use the formula to convert 50°F to its equivalent temperature on the Celsius scale.

A. 10°C B. 2°C C. 32°C D. 46°C

Solve the problem. Round to two decimal places unless otherwise indicated.

30. In the following formula, y is the minimum number of hours of studying required to attain a test score of x :

$$y = \frac{0.5x}{100.5 - x}. \text{ How many hours of study are needed to score 93?}$$

A. 99.96 hr B. 6.20 hr C. 12.47 hr D. 62.00 hr

Solve the problem.

31. If the lengths of the sides of a square are tripled, by what factor will the area change?

A. 6 B. 27 C. 9 D. 3

32. The cost of manufacturing clocks is given by $c = 25(n + 64)^{1/2}$, where c is the cost in dollars and n is the number produced. What is the cost when no clocks are produced?

A. \$25 B. \$200 C. \$40 D. \$1600

33. Levi borrowed \$7129 at 4% simple interest for 6 months. How much will the interest amount to? Round answers to the nearest cent if necessary.

A. \$118.82 B. \$166.34 C. \$143.78 D. \$142.58

34. A person's emotional quotient (EQ) is found by multiplying emotional age by 100 and dividing by chronological age. Using this information, if a 21 yr old person has an EQ of 97 what is that person's emotional age?

A. 20.37 years old B. 21 years old C. 23.6 years old D. 21.65 years old

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35. Walt made an extra \$10,000 last year from a part-time job. He invested part of the money at 2% and the rest at 3.75%. He made a total of \$270.00 in interest. How much was invested at 3.75%?
- A. \$6000 B. \$8000 C. \$4000 D. \$5000
36. Find the height of a moving box if its length is 29 in., its width is 36 in., and its surface area is 4038 in². Assume that the surface area includes the top of the moving box.
- A. 36 in. B. 29 in. C. 15 in. D. 15,660 in.

When done, or time is called, leave test booklet & answer sheet and exit quietly.

Answer Key

Testname: ALGEBRA MEDLEY TEAM

1. A
2. D
3. C
4. B
5. A
6. A
7. B
8. A
9. D
10. B
11. D
12. A
13. D
14. D
15. D
16. A
17. D
18. B
19. C
20. D
21. C
22. C
23. A
24. C
25. C
26. D
27. D
28. B
29. A
30. B
31. C
32. B
33. D
34. A
35. C
36. C

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