

PRACTICE TEST 8

Directions: Solve each problem and choose the best answer from the choices given.

1. What is the value of $20 - 6 \times 2 + 10 \div 5$?

- A. 8
- B. 10
- C. 14
- D. 16

2. A jacket originally priced at \$85 is on sale for 35% off. What is the sale price?

- A. \$50
- B. \$52.50
- C. \$54.25
- D. \$55.25

3. Simplify: $\frac{2}{5} + \frac{7}{10}$

- A. $\frac{11}{10}$
- B. $\frac{9}{15}$
- C. $\frac{9}{10}$
- D. $\frac{1}{2}$

4. If $9x - 24 = 57$, what is the value of x ?

- A. 7
- B. 8
- C. 9
- D. 10

5. Which expression is equivalent to $(4x - 3)(3x + 2)$?

- A. $12x^2 - x - 6$
- B. $12x^2 + x - 6$
- C. $12x^2 - x + 6$
- D. $12x^2 + 17x - 6$

6. A triangle has legs 12 and 16. What is the hypotenuse?

- A. 14
- B. 18
- C. 19
- D. 20

7. What is the slope of the line through $(5, -2)$ and $(-3, 6)$?

- A. -1
- B. 1
- C. -2
- D. 2

8. If $h(x) = x^3 + 5x - 7$, what is $h(2)$?

- A. 5
- B. 9
- C. 11
- D. 15

9. Solve: $3(x + 7) - 5 = 4x + 10$

- A. $x = 4$
- B. $x = 6$
- C. $x = 8$
- D. $x = 10$

10. A cylinder has radius 5 feet and height 14 feet. What is its volume? (Use $\pi \approx 3.14$)

- A. 879.2 ft^3
- B. 942 ft^3
- C. $1,050 \text{ ft}^3$
- D. $1,099 \text{ ft}^3$

11. What is $5/8 - 1/3$?

- A. $7/24$
- B. $4/5$
- C. $1/4$
- D. $11/24$

12. If x varies inversely with y , and $x = 12$ when $y = 5$, what is x when $y = 10$?

- A. 24
- B. 10
- C. 6
- D. 3

13. Factor: $x^2 + 14x + 48$

- A. $(x + 6)(x + 8)$
- B. $(x + 6)(x + 8)$
- C. $(x + 4)(x + 12)$
- D. $(x + 2)(x + 24)$

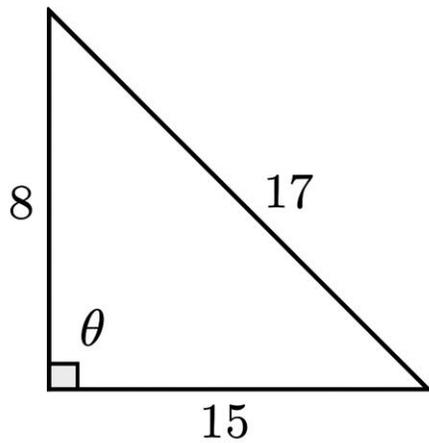
14. What is the area of a circle with radius 9? (Use $\pi \approx 3.14$)

- A. 28.26
- B. 56.52
- C. 113.04
- D. 254.34

15. Solve for x: $6x + 7 < 43$

- A. $x < 6$
- B. $x > 6$
- C. $x < 7$
- D. $x \leq 6$

16. In the right triangle shown, what is $\sin \theta$?



- A. $15/17$
- B. $8/15$
- C. $8/17$
- D. $17/8$

17. What is the distance between points $(-5, 3)$ and $(7, -2)$?

- A. 15
- B. 13
- C. 11
- D. 17

18. Simplify: $\sqrt{180} - \sqrt{45}$

- A. $\sqrt{135}$
- B. $2\sqrt{5}$
- C. $4\sqrt{5}$
- D. $3\sqrt{5}$

19. If $4^x = 256$, what is the value of x ?

- A. 4
- B. 5
- C. 6
- D. 8

20. What is the mode of: 22, 18, 22, 15, 30, 18, 22, 27?

- A. 18
- B. 21
- C. 22
- D. 27

21. A recipe calls for $\frac{3}{4}$ cup of flour per 8 servings. How many cups for 20 servings?

- A. 1.5 cups
- B. 1.875 cups
- C. 2 cups
- D. 2.25 cups

22. Solve: $|4x - 9| = 19$

- A. $x = 5$ or $x = -5$
- B. $x = 7$ or $x = -2.5$
- C. $x = 10$ or $x = -10$
- D. $x = 7$ or $x = -2.5$

23. What is the sum of the interior angles of a hexagon?

- A. 720°
- B. 900°
- C. $1,080^\circ$
- D. 540°

24. A rectangular box has dimensions $9 \text{ cm} \times 7 \text{ cm} \times 5 \text{ cm}$. What is its volume?

- A. 280 cm^3
- B. 300 cm^3
- C. 315 cm^3
- D. 350 cm^3

25. If $\log_5(x) = 4$, what is x ?

- A. 20
- B. 625
- C. 125
- D. 1,024

26. What is 15 out of 75 as a percentage?

- A. 15%
- B. 25%
- C. 18%
- D. 20%

27. Simplify: $(x - 9)(x + 9)$

A. $x^2 - 81$

B. $x^2 + 81$

C. $x^2 - 18x - 81$

D. $x^2 - 18$

28. A plane travels 420 miles in 2.5 hours. What is its average speed?

A. 160 mph

B. 165 mph

C. 168 mph

D. 175 mph

29. What is $\tan 45^\circ$?

A. 0

B. 1

C. $\sqrt{2}/2$

D. $\sqrt{3}$

30. Solve the system:

$$5x - 2y = 16$$

$$3x + 2y = 24$$

A. $x = 6, y = 3$

B. $x = 4, y = 2$

C. $x = 3, y = 0.5$

D. $x = 5, y = 4.5$

31. What is the domain of $f(x) = x^2 + 3$?

A. All real numbers

B. $x \geq 0$

C. $x \geq 3$

D. $x \neq 3$

32. Convert $11\pi/6$ radians to degrees.

A. 300°

B. 315°

C. 330°

D. 345°

33. A sphere has radius 9. What is its volume? (Use $\pi \approx 3.14$)

A. 2,826

B. 3,052.08

C. 3,617.28

D. 1,017.36

34. Factor completely: $3x^2 - 75$

A. $3(x^2 - 25)$

B. $(3x - 15)(x + 5)$

C. $3(x - 5)^2$

D. $3(x + 5)(x - 5)$

35. What is the least common multiple (LCM) of 18 and 24?

A. 72

B. 6

C. 36

D. 144

36. If $f(x) = 2x - 8$ and $g(x) = x^2 + 1$, what is $f(g(3))$?

A. 14

B. 18

C. 12

D. 22

37. A triangle has sides 20, 21, and 29. Is this a right triangle?

A. No

B. Yes

C. Cannot determine

D. Only if angles given

38. What is the slope of the line $4x - 6y = 18$?

A. $4/6$

B. $-2/3$

C. $-4/6$

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

39. Simplify: $(5x + 3)^2$

A. $25x^2 + 30x + 9$

B. $25x^2 + 15x + 9$

C. $25x^2 + 30x + 6$

D. $25x^2 + 9$

40. A bag contains 9 red, 5 blue, and 6 green marbles. What is the probability of drawing a green marble?

A. $\frac{6}{20}$

B. $\frac{1}{3}$

C. $\frac{3}{10}$

D. $\frac{9}{20}$

41. What is the 15th term of the arithmetic sequence: 3, 8, 13, 18, ...?

A. 68

B. 73

C. 78

D. 63

42. Solve: $x^2 + 2x - 35 = 0$

A. $x = 7$ or $x = -5$

B. $x = -7$ or $x = 5$

C. $x = 5$ or $x = -5$

D. $x = 5$ or $x = -7$

43. What is the perimeter of a circle with diameter 22? (Use $\pi \approx 3.14$)

A. 69.08

B. 138.16

C. 379.94

D. 44

44. A square has perimeter 56. What is its area?

A. 144

B. 169

C. 196

D. 225

45. What is $\cos 60^\circ$?

A. $\sqrt{3}/2$

B. $1/2$

C. 1

D. $\sqrt{2}/2$

46. Simplify: $\sqrt{(48x^8y^4)} + \sqrt{(27x^8y^4)}$

A. $7x^4y^2\sqrt{3}$

B. $5x^4y^2\sqrt{3}$

C. $9x^4y^2\sqrt{3}$

D. $7x^4y^2\sqrt{3}$

47. In how many ways can 5 items be selected from 9 items?

A. 126

B. 45

C. 3,024

D. 15,120

48. What is the vertex of $y = 2(x - 7)^2 - 3$?

A. (-7, -3)

B. (7, 3)

C. (7, -3)

D. (-7, 3)

49. If $7^{x-2} = 343$, what is x ?

A. 4

B. 5

C. 6

D. 3

50. What is the area of a trapezoid with bases 14 and 20, and height 9?

A. 126

B. 170

C. 180

D. 153

51. Solve: $6x - 8 > 4x + 18$

A. $x > 13$

B. $x < 13$

C. $x > 26$

D. $x < 10$

52. What is $\sin 0^\circ$?

A. 1

B. $\sqrt{2}/2$

C. 0

D. Undefined

53. A cone has radius 10 and height 18. What is its volume? (Use $\pi \approx 3.14$)

A. 1,570

B. 1,884

C. 2,260.8

D. 5,652

54. Simplify: $(4a^3b^2)^2$

A. $8a^6b^4$

B. $16a^5b^4$

C. $4a^6b^4$

D. $16a^6b^4$

55. What is the domain of $f(x) = 1/(x + 5)$?

A. $x \neq -5$

B. $x \neq 5$

C. $x > -5$

D. All real numbers

56. A store marks items 55% above cost. If the cost is \$80, what is the selling price?

A. \$120

B. \$128

C. \$124

D. \$135

57. What is the sum of the solutions to $x^2 - 15x + 50 = 0$?

A. 50

B. 15

C. -15

D. -50

58. If $P(A) = 0.35$ and $P(B) = 0.45$, and events are independent, what is $P(A \text{ and } B)$?

A. 0.1575

B. 0.8

C. 0.6425

D. 0.1575

59. What is the measure of each interior angle of a regular octagon?

A. 135°

B. 120°

C. 140°

D. 108°

60. Solve: $16^x = 4,096$

A. 2

B. 4

C. 3

D. 5

61. A cylinder has diameter 12 and height 15. What is its volume? (Use $\pi \approx 3.14$)

A. 565.2

B. 1,695.6

C. 2,260.8

D. 678.24

62. Factor: $16x^2 - 40x + 25$

A. $(4x - 5)(4x - 5)$

B. $(4x - 5)^2$

C. $(8x - 5)(2x - 5)$

D. $(4x - 5)^2$

63. What is the slope of a line perpendicular to $y = -(5/3)x + 1$?

A. $3/5$

B. $-3/5$

C. $5/3$

D. $-5/3$

64. Simplify: $(6 + 4i)(2 - 3i)$

A. $12 - 12i$

B. $12 + 8i$

C. $24 - 10i$

D. $0 - 10i$

65. The first term of a geometric sequence is 2 and the common ratio is 4. What is the 6th term?

A. 512

B. 2,048

C. 8,192

D. 1,024

66. What is the distance from point $(8, -5)$ to the x-axis?

A. 8

B. $\sqrt{89}$

C. 13

D. 5

67. Solve: $(x + 7)^2 = 64$

A. $x = 1$ or $x = -15$

B. $x = 8$ or $x = -8$

C. $x = 57$ or $x = -71$

D. $x = 7$ or $x = -7$

68. What is the area of a parallelogram with base 18 and height 11?

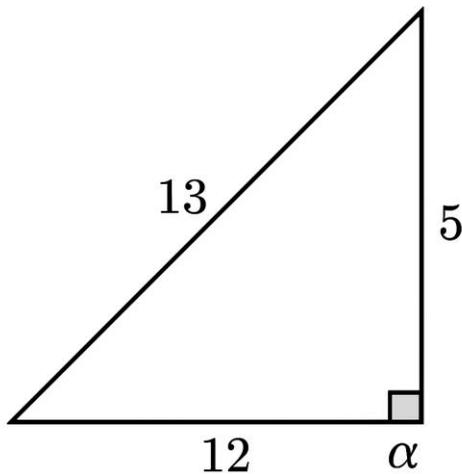
A. 29

B. 58

C. 198

D. 99

69. In the right triangle shown, what is $\cos \alpha$?



A. $5/13$

B. $12/13$

- C. $5/12$
- D. $13/12$

70. What is the value of $7! \div 5!$?

- A. 1.4
- B. 7
- C. 35
- D. 42

71. A number decreased by 15% equals 68. What is the original number?

- A. 80
- B. 75
- C. 85
- D. 78.2

72. Simplify: $\sqrt{(x^{12}y^{10})}$

- A. x^4y^5
- B. $x^{12}y^{10}$
- C. x^6y^5
- D. x^5y^6

73. What is the range of: 56, 42, 61, 38, 55, 47?

- A. 19
- B. 23

C. 18

D. 14

74. Solve the system:

$$3x - 4y = 2$$

$$5x + 4y = 30$$

A. $x = 3, y = 2$

B. $x = 5, y = 1.25$

C. $x = 6, y = 4$

D. $x = 4, y = 2.5$

75. What is the equation of a circle with center $(3, -7)$ and radius 9?

A. $(x - 3)^2 + (y + 7)^2 = 81$

B. $(x + 3)^2 + (y - 7)^2 = 81$

C. $(x - 3)^2 + (y - 7)^2 = 9$

D. $x^2 + y^2 = 81$

76. In a class of 60 students, 42 passed the exam. What percent passed?

A. 60%

B. 65%

C. 70%

D. 75%

77. What is the length of the hypotenuse of a right triangle with legs 11 and 60?

- A. 71
- B. 61
- C. $\sqrt{3,721}$
- D. 49

78. Simplify: $(x^5y^4) \div (x^3y)$

- A. x^2y^4
- B. x^8y^5
- C. x^2y^4
- D. x^2y^3

79. What is the median of: 44, 38, 51, 42, 47, 39, 53?

- A. 44
- B. 47
- C. 42
- D. 51

80. Evaluate: $\log_2(32) + \log_2(64)$

- A. 96
- B. 10
- C. 11
- D. 5

81. A ladder 34 feet long leans against a wall. If the base is 16 feet from the wall, how high does it reach?

- A. 18 feet
- B. 30 feet
- C. 25 feet
- D. 28 feet

82. What is the solution to $5x^2 = 125$?

- A. $x = \pm 25$
- B. $x = 5$
- C. $x = \pm 10$
- D. $x = \pm 5$

83. How many diagonals does a nonagon (9 sides) have?

- A. 27
- B. 18
- C. 36
- D. 9

84. Simplify: $9/(x + 4) - 5/(x + 4)$

- A. $14/(x + 4)$
- B. $14/(2x + 8)$
- C. $4/(x + 4)$
- D. $1/(x + 4)$

85. What is the y-intercept of $7x + 3y = 21$?

- A. 3
- B. 7
- C. 21
- D. -7

86. A regular polygon has 15 sides. What is the sum of its interior angles?

- A. $1,980^\circ$
- B. $2,160^\circ$
- C. $2,520^\circ$
- D. $2,340^\circ$

87. If matrix A is 4×3 and matrix B is 3×5 , what are the dimensions of AB?

- A. 4×5
- B. 3×3
- C. 4×3
- D. Cannot multiply

88. What is the area of a rhombus with diagonals 20 and 32?

- A. 640
- B. 52
- C. 320
- D. 1,280

89. Solve: $4|x - 5| = 28$

- A. $x = 12$ or $x = -2$
- B. $x = 12$ or $x = -2$
- C. $x = 9$ or $x = 1$
- D. $x = 33$ or $x = -23$

90. What is the probability of rolling a sum of 6 with two dice?

- A. $1/12$
- B. $1/6$
- C. $1/9$
- D. $5/36$

91. Simplify: $(8x - 5) - (4x + 3)$

- A. $4x - 8$
- B. $12x - 2$
- C. $4x + 2$
- D. $4x - 2$

92. What is the volume of a rectangular prism with length 15, width 8, and height 6?

- A. 480
- B. 720
- C. 720
- D. 900

93. If $6^{x+2} = 1,296$, what is x ?

- A. 2
- B. 2
- C. 3
- D. 4

94. What is the surface area of a cube with edge 11?

- A. 121
- B. 1,331
- C. 726
- D. 726

95. Factor: $x^3 - 64$

- A. $(x - 4)(x^2 + 4x + 16)$
- B. $(x + 4)(x^2 - 4x + 16)$
- C. $(x - 4)(x^2 - 16)$
- D. $(x - 4)^3$

96. What is the mean of: 16, 24, 20, 28, 32, 20?

- A. 20
- B. 22
- C. 23.33
- D. 24

97. Solve: $x/5 + 4 = x/3 - 2$

- A. $x = 30$
- B. $x = 45$
- C. $x = 60$
- D. $x = 15$

98. What is the value of $(125)^{(2/3)}$?

- A. 50
- B. 5
- C. 10
- D. 25

99. If the ratio of m to n is $7:9$ and $m = 28$, what is n ?

- A. 36
- B. 21.78
- C. 32
- D. 40

100. What is the equation of a line with slope -5 passing through $(2, 8)$?

- A. $y = -5x + 2$
- B. $y = -5x + 8$
- C. $y = -5x + 18$
- D. $y = -5x - 2$

Answer Key and Explanations

1. B. 10

Solution: Follow order of operations (PEMDAS). First multiply: $6 \times 2 = 12$. Next divide: $10 \div 5 = 2$. Now substitute: $20 - 12 + 2$. Work left to right: $20 - 12 = 8$, then $8 + 2 = 10$.

2. D. \$55.25

Solution: Calculate 35% of \$85: $0.35 \times \$85 = \29.75 . Subtract the discount: $\$85 - \$29.75 = \$55.25$. Alternatively, the sale price is 65% of original: $0.65 \times \$85 = \55.25 .

3. A. 11/10

Solution: Find LCD of 5 and 10, which is 10. Convert: $2/5 = 4/10$. Add: $4/10 + 7/10 = 11/10$.

4. C. 9

Solution: Add 24 to both sides: $9x = 81$. Divide by 9: $x = 9$.

5. B. $12x^2 + x - 6$

Solution: Use FOIL: First: $(4x)(3x) = 12x^2$. Outer: $(4x)(2) = 8x$. Inner: $(-3)(3x) = -9x$. Last: $(-3)(2) = -6$. Combine: $12x^2 + 8x - 9x - 6 = 12x^2 - x - 6$.

Use FOIL: $12x^2 + 8x - 9x - 6 = 12x^2 - x - 6$.

6. D. 20

Solution: For a right triangle with legs 12 and 16, use Pythagorean theorem: $c^2 = 12^2 + 16^2 = 144 + 256 = 400$, so $c = 20$. This is the 3-4-5 Pythagorean triple scaled by 4.

7. A. -1

Solution: Slope = $(y_2 - y_1)/(x_2 - x_1) = (6 - (-2))/(-3 - 5) = 8/(-8) = -1$.

8. C. 11

Solution: Substitute 2: $h(2) = 2^3 + 5(2) - 7 = 8 + 10 - 7 = 11$.

9. B. $x = 6$

Solution: Distribute: $3x + 21 - 5 = 4x + 10$, which simplifies to $3x + 16 = 4x + 10$. Subtract $3x$: $16 = x + 10$. Subtract 10: $x = 6$.

10. D. 1,099 ft³

Solution: Volume of cylinder: $V = \pi r^2 h = 3.14 \times 5^2 \times 14 = 3.14 \times 25 \times 14 = 1,099 \text{ ft}^3$.

11. A. 7/24

Solution: Find LCD of 8 and 3, which is 24. Convert: $5/8 = 15/24$ and $1/3 = 8/24$. Subtract: $15/24 - 8/24 = 7/24$.

12. C. 6

Solution: Inverse variation: $xy = k$. Find k : $12 \times 5 = 60$. When $y = 10$: $x(10) = 60$, so $x = 6$.

13. B. $(x + 6)(x + 8)$

Solution: Find two numbers that multiply to 48 and add to 14. The numbers are 6 and 8: $6 \times 8 = 48$ and $6 + 8 = 14$. Therefore $x^2 + 14x + 48 = (x + 6)(x + 8)$.

14. D. 254.34

Solution: Area = $\pi r^2 = 3.14 \times 9^2 = 3.14 \times 81 = 254.34$.

15. A. $x < 6$

Solution: Subtract 7 from both sides: $6x < 36$. Divide by 6: $x < 6$.

16. C. 8/17

Solution: In a right triangle, $\sin \theta = \text{opposite/hypotenuse}$. The opposite side to angle θ is 8 and the hypotenuse is 17, so $\sin \theta = 8/17$.

17. B. 13

Solution: Distance = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(7 - (-5))^2 + (-2 - 3)^2} = \sqrt{144 + 25} = \sqrt{169} = 13$.

18. D. $3\sqrt{5}$

Solution: Simplify each: $\sqrt{180} = \sqrt{(36 \times 5)} = 6\sqrt{5}$ and $\sqrt{45} = \sqrt{(9 \times 5)} = 3\sqrt{5}$. Subtract: $6\sqrt{5} - 3\sqrt{5} = 3\sqrt{5}$.

19. A. 4

Solution: Rewrite 256 as 4^4 . Since $4^x = 4^4$, we have $x = 4$.

20. C. 22

Solution: Count frequency: 22 appears three times, 18 appears twice, others once. The mode is 22.

21. B. 1.875 cups

Solution: Set up proportion: $(\frac{3}{4} \text{ cups}) / (8 \text{ servings}) = (x \text{ cups}) / (20 \text{ servings})$. Cross multiply: $8x = (\frac{3}{4})(20) = 15$. Divide: $x = 15/8 = 1.875$ cups.

22. D. $x = 7$ or $x = -2.5$

Solution: Split into cases: $4x - 9 = 19$ OR $4x - 9 = -19$. First case: $4x = 28$, so $x = 7$. Second case: $4x = -10$, so $x = -2.5$.

23. A. 720°

Solution: Sum of interior angles: $(n - 2) \times 180^\circ = (6 - 2) \times 180^\circ = 4 \times 180^\circ = 720^\circ$.

24. C. 315 cm^3

Solution: Volume = length \times width \times height = $9 \times 7 \times 5 = 315 \text{ cm}^3$.

25. B. 625

Solution: $\log_5(x) = 4$ means $5^4 = x$. Calculate: $5^4 = 625$.

26. D. 20%

Solution: Percent = $(15/75) \times 100 = 0.20 \times 100 = 20\%$.

27. A. $x^2 - 81$

Solution: Difference of squares: $(x - 9)(x + 9) = x^2 - 81$.

28. C. 168 mph

Solution: Average speed = $420 \div 2.5 = 168$ mph.

29. B. 1

Solution: From the unit circle or 45-45-90 triangle, $\tan 45^\circ = 1$.

30. D. $x = 5, y = 4.5$

Solution: Add equations to eliminate y : $(5x - 2y) + (3x + 2y) = 16 + 24$, giving $8x = 40$, so $x = 5$. Substitute: $5(5) - 2y = 16$, so $25 - 2y = 16$, giving $2y = 9$, and $y = 4.5$.

31. A. All real numbers

Solution: The function $f(x) = x^2 + 3$ is defined for all real numbers. There are no restrictions on x .

32. C. 330°

Solution: Convert: $(11\pi/6) \times (180/\pi) = (11 \times 180)/6 = 1,980/6 = 330^\circ$.

33. B. 3,052.08

Solution: Volume of sphere: $V = (4/3)\pi r^3 = (4/3)(3.14)(9^3) = (4/3)(3.14)(729) = (4/3)(2,289.06) \approx 3,052.08$.

34. D. $3(x + 5)(x - 5)$

Solution: Factor out GCF: $3x^2 - 75 = 3(x^2 - 25)$. Recognize difference of squares: $3(x + 5)(x - 5)$.

35. A. 72

Solution: List multiples of 18: 18, 36, 54, 72... List multiples of 24: 24, 48, 72... The LCM is 72.

36. C. 12

Solution: First find $g(3)$: $g(3) = 3^2 + 1 = 10$. Now find $f(10)$: $f(10) = 2(10) - 8 = 12$.

37. B. Yes

Solution: Check Pythagorean theorem: $20^2 + 21^2$ should equal 29^2 . Calculate: $400 + 441 = 841$, and $29^2 = 841$. Since they're equal, this is a right triangle. This is the 20-21-29 Pythagorean triple.

38. D. $2/3$

Solution: Rewrite in slope-intercept form: $4x - 6y = 18$ becomes $-6y = -4x + 18$, so $y = (2/3)x - 3$. The slope is $2/3$.

39. A. $25x^2 + 30x + 9$

Solution: Use $(a + b)^2 = a^2 + 2ab + b^2$: $(5x)^2 + 2(5x)(3) + 3^2 = 25x^2 + 30x + 9$.

40. C. $3/10$

Solution: Total marbles = $9 + 5 + 6 = 20$. Probability of green = $6/20 = 3/10$.

41. B. 73

Solution: Formula: $a_n = a_1 + (n - 1)d$. Here: $a_{15} = 3 + (15 - 1)(5) = 3 + 70 = 73$.

42. D. $x = 5$ or $x = -7$

Solution: Factor: find numbers that multiply to -35 and add to 2. The numbers are 7 and -5: $7 \times (-5) = -35$ and $7 + (-5) = 2$. So $x^2 + 2x - 35 = (x + 7)(x - 5) = 0$. Solutions: $x = -7$ or $x = 5$.

43. A. 69.08

Solution: Circumference (perimeter): $C = \pi d = 3.14 \times 22 = 69.08$.

44. C. 196

Solution: Perimeter = $4s$, so $56 = 4s$, giving $s = 14$. Area = $s^2 = 14^2 = 196$.

45. B. $1/2$

Solution: From the unit circle or 30-60-90 triangle, $\cos 60^\circ = 1/2$.

46. D. $7x^4y^2\sqrt{3}$

Solution: Simplify each: $\sqrt{(48x^8y^4)} = 4x^4y^2\sqrt{3}$ and $\sqrt{(27x^8y^4)} = 3x^4y^2\sqrt{3}$. Add: $4x^4y^2\sqrt{3} + 3x^4y^2\sqrt{3} = 7x^4y^2\sqrt{3}$.

47. A. 126

Solution: Combination formula: $C(9, 5) = 9!/(5! \times 4!) = (9 \times 8 \times 7 \times 6)/(4 \times 3 \times 2 \times 1) = 3,024/24 = 126$.

48. C. (7, -3)

Solution: Vertex form $y = a(x - h)^2 + k$ has vertex (h, k) . Here the vertex is $(7, -3)$.

49. B. 5

Solution: Rewrite 343 as 7^3 . So $7^{x-2} = 7^3$, meaning $x - 2 = 3$, and $x = 5$.

50. D. 153

Solution: Area of trapezoid: $A = (1/2)(b_1 + b_2)h = (1/2)(14 + 20)(9) = (1/2)(34)(9) = 153$.

51. A. $x > 13$

Solution: Subtract $4x$ from both sides: $2x - 8 > 18$. Add 8: $2x > 26$. Divide by 2: $x > 13$.

52. C. 0

Solution: From the unit circle, $\sin 0^\circ = 0$.

53. B. 1,884

Solution: Volume of cone: $V = (1/3)\pi r^2 h = (1/3)(3.14)(10^2)(18) = (1/3)(3.14)(100)(18) = (1/3)(5,652) = 1,884$.

54. D. $16a^6b^4$

Solution: Apply power rule: $(4a^3b^2)^2 = 4^2(a^3)^2(b^2)^2 = 16a^6b^4$.

55. A. $x \neq -5$

Solution: The denominator cannot equal zero: $x + 5 \neq 0$, so $x \neq -5$. The domain is all real numbers except -5.

56. C. \$124

Solution: Markup: $0.55 \times \$80 = \44 . Selling price: $\$80 + \$44 = \$124$. Alternatively: $1.55 \times \$80 = \124 .

57. B. 15

Solution: For quadratic $ax^2 + bx + c = 0$, sum of solutions = $-b/a$. Here: $-(-15)/1 = 15$.

58. D. 0.1575

Solution: For independent events: $P(A \text{ and } B) = P(A) \times P(B) = 0.35 \times 0.45 = 0.1575$.

59. A. 135°

Solution: Sum of interior angles: $(8 - 2) \times 180^\circ = 1,080^\circ$. Each angle: $1,080^\circ \div 8 = 135^\circ$.

60. C. 3

Solution: Rewrite 4,096 as $16^3 = (16)^3$. Since $16^x = 16^3$, we have $x = 3$.

61. B. 1,695.6

Solution: Radius = diameter/2 = 6. Volume of cylinder: $V = \pi r^2 h = 3.14 \times 6^2 \times 15 = 3.14 \times 36 \times 15 = 1,695.6$.

62. D. $(4x - 5)^2$

Solution: Perfect square trinomial: $16x^2 - 40x + 25 = (4x)^2 - 2(4x)(5) + 5^2 = (4x - 5)^2$.

63. A. $3/5$

Solution: Given line has slope $-5/3$. Perpendicular slope is negative reciprocal: $3/5$.

64. C. 24 - 10i

Solution: Use FOIL: $6(2) + 6(-3i) + 4i(2) + 4i(-3i) = 12 - 18i + 8i - 12i^2 = 12 - 10i - 12(-1) = 12 - 10i + 12 = 24 - 10i$.

65. B. 2,048

Solution: Formula: $a_n = a_1 \times r^{(n-1)}$. Here: $a_6 = 2 \times 4^5 = 2 \times 1,024 = 2,048$.

66. D. 5

Solution: Distance from a point to the x-axis is the absolute value of the y-coordinate: $|-5| = 5$.

67. A. $x = 1$ or $x = -15$

Solution: Take square root: $x + 7 = \pm 8$. This gives $x + 7 = 8$ (so $x = 1$) or $x + 7 = -8$ (so $x = -15$).

68. C. 198

Solution: Area of parallelogram: $A = \text{base} \times \text{height} = 18 \times 11 = 198$.

69. B. 12/13

Solution: In a right triangle, $\cos \alpha = \text{adjacent/hypotenuse}$. The adjacent side to angle α is 12 and the hypotenuse is 13, so $\cos \alpha = 12/13$.

70. D. 42

Solution: Calculate: $7! = 5,040$ and $5! = 120$. Divide: $5,040 \div 120 = 42$.

71. A. 80

Solution: Let $x = \text{original number}$. After 15% decrease: $0.85x = 68$. Divide: $x = 68/0.85 = 80$.

72. C. x^6y^5

Solution: Take square root of each factor: $\sqrt{(x^{12})} = x^6$ and $\sqrt{(y^{10})} = y^5$. Result: x^6y^5 .

73. B. 23

Solution: Range = maximum - minimum = $61 - 38 = 23$.

74. D. $x = 4, y = 2.5$

Solution: Add equations to eliminate y : $(3x - 4y) + (5x + 4y) = 2 + 30$, giving $8x = 32$, so $x = 4$. Substitute: $3(4) - 4y = 2$, so $12 - 4y = 2$, giving $4y = 10$, and $y = 2.5$.

75. A. $(x - 3)^2 + (y + 7)^2 = 81$

Solution: Circle equation: $(x - h)^2 + (y - k)^2 = r^2$. With center $(3, -7)$ and radius 9: $(x - 3)^2 + (y - (-7))^2 = 9^2$, which is $(x - 3)^2 + (y + 7)^2 = 81$.

76. C. 70%

Solution: Percent: $(42/60) \times 100 = 0.70 \times 100 = 70\%$.

77. B. 61

Solution: Pythagorean theorem: $c^2 = 11^2 + 60^2 = 121 + 3,600 = 3,721$, so $c = \sqrt{3,721} = 61$. This is the 11-60-61 Pythagorean triple.

78. D. x^2y^3

Solution: Divide: $x^5y^4 \div x^3y = x^{5-3}y^{4-1} = x^2y^3$.

79. A. 44

Solution: Arrange in order: 38, 39, 42, 44, 47, 51, 53. With 7 values, median is the 4th value: 44.

80. C. 11

Solution: Use logarithm property: $\log_2(32) + \log_2(64) = \log_2(32 \times 64) = \log_2(2,048) = \log_2(2^{11}) = 11$.

81. B. 30 feet

Solution: Pythagorean theorem: $16^2 + h^2 = 34^2$. Calculate: $256 + h^2 = 1,156$, so $h^2 = 900$, and $h = 30$ feet. This is the 8-15-17 triple doubled to 16-30-34.

82. D. $x = \pm 5$

Solution: Divide by 5: $x^2 = 25$. Take square root: $x = \pm 5$.

83. A. 27

Solution: Formula for diagonals: $n(n - 3)/2$. For nonagon: $9(9 - 3)/2 = 9(6)/2 = 27$.

84. C. $4/(x + 4)$

Solution: Subtract fractions with same denominator: $9/(x + 4) - 5/(x + 4) = (9 - 5)/(x + 4) = 4/(x + 4)$.

85. B. 7

Solution: The y-intercept occurs when $x = 0$: $7(0) + 3y = 21$, so $3y = 21$, and $y = 7$.

86. D. 2,340°

Solution: Sum of interior angles: $(n - 2) \times 180^\circ = (15 - 2) \times 180^\circ = 13 \times 180^\circ = 2,340^\circ$.

87. A. 4×5

Solution: Matrix A(4×3) times B(3×5) yields a matrix with dimensions 4×5 .

88. C. 320

Solution: Area of rhombus: $A = (1/2)d_1d_2 = (1/2)(20)(32) = 320$.

89. B. $x = 12$ or $x = -2$

Solution: Divide by 4: $|x - 5| = 7$. Split into cases: $x - 5 = 7$ (so $x = 12$) or $x - 5 = -7$ (so $x = -2$).

90. D. 5/36

Solution: Ways to get sum of 6: (1,5), (2,4), (3,3), (4,2), (5,1)—that's 5 outcomes out of 36 total. Probability: 5/36.

91. A. $4x - 8$

Solution: Distribute negative: $(8x - 5) - (4x + 3) = 8x - 5 - 4x - 3 = 4x - 8$.

92. C. 720

Solution: Volume = length \times width \times height = $15 \times 8 \times 6 = 720$.

93. B. 2

Solution: Rewrite 1,296 as 6^4 . So $6^{x+2} = 6^4$, meaning $x + 2 = 4$, and $x = 2$.

94. D. 726

Solution: A cube has 6 faces, each with area $11^2 = 121$. Surface area: $6 \times 121 = 726$.

95. A. $(x - 4)(x^2 + 4x + 16)$

Solution: Difference of cubes: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$. Here $x^3 - 64 = x^3 - 4^3 = (x - 4)(x^2 + 4x + 16)$.

96. C. 23.33

Solution: Sum: $16 + 24 + 20 + 28 + 32 + 20 = 140$. Count: 6. Mean: $140 \div 6 \approx 23.33$.

97. B. 45

Solution: Multiply all terms by 15: $3x + 60 = 5x - 30$. Subtract $3x$: $60 = 2x - 30$. Add 30: $90 = 2x$. Divide: $x = 45$.

98. D. 25

Solution: Rewrite as: $(125)^{(2/3)} = (125^{(1/3)})^2 = 5^2 = 25$. The cube root of 125 is 5, and 5 squared is 25.

99. A. 36

Solution: Set up proportion: $7/9 = 28/n$. Cross multiply: $7n = 252$. Divide: $n = 36$.

100. C. $y = -5x + 18$

Solution: Use point-slope form: $y - 8 = -5(x - 2)$. Distribute: $y - 8 = -5x + 10$. Add 8: $y = -5x + 18$.