



Honors Precalculus

Due August 5th, 2024

Solve the problems without consulting a text. If you can solve at least half the problems correctly, you will likely do OK in Precalculus. For problems which you do not solve correctly, the questions should at least look familiar, and you should be able to solve such problems with the aid of a text and armed with the correct answers.

1. If $y = 3 - 4x$, determine the value of y corresponding to $x = -2$.
2. Given $f(x) = \frac{7}{3x + 14}$, determine $f(2)$.
3. Graph $y = -3x + 2$.
4. Find the x - and y -intercepts of the line $5x - 3y = 15$.
5. Find the slope of the line containing the points $P_1(3, -2)$ and $P_2(5, 6)$.
6. Determine the slope of the line $5x - 3y = 15$.
7. Find an equation for the line that contains the point $(-2, 3)$ and has slope $\frac{5}{7}$.
8. Are the lines $4x - 2y = 3$ and $7x + 3y = 7$ perpendicular?
9. Graph the solution set to $2x - 3y \leq 12$.
10. Solve the system $\begin{cases} y = 2x - 4 \\ y = 3x + 8 \end{cases}$.
11. By factoring the numerator and denominator, simplify $\frac{x^2 + x - 6}{x^2 + 2x - 3}$.
12. Multiply and simplify $\frac{x^2 - x - 6}{x^2y} \cdot \frac{xy^3}{x^2 - 6x + 9}$.
13. Divide and simplify $\frac{x^2 - 4}{x^4y^3} \div \frac{x^2 + 2x - 8}{x^4y^2}$.
14. Add: $\frac{5}{x - 2} + \frac{4}{x - 2}$.
15. Subtract and simplify: $\frac{2x + 1}{x^2 + x - 6} - \frac{x - 2}{x^2 + x - 6}$.

16. Add and simplify : $\frac{2x-1}{x^2+5x+6} + \frac{5}{x+2}$.

17. Solve: $\frac{2}{3x-2} = 5$.

18. Solve: $\frac{2}{x+4} = \frac{3}{x+1}$.

19. Solve: $\frac{x+6}{3} = \frac{2}{7}$.

20. Solve for r : $s = r + rt$.

21. Simplify: $(x^3y^9)^{\frac{4}{3}}$.

22. Simplify: $x^{-\frac{2}{3}}(x^{\frac{5}{3}} - x^{\frac{8}{3}})$.

23. Add: $\sqrt{80} - \sqrt{20}$.

24. Multiply: $(a+2b)(a-2b)$.

25. Multiply the complex numbers: $(2+4i)(3-2i)$.

26. Divide the complex numbers: $\frac{2+4i}{3-2i}$.

27. Solve by factoring: $3x^2 - 11x - 4 = 0$.

28. Solve by using the quadratic formula: $2x^2 + 10x + 3 = 0$.

29. Solve the inequality: $(x-5)(x+2) \leq 0$.

30. Graph the parabola $f(x) = x^2 + 2x - 3$.

Answers

(1) 11 (2) $\frac{7}{20}$ (3) The straight line through 2 on the y -axis and $\frac{2}{3}$ on the x -axis.

(4) x -intercept: 3, y -intercept: -5 (5) 4 (6) $5/3$

(7) Several different forms of the answer are possible. Reasonable choices are $7y = 5x + 31$, or $5x - 7y = -31$, or $y = \frac{5}{7}x + \frac{31}{7}$.

(8) No

(9) The part of the plane on and above the line through -4 on the y -axis and 6 on the x -axis.

(10) $x = -12, y = -28$ (11) $\frac{x-2}{x-1}$ (12) $\frac{y^2(x-2)}{x(x-3)}$ (13) $\frac{x+2}{y(x+4)}$ (14) $\frac{9}{x-2}$

(15) $\frac{1}{x-2}$ (16) $\frac{7}{x+3}$ (17) $x = \frac{4}{5}$ (18) $x = -10$ (19) $x = -\frac{36}{7}$

(20) $r = \frac{s}{1+t}$ (21) x^4y^{12} (22) $x - x^2$ (23) $2\sqrt{5}$ (24) $a^2 - 4b^2$ (25) $14 + 8i$

(26) $-\frac{2}{13} + \frac{16}{13}i$ (27) $x = 4, -\frac{1}{3}$ (28) $x = \frac{-5 \pm \sqrt{19}}{2}$

(29) The interval $[-2, 5]$ (30) the parabola opens upwards and its vertex is at the point $(-1, -4)$

PRECALCULUS READINESS TEST

All problems are to be done without the use of a graphing or scientific calculator.

Topic I – Rational Expressions

Simplify the following:

1. $\left(\frac{9x^2 - 12x}{x^2 + 1}\right)\left(\frac{2x^2 + 2}{9x^2 + 6x - 24}\right)$

2. $\frac{\left(1 - \frac{3}{x}\right)}{9 - x^2}$

3. $\left(\frac{6v^3}{u^2}\right)\left(\frac{-uv}{2v}\right)\left(\frac{1}{7v^2}\right)$

4. $\frac{-4}{9 - x^2} - \frac{2x + 1}{x^2 - 3x}$

5. $\frac{3}{(x + 2b)(x - b)} + \frac{2}{(3b - x)(x + 2b)} + \frac{1}{(x - 3b)(b - x)}$

6. $\left(\frac{2a}{b} - \frac{b}{a}\right)^{-2}$

7. $\frac{\left(\frac{xy^2}{x + y}\right)}{\left(\frac{x - y}{x^2 - y^2}\right)}$

8. $\frac{\left(\frac{m}{m - 3} - \frac{2m}{m^2 - 2m - 3}\right)}{\left(\frac{2}{m + 1} - \frac{1}{m}\right)}$

Topic II – Exponents and Radicals

9. Evaluate: $81^{-3/4}$

Simplify the following:

10. $\sqrt{6}\sqrt{15}$

11. $\sqrt{(a+b)(a^2-b^2)}$

12. $\sqrt{16x^2 + 24y^2 + 36z^2}$

13. $\frac{(3xy^{1/2})(4x^2y)^{-2}}{xy^{3/2}}$

14. $\frac{a^{-2}b^3c}{a^{-1}b^{-2}c^0}$

15. $\frac{a^{3x+2}}{a^{4-x}}$

16. $(m^{b+1})^{b-1}$

17. $\left(\frac{4^3x^{3/2}y^{4/3}}{16x^{-1/2}y^2}\right)^{-1/2}$

18. $(-125x^{18}y^{24})^{-2/3}$

19. $(\sqrt[4]{m^6})(2m\sqrt{m})$

20. $2\sqrt{12} + \sqrt{27} - \sqrt{48}$

Rationalize the following:

21. $\frac{x}{\sqrt[5]{4}}$

22. $\frac{\sqrt[3]{x}}{\sqrt[15]{x^2}}$

23. Solve for x: $3^{5x+2} = 27^{x-4}$

Topic III – Linear Equations, Inequalities, and Absolute Value

24. Solve for x: $3x = \frac{a}{b}(x-1)$

25. Solve for a : $\sqrt{a-2} + 3 = 7$

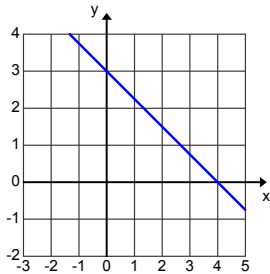
26. Solve for x : $\frac{3}{x} - \frac{2}{x+1} = \frac{5x+3}{x+1}$

27. Solve this system of equations: $\begin{cases} 2x + 3y = -5 \\ 5x - 2y = 8 \end{cases}$

28. Solve this system of equations: $\begin{cases} 3x = 4y \\ 2x + 3y = 17 \end{cases}$

29. If $m = -3$, evaluate $|3-m| + |-4| - |-m|$

30. Find the equation of this line:



31. Solve for x : $|5-2x| \leq 3$

32. Given the points (1, 1) and (3, 4), find the area of the right triangle formed by the line through those points, the x-axis, and $x = 3$.

Topic IV – Polynomials and Polynomial Equations

33. Solve for x : $x - 6x^{1/2} + 5 = 0$

34. Solve for x : $-4x^2 + 12x + 3 = 0$

35. Solve for x : $(x-2)(x-3) = 2$

36. If you wanted to complete the square, what would you add to both sides?
 $x^2 - 3x = 2$

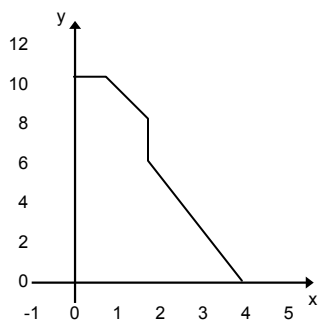
37. Solve for x : $2 = \sqrt{2x-5} - \sqrt{x-2}$

38. Simplify: $\frac{x^4 - 14x^2 + 3x + 34}{x - 2}$
39. Find the values of a so that the following has 2 distinct real roots: $2ax^2 - 12x - 7$
40. Solve for x : $x^2 - x - 42 > 0$
41. Graph: $y = x^2 - x - 6$
42. Graph: $|x + 2| = y$
43. Graph: $y = 2^x + 1$
44. Graph: $y = \frac{2}{x}$
45. If $x = 3$, $y = -1$, and $z = -2$, evaluate $\frac{x^2 - xy^2z}{z^2y^2 - xz}$
46. Find the vertical and horizontal asymptotes of $f(x) = \frac{x + 1}{(2x - 1)(x + 3)}$

Topic V – Functions

47. Find $f(0)$ when $f(x) = \frac{3x^3 - 4x + 5}{ax^2 + bx - 2}$
48. If $f(x) = -\frac{2}{x-1}$, find $f\left(\frac{1}{x+3}\right)$.
49. If $f(x) = x^2 - 1$ and $g(x) = 2x + 1$, find: a) $f(g(x))$ and b) $g \circ f(x)$
50. If $f(x) = \frac{3x + 2}{2x - 1}$, for what x does $f(x) = -3$?
51. Find $\frac{4}{f(3)}$ if $f(t) = \frac{t^2 - 1}{2t - 2}$
52. Graph: $f(x) = \frac{1}{2x + 1}$
53. Graph: $f(x) = |x^2 - 2|$

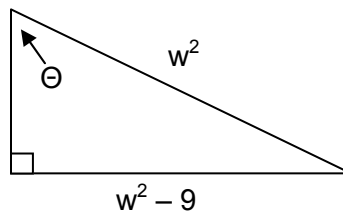
54. Find the domain and range of $g(x) = \sqrt{x^2 - 2x - 5}$
55. Express the domain and range of $g(x) = (25 + 4x - x^2)^{\frac{1}{2}}$ in interval notation (with exact answers, no decimals).
56. Find the area of the interior region of this figure:



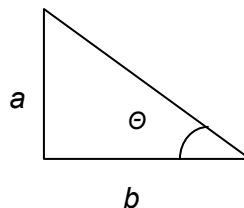
57. Let $f(x) = 3x - 5$. If $3f(a) = f(2a + 1)$, then $a =$

Topic VI – Trigonometry

58. Find $\cos(\theta)$ in the given triangle.



- omit 59. Use this triangle to find $\cot\theta \sin\theta$.



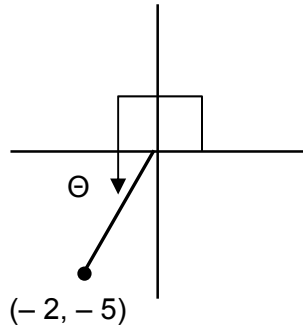
60. Evaluate: $\cos(\theta + \pi)$

- omit 61. Verify this identity: $\sec\theta - \cos\theta = \tan\theta \sin\theta$

62. Graph the function: $y = \frac{3}{2} \cos 2x$

63. Graph: $y = \sin \frac{x}{2}$

omit 64. In the figure shown, find $\csc \theta$.



65. Express 114° in radians.

omit 66. Which trig functions are even?

67. Find $\sin^{-1}\left(\frac{\sqrt{12}}{4}\right)$.

68. Find $\cos\left(\frac{5\pi}{3}\right)$.

Topic VII – Logarithmic and Exponential Functions

69. Solve for b : $\log_a b = x$

70. Solve for x : $2^x = 5$

71. Evaluate: $\log_{36} \sqrt[3]{6}$

72. Evaluate: $\log_9 \left(\frac{9^6}{27}\right)$

73. Simplify: $\log a^2 b - \log 2a + \log b$

74. Solve for x : $5^{3x} - \frac{1}{25} = 0$

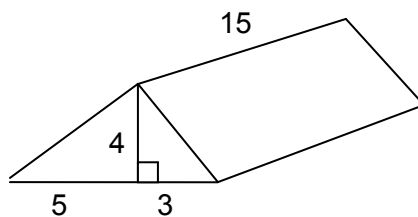
75. Solve for y : $\log_4(3y - 5) = 2$

76. Graph: $y = \left(\frac{1}{3}\right)^{-x}$

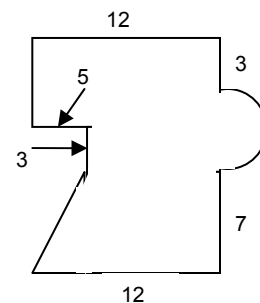
77. Graph: $x = \log_2(y + 3)$

Topic VIII – Word Problems

78. A bakery has a special on peanut butter cookies and chocolate chip cookies. There are 12 dozen cookies on special. If there are 40% more chocolate chip cookies than peanut butter cookies, how many chocolate chip cookies are there?
79. A 24w by 36L inch poster is enlarged so that its length is 5 ft. What is its width?
80. The circumference of a circle is quadrupled. How much is the area increased?
81. The sum of two numbers is $179\frac{1}{2}$. Six times the first number minus seven times the second number is 778. Find the numbers.
82. The cube root of a number is squared and the result is 16. What is the number?
83. The price of an airplane ticket is decreased 16% to \$193.20. What was the original price?
84. If the radius of a circle is decreased by 15%, what is the percent decrease in the area of the circle?
85. What is the surface area of the given triangular prism?



86. Find the area of the given figure to the nearest tenth.



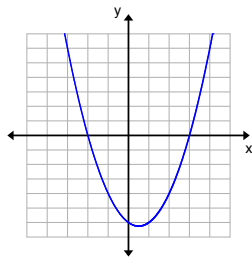
87. How long does it take something to travel 500 meters at 42 meters per second?
88. A tree twenty-five feet tall casts a shadow that is 35 feet long. If the shadow of a nearby building is 119 feet long, how tall is the building?

Answers to PRECALCULUS READINESS TEST

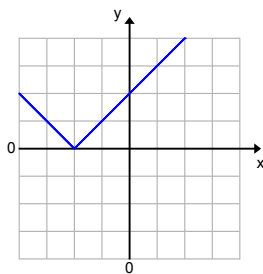
1. $\frac{2x}{x+2}$
2. $\frac{-1}{x(x+3)}$
3. $\frac{-3v}{7u}$
4. $\frac{2x^2+3x+3}{x(x+3)(3-x)}$
5. $\frac{9b}{(x+2b)(3b-x)(x-b)}$
6. $\frac{a^2b^2}{(2a^2-b^2)^2}$ or $\frac{a^2b^2}{4a^4-4a^2b^2+b^4}$
7. xy^2
8. $\frac{m^2}{m-3}$
9. $\frac{1}{27}$
10. $\sqrt{90} = 3\sqrt{10}$
11. $(a+b)\sqrt{a-b}$
12. $2\sqrt{4x^2+6y^2+9z^2}$
13. $\frac{3}{16x^4y^3}$
14. $\frac{b^5c}{a}$
15. a^{4x-2}
16. m^{b^2-1}
17. $\frac{y^{1/3}}{2x}$
18. $\frac{1}{25x^{12}y^{16}}$
19. $2m^3$
20. $3\sqrt{3}$
21. $\frac{x\sqrt[5]{8}}{2}$
22. $x^{1/5}$
23. $x = -7$
24. $\frac{-a}{3b-a}$ or $\frac{a}{a-3b}$
25. $a = 18$
26. $x = \frac{3}{5}$
27. $x = \frac{14}{19}, y = \frac{-41}{19}$
28. $x = 4, y = 3$
29. 7
30. $3x + 4y = 12$
31. $1 \leq x \leq 4$
32. The line formed by the 2 points is $3x - 2y = 1$. This line intersects the x-axis at $\left(\frac{1}{3}, 0\right)$, so the base of the right triangle is $3 - \frac{1}{3} = \frac{8}{3}$ units in length.
The area is then $\frac{16}{3}$ sq units.
33. $x = 1, 25$
34. $\frac{3 \pm 2\sqrt{3}}{2}$
35. $x = 1$ or 4
36. Add $\frac{9}{4}$ to both sides.
37. $x = 27$ (3 doesn't work)
38. $x^3 + 2x^2 - 10x - 17$
39. $a > \frac{-18}{7}$

40. $x < -6$ or $x > 7$

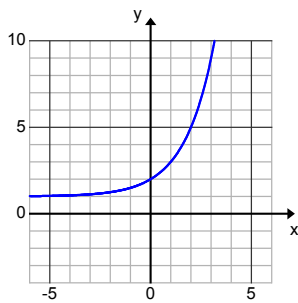
41.



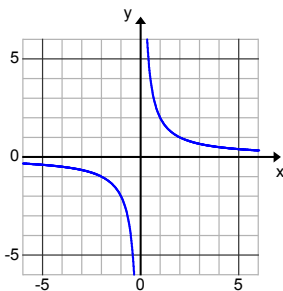
42.



43.



44.



45. $\frac{3}{2}$

46. Vertical: $x = \frac{1}{2}, x = -3$

Horizontal: $y = 0$

47. $-\frac{5}{2}$

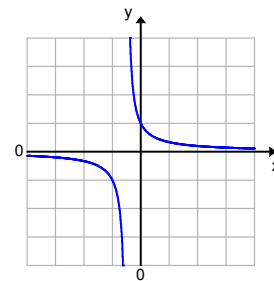
48. $\frac{2(x+3)}{x+2}$

49. a) $4x^2 - 4x$ b) $2x^2 - 1$

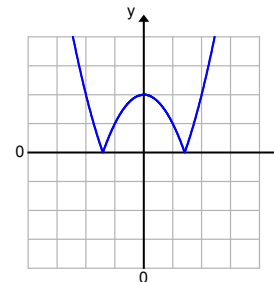
50. $x = \frac{1}{9}$

51. 2

52.



53.



54. domain: $x \leq (1 - \sqrt{6})$ or $x \geq (1 + \sqrt{6})$

range: $0 \leq g(x) \leq \infty$

55. domain: $[2 - \sqrt{29}, 2 + \sqrt{29}]$

range: $[2, \sqrt{29}]$

56. $(1 \cdot 2) + \frac{1}{2}(1 \cdot 2) + (2 \cdot 8) + \frac{1}{2}(2 \cdot 6) = 25$

57. $a = \frac{13}{3}$

58. $\cos \theta = \frac{3\sqrt{2w^2 - 9}}{w^2}$

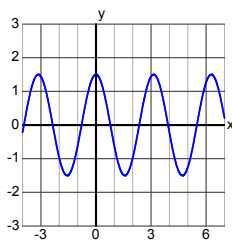
59. $\frac{b}{\sqrt{a^2 + b^2}}$

60. $-\cos \theta$

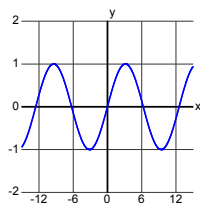
61.

$$\begin{aligned} \sec \theta - \cos \theta &= \frac{1}{\cos \theta} - \cos \theta \\ &= \frac{1 - \cos^2 \theta}{\cos \theta} \\ &= \frac{\sin^2 \theta}{\cos \theta} \\ &= \frac{\sin \theta}{\cos \theta} \cdot \sin \theta \\ &= \tan \theta \sin \theta \end{aligned}$$

62.



63.



64. $\frac{-\sqrt{29}}{5}$

65. $\frac{19\pi}{30}$

66. cosine and secant

67. $\frac{\pi}{3}$ or 60°

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

69. $b = a^x$

70. $x = \frac{\log 5}{\log 2}$ or $\frac{\ln 5}{\ln 2}$

71. $\frac{1}{6}$

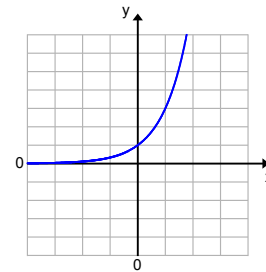
72. $\frac{9}{2}$

73. $\log\left(\frac{ab^2}{2}\right)$

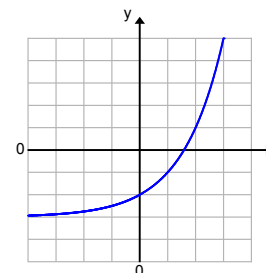
74. $x = -\frac{2}{3}$

75. $y = 7$

76.



77.



78. $p + 1.40p = 12$; 7 dozen chocolate
chip cookies
79. 40 inches
80. 16 times
81. $156\frac{1}{2}$ and 23
82. ± 64
83. \$230
84. 27.75%
85. $227 + 15\sqrt{41}$
86. 173.6
87. 11.9 sec
88. 85 ft.

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45. a b c d

1. Simplify: $(64)^{2/3}$

- a) 1 b) 4 c) 8 d) 16

2. Simplify: $\frac{49 - 7x}{x^2 - 49}$

- a) $\frac{7}{x+7}$ b) $\frac{7}{x-7}$ c) $\frac{-7}{x+7}$ d) $\frac{-7}{x}$

3. Solve for x : $\frac{p}{x} + y = 3$

- a) $\frac{p}{3-y}$ b) $\frac{3-y}{p}$ c) $\frac{p+yx}{3}$ d) 0

4. What value does P need to have in order for $x^2 - 4x + P$ to be a perfect square?

- a) $P = -4$ b) $P = 4$ c) $P = 2$ d) $P = -2$

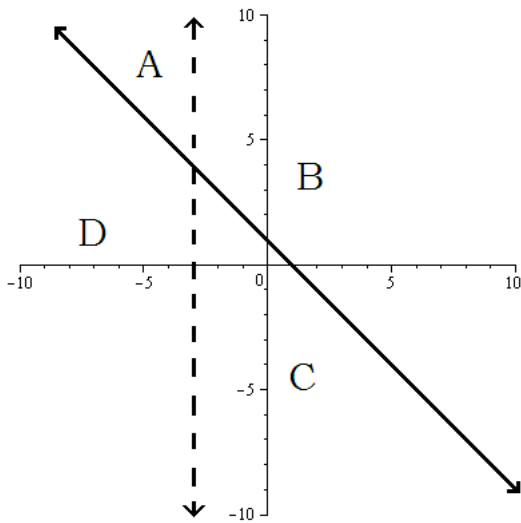
5. Factor completely: $2x(4w + 9) - 3y(4w + 9)$

- a) $(4w + 9)(2x - 3y)$ b) $8xw + 18x - 12yw + 27y$
c) $8xw + 11x - 12yw - 27y$ d) $(2x + 3y)(4w + 9)$

6. Write 0.00009487 in scientific notation.

- a) 0.9487×10^{-4} b) 9.487×10^5 c) 9.487×10^{-5} d) 948.7×10^7

7. Which region represents the solutions to the system of equations: $\begin{cases} x > -3 \\ y \leq -x + 1 \end{cases}$.



- a) *A* b) *B* c) *C* d) *D*

8. Simplify and write with positive exponents: $(5c^{-3}d^2)^3(7c^{-3}d^8)^0$

- a) $\frac{35}{c^{12}d^2}$ b) $\frac{125d^6}{c^9}$ c) $\frac{125}{7c^9d^6}$ d) 0

9. Solve this equation for x : $|2x + 1| + 1 \leq 5$

- a) $x \leq \frac{3}{2}$ b) $x \leq \frac{3}{2}$ and $x \geq \frac{-7}{2}$ c) $x \leq \frac{3}{2}$ and $x \geq \frac{-5}{2}$ d) No Solution

10. Simplify: $\sqrt{50} + \sqrt{20}$

- a) 10 b) $10\sqrt{10}$ c) $5\sqrt{2} + 2\sqrt{5}$ d) Cannot be simplified

11. Add and express as one fraction: $2x^{-1} + 3x$

a) $\frac{2 + 3x^2}{x}$

b) $\frac{1 + 6x^2}{2x}$

c) $\frac{3}{2}$

d) 5

12. At which values of x is this rational expression undefined? $\frac{x^2 + 4x + 4}{x^2 - 1}$

a) $-1, 1$

b) $-2, -1, 1$

c) 0

d) 1

13. Solve for x : $x^2 + 4x + 1 = 0$

a) $x = 2 \pm 2\sqrt{3}$

b) $x = -2 \pm \sqrt{3}$

c) $x = \frac{-4 \pm \sqrt{22}}{2}$

d) $x = \frac{4 \pm \sqrt{22}}{2}$

14. Evaluate $a - b^2 - c$ when $a = 1$, $b = -1$, and $c = -1$.

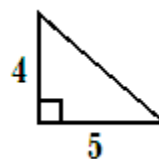
a) 3

b) -1

c) -3

d) 1

15. Find the exact length of the hypotenuse of this right triangle:



a) 3

b) 9

c) $\sqrt{41}$

d) $2\sqrt{5}$

16. Find the midpoint of the line segment whose endpoints are $(-3, 2)$ and $(-7, -8)$.

- a) $(2, 5)$ b) $\left(\frac{-1}{2}, \frac{-15}{2}\right)$ c) $(-2, 15)$ d) $(-5, -3)$

17. Simplify: $4^{-1} + 4^{-2}$

- a) $\frac{5}{16}$ b) $\frac{1}{4^3}$ c) $\frac{1}{16^3}$ d) -12

18. Solve the following inequality for x : $5 - 3x > 3 - 2x$

- a) $x > 2$ b) $x < 2$ c) $x > -2$ d) $x < \frac{8}{5}$

19. Simplify: $\sqrt[5]{32x^6y^2w^{10}}$

- a) $2xw^2\sqrt[5]{xy^2}$ b) $2xy^{-3}x^5$ c) $6\sqrt[5]{7xy^2w^2}$ d) $2xw\sqrt[5]{xy^2}$

20. Simplify as much as possible: $\frac{\left(\frac{2}{x}\right)}{\left(\frac{2}{x} + \frac{x}{2}\right)}$

- a) $\frac{4}{x^2 + 4}$ b) $\frac{2}{x}$ c) $\frac{x}{2}$ d) $\frac{1}{x^2}$

21. Solve for x : $x^5 \cdot x^{-3} = 13x$

- a) 169 b) -13 c) 26 d) 13

22. Simplify: i^{51}

- a) 0 b) $-i$ c) 1 d) -1

23. Factor completely: $3p^2 - 4p - 4$

- a) $(3p + 4)(p - 1)$ b) $(3p - 2)(p + 2)$ c) $(3p + 1)(p - 4)$ d) $(3p + 2)(p - 2)$

24. Find $f(a - 2)$ when $f(x) = 5 - x$.

- a) $3 - a$ b) $7 - a$ c) $-7 + x$ d) $x - 3$

25. Solve this system of equations: $\begin{cases} 4y + 3x = 0 \\ y + x = 1 \end{cases}$.

- a) $(-4, 3)$ b) $(4, -3)$ c) $(3, -4)$ d) No Solution

26. Simplify as much as possible and express with positive exponents: $\frac{(3x)^2}{(-3x)^3}$

- a) $\frac{9x^2}{27x^3}$ b) $\frac{-1}{x}$ c) $\frac{-1}{3x}$ d) $\frac{1}{3x}$

27. Write $x^y = z$ in logarithmic form.

- a) $\log_z(y) = x$ b) $\log_x(z) = y$ c) $\log_x(y) = z$ d) $\log(x^y) = z$

28. Rationalize: $\frac{\sqrt{2} + \sqrt{5}}{\sqrt{2} - \sqrt{5}}$

a) $-\frac{7 + 2\sqrt{10}}{3}$

b) $-7 + 2\sqrt{10}$

c) $-10 - 2\sqrt{10}$

d) $-\frac{3 + 2\sqrt{10}}{3}$

29. Add and simplify: $\frac{5y}{y-5} - \frac{y-2}{y+2}$

a) $\frac{4y^2 + 17y - 10}{(y-5)(y+2)}$

b) $\frac{6y-5}{y-5}$

c) $\frac{4y+2}{2y-3}$

d) $\frac{4y^2 + 17y + 10}{(y-5)(y+2)}$

30. Solve for M : $2k - \frac{1}{2} = \frac{3}{M}$

a) $\frac{6}{4K-1}$

b) $\frac{2K-1}{3}$

c) $\frac{4K-1}{6}$

d) $4K - 7$

31. Rationalize and simplify: $\frac{5i-2i}{1-2i}$

a) $\frac{4}{3} + \frac{5}{3}i$

b) $-\frac{6}{5} + \frac{3}{5}i$

c) $\frac{9}{5} - \frac{12}{5}i$

d) $6 - 3i$

32. Multiply and simplify: $(a-b)(a+b) + (a+b)^2$

a) 0

b) $2a^2$

c) $2a^2 + 2b^2$

d) $2a^2 + 2ab$

33. Find the quotient of $\frac{1.8 \times 10^{-3}}{6.0 \times 10^{-15}}$ and write your answer in scientific notation.

a) 3.0×10^{11}

b) 3.0×10^{-18}

c) 0.3×10^{11}

d) -3.0×10^{12}

34. Find the slope of the line whose equation is $3x - 5y = 45$.

- a) -9 b) $-\frac{3}{5}$ c) 15 d) $\frac{3}{5}$

35. Simplify: $\left(\frac{-4x^7y^{-3}}{-3x^{-3}y^{-3}}\right)^2$

- a) $\frac{16x^{20}}{9}$ b) $\frac{-16x^8y^{12}}{9}$ c) $\frac{16x^8}{9}$ d) $\frac{16x^8y^2}{9}$

36. Expand as much as possible using the properties of logarithms: $\log_5(17mk)$

- a) $\log_5(17) \cdot \log_5(m) \cdot \log_5(k)$ b) $\log_5(17) + (\log_5(m) \cdot \log_5(k))$
c) $\log_5 17 + \log_5 m + \log_5 k$ d) $\log_5 m - \log_5 17 + \log_5 k$

37. Express with rational exponents and simplify: $\sqrt[3]{\sqrt[4]{x^{10}}}$

- a) x^3 b) $x^{10/7}$ c) $x^{5/6}$ d) $\sqrt[17]{x}$

38. Divide and simplify: $\frac{x^2 - 1}{x^2 - 2x - 3} \div \frac{x^2 + 2x - 3}{x^2 - 9}$

- a) 1 b) $\frac{x^2 - 2x + 1}{x^2 - 6x + 9}$ c) $\frac{x - 1}{x - 3}$ d) $\frac{x + 1}{x - 3}$

39. Solve for x : $\frac{1}{6} + \frac{5}{x} = \frac{1}{3}$

- a) $x = 30$ b) $x = -30$ c) $x = \frac{30}{3}$ d) $x = 5$

40. $x^2 = -36$. What is the real number value of x ?

- a) -6 b) 6 c) ± 18 d) None of the above

41. Factor completely in the real number system: $x^4 - 1$

- a) $(x^2 + 1)(x^2 - 1)$ b) $(x^2 + 1)(x - 1)(x + 1)$ c) $(x^2 - 1)(x^2 - 1)$ d) Prime

42. Fred's midterm exam percent grades are 68, 76, and 81. What score does Fred need to get on the fourth midterm exam to have an average exam score of 80%?

- a) 15% b) 22.5% c) 32% d) 95%

43. Find the distance between $(2, 7)$ and $(-7, 19)$.

- a) 15 b) $\sqrt{145}$ c) $5\sqrt{29}$ d) 17

44. Simplify: $(-5^2)^3$

- a) 5^5 b) -5^8 c) -5^6 d) 5^6

45. Solve for M : $3 \log(M) = 3$

- a) $M = 3$ b) $M = 1$ c) $M = 10$ d) $M = 1000$

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d
6. a b c d
7. a b c d
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41. a b c d
42. a b c d
43. a b c d
44. a b c d
45. a b c d