

1. [U1·L1 — Order of Operations] Evaluate: $12 \div (5 - 2) + 4 \times 3$

$$5 - 2 = 3; 12 \div 3 = 4$$

$$4 \times 3 = 12$$

$$4 + 12 = 16$$

Answer: 16

2. [U1·L1 — Order of Operations] Evaluate: $2^2 + 6 \times (10 - 7)$

$$10 - 7 = 3; 6 \times 3 = 18$$

$$2^2 = 4$$

$$4 + 18 = 22$$

Answer: 22

3. [U1·L2 — Evaluating Expressions] Evaluate $4m - n$ when $m = 5$ and $n = 12$.

$$4(5) - 12$$

$$20 - 12$$

Answer: 8

4. [U1·L2 — Evaluating Expressions] Evaluate $a^2 + b^2$ when $a = 3$ and $b = 4$.

$$9 + 16$$

Answer: 25

5. [U1·L3 — Combining Like Terms] Simplify: $8x - 5 - 3x + 2$

$$8x - 3x = 5x$$

$$-5 + 2 = -3$$

Answer: $5x - 3$

6. [U1·L3 — Combining Like Terms] Simplify: $2m + 7n - 5m + n$

$$2m - 5m = -3m$$

$$7n + n = 8n$$

Answer: $-3m + 8n$

7. [U1·L4 — Distributive Property] Expand: $3(4x - 7)$

$$3 \cdot 4x = 12x$$

$$3 \cdot (-7) = -21$$

Answer: $12x - 21$

8. [U1·L4 — Distributive Property] Expand and simplify: $4(2x + 1) - 3x$

$$8x + 4 - 3x$$

$$8x - 3x = 5x$$

Answer: $5x + 4$

9. [U1·L5 — Integer & Signed-Number Rules] Simplify: $-5 - 8 + 3$

$$-5 - 8 = -13$$

$$-13 + 3$$

Answer: -10

10. [U1·L5 — Integer & Signed-Number Rules] Simplify: $(-4)(-5) - 12 \div 3$

$$(-4)(-5)=20$$

$$12 \div 3=4$$

$$20-4$$

Answer: 16

11. [U2·L1 — Multi-Step & Literal Equations] Solve: $5x + 3 = 2x + 18$

$$3x=15$$

$$x=5$$

Answer: $x = 5$

12. [U2·L1 — Multi-Step & Literal Equations] Solve for w: $P = 2l + 2w$

$$P-2l=2w$$

Answer: $w = (P - 2l)/2$

13. [U2·L2 — Compound Inequalities] Solve: $1 \leq 2x - 3 < 7$

$$\text{add } 3: 4 \leq 2x < 10$$

$$\div 2$$

Answer: $2 \leq x < 5$

14. [U2·L2 — Compound Inequalities] Solve: $-5x \leq 15$

$$\div (-5), \text{ flip}$$

Answer: $x \geq -3$

15. [U2·L3 — Modeling Real-World Situations] Five less than three times a number is 16. Find the number.

$$3n-5=16$$

$$3n=21$$

Answer: 7

16. [U2·L3 — Modeling Real-World Situations] A phone plan is \$20 plus \$0.10 per text. Write the cost C for t texts and find t when C = \$35.

$$C=20+0.10t$$

$$35=20+0.10t \rightarrow 15=0.10t$$

Answer: $C = 20 + 0.10t$; $t = 150$

17. [U3·L1 — Introduction to Functions] Is $\{(2,3),(4,3),(6,3)\}$ a function?

each input one output

Answer: Yes

18. [U3·L1 — Introduction to Functions] Does the mapping $5 \rightarrow 1, 5 \rightarrow 9$ represent a function?

5 has two outputs

Answer: No — 5 maps to two outputs

19. [U3·L2 — Function Notation] If $f(x) = 4x + 1$, find $f(3)$.

$$4(3)+1$$

Answer: 13

20. [U3·L2 — Function Notation] If $h(x) = x^2 - 2x$, find $h(5)$.

25-10

Answer: 15

21. [U3·L3 — Graphs of Functions] For $y = 2x + 3$, find y when $x = -1$.

$2(-1)+3$

Answer: 1

22. [U3·L3 — Graphs of Functions] Is $(4, 9)$ on the graph of $y = 2x + 1$?

$2(4)+1=9$ ✓

Answer: Yes

23. [U3·L4 — Graphical Features and Terminology] A line has y -intercept 5 and x -intercept 5. Where does it cross each axis?

y -axis $(0,5)$; x -axis $(5,0)$

Answer: $(0, 5)$ and $(5, 0)$

24. [U3·L4 — Graphical Features and Terminology] A parabola's highest point is $(-2, 6)$. Max or min, and what value?

highest → maximum

Answer: Maximum; value 6

25. [U3·L5 — Exploring Functions on the TI-Nspire] For $y = 3x - 2$, list outputs at $x = 0, 1, 2$.

$-2, 1, 4$

Answer: $-2, 1, 4$

26. [U3·L5 — Exploring Functions on the TI-Nspire] Graphing $y = x^2$ and $y = 9$, where do they intersect?

$x^2=9$

Answer: $x = -3$ and $x = 3$

27. [U3·L6 — Average Rate of Change] Find the average rate of change between $(0, 4)$ and $(5, 19)$.

$(19-4)/(5-0)=15/5$

Answer: 3

28. [U3·L6 — Average Rate of Change] $f(2) = 20$, $f(6) = 4$. Find the average rate of change.

$(4-20)/(6-2)=-16/4$

Answer: -4

29. [U3·L7 — Domain and Range] State the domain and range of $\{(1,2),(3,6),(5,10)\}$.

x 's; y 's

Answer: Domain $\{1,3,5\}$; Range $\{2,6,10\}$

30. [U3·L7 — Domain and Range] A graph spans $y = 0$ to $y = 8$. State the range in interval notation.

closed endpoints

Answer: $[0, 8]$

31. [U4·L1 — Proportional Relationships] y is proportional to x ; $y = 20$ when $x = 4$. Find k .

$$k = 20/4$$

Answer: $k = 5$

32. [U4·L1 — Proportional Relationships] If $y = 6x$, find x when $y = 42$.

$$42 = 6x$$

Answer: $x = 7$

33. [U4·L2 — Unit Conversions] Convert 3 hours to seconds.

$$3 \times 3600$$

Answer: 10,800 seconds

34. [U4·L2 — Unit Conversions] A recipe needs 2 pounds of flour. How many ounces? (16 oz = 1 lb)

$$2 \times 16$$

Answer: 32 ounces

35. [U4·L3 — Non-Proportional Linear Relationships] State the slope and y -intercept of $y = 5x - 8$.

read m , b

Answer: slope 5; y -intercept -8

36. [U4·L3 — Non-Proportional Linear Relationships] Is $y = -x + 4$ proportional? Explain.

$$b = 4 \neq 0$$

Answer: No — y -intercept is 4, not 0

37. [U4·L4 — More Work Graphing Linear Functions] Rewrite $3x + y = 6$ in slope-intercept form.

$$y = 6 - 3x$$

Answer: $y = -3x + 6$

38. [U4·L4 — More Work Graphing Linear Functions] For $y = \frac{1}{3}x + 2$, give the y -intercept and one more point.

$$(0, 2); \text{rise } 1 \text{ run } 3 \rightarrow (3, 3)$$

Answer: (0, 2) and (3, 3)

39. [U4·L5 — Writing Equations in Slope-Intercept Form] Write the line through (0, -2) with slope 4.

$$b = -2$$

Answer: $y = 4x - 2$

40. [U4·L5 — Writing Equations in Slope-Intercept Form] Write the line through (2, 7) and (4, 13).

$$m = \frac{6}{2} = 3; 7 = 3(2) + b \rightarrow b = 1$$

Answer: $y = 3x + 1$

41. [U4·L6 — Modeling with Linear Functions] A taxi charges \$3 plus \$2/mile. Write cost C for m miles; find C for 10 miles.

$$C = 3 + 2m; C = 3 + 20$$

Answer: $C = 3 + 2m$; \$23

42. [U4·L6 — Modeling with Linear Functions] A candle is 12 cm and burns 2 cm/hour. Write height H after t hours.

start 12, rate -2

Answer: $H = 12 - 2t$

43. [U4·L7 — More Linear Modeling] With $C = 3 + 2m$, how many miles give a cost of \$17?

$17 = 3 + 2m \rightarrow 14 = 2m$

Answer: 7 miles

44. [U4·L7 — More Linear Modeling] $H = 12 - 2t$. When is the candle fully burned ($H = 0$)?

$0 = 12 - 2t$

Answer: $t = 6$ hours

45. [U4·L8 — Strange Lines — Vertical and Horizontal] Write the vertical line through $(-4, 7)$.

$x = \text{constant}$

Answer: $x = -4$

46. [U4·L8 — Strange Lines — Vertical and Horizontal] What is the slope of the horizontal line $y = 8$?

horizontal $\rightarrow 0$

Answer: 0

47. [U4·L9 — Absolute Value and Step Functions] Evaluate $|5 - 9| - |-2|$.

$|-4| - |-2| = 4 - 2$

Answer: 2

48. [U4·L9 — Absolute Value and Step Functions] Solve $|x| = 10$.

± 10

Answer: $x = 10$ or $x = -10$

49. [U4·L10 — The Truth About Graphs] Is $(2, 1)$ on the graph of $y = 3x - 5$?

$3(2) - 5 = 1 \checkmark$

Answer: Yes

50. [U4·L10 — The Truth About Graphs] Is $(-2, 0)$ on the graph of $y = x^2 - 4$?

$(-2)^2 - 4 = 0 \checkmark$

Answer: Yes

51. [U4·L11 — Graphs of Linear Inequalities] For $y < x + 2$, is the boundary solid or dashed? Shade above or below?

$< \rightarrow$ dashed, below

Answer: Dashed line; shade below

52. [U4·L11 — Graphs of Linear Inequalities] Does $(1, 1)$ satisfy $y \geq 2x - 3$?

$1 \geq 2(1) - 3 = -1 \checkmark$

Answer: Yes

53. [U4·L12 — Introduction to Sequences] An arithmetic sequence starts at 10, common difference -4. Write the first four terms.

10, 6, 2, -2

Answer: 10, 6, 2, -2

54. [U4·L12 — Introduction to Sequences] Find the 5th term of 3, 7, 11, ...

$d=4$; $3+(5-1)4=3+16$

Answer: 19

55. [U5·L1 — Solving Systems by Graphing] Where do $y = x - 3$ and $y = -2x + 6$ intersect?

$x-3=-2x+6 \rightarrow 3x=9 \rightarrow x=3, y=0$

Answer: (3, 0)

56. [U5·L1 — Solving Systems by Graphing] How many solutions do two identical lines have?

overlap everywhere

Answer: Infinitely many

57. [U5·L2 — Solving Systems by Substitution] Solve: $y = x + 4$ and $3x + y = 12$.

$3x+x+4=12 \rightarrow 4x=8 \rightarrow x=2, y=6$

Answer: (2, 6)

58. [U5·L2 — Solving Systems by Substitution] Solve: $x = 2y$ and $x + 3y = 15$.

$2y+3y=15 \rightarrow 5y=15 \rightarrow y=3, x=6$

Answer: (6, 3)

59. [U5·L3 — Properties of Systems] Multiply $2x + y = 5$ by 4. Write the result.

distribute 4

Answer: $8x + 4y = 20$

60. [U5·L3 — Properties of Systems] Are $3x - y = 2$ and $6x - 2y = 4$ the same line? Explain.

second = first $\times 2$

Answer: Yes — the second is the first $\times 2$

61. [U5·L4 — The Method of Elimination] Solve by elimination: $2x + y = 11$ and $x - y = 1$.

add: $3x=12 \rightarrow x=4; y=3$

Answer: (4, 3)

62. [U5·L4 — The Method of Elimination] Solve by elimination: $3x + 4y = 10$ and $3x - 2y = -2$.

subtract: $6y=12 \rightarrow y=2; 3x+8=10 \rightarrow x=2/3$

Answer: (2/3, 2)

63. [U5·L5 — Modeling with Systems of Equations] Two numbers sum to 30; one is 4 times the other. Find them.

$x+4x=30 \rightarrow 5x=30 \rightarrow x=6$

Answer: 6 and 24

64. [U5·L5 — Modeling with Systems of Equations] Pens \$1, markers \$3. 10 items cost \$18. How many of each?

$$p+m=10, p+3m=18 \rightarrow 2m=8 \rightarrow m=4, p=6$$

Answer: 6 pens, 4 markers

65. [U5·L6 — Solving Equations Graphically] To solve $3x - 2 = x + 4$ graphically, at what x do the two lines meet?

$$3x-2=x+4 \rightarrow 2x=6$$

Answer: $x = 3$

66. [U5·L6 — Solving Equations Graphically] $y = |x|$ and $y = 5$ cross at which two x -values?

$$|x|=5$$

Answer: $x = -5$ and $x = 5$

67. [U5·L7 — Systems of Inequalities] Does $(1, 0)$ satisfy $y \leq x$ and $y \geq -2$? Explain.

$$0 \leq 1 \checkmark \text{ and } 0 \geq -2 \checkmark$$

Answer: Yes — both hold

68. [U5·L7 — Systems of Inequalities] For $x \geq 0$ and $y \geq 0$, name one point in the solution region.

first quadrant

Answer: e.g. $(2, 3)$

69. [U5·L8 — Modeling with Systems of Inequalities] You have at most \$40. Apples \$2, oranges \$3. Write an inequality for a apples, o oranges.

$$\text{cost} \leq 40$$

Answer: $2a + 3o \leq 40$

70. [U5·L8 — Modeling with Systems of Inequalities] A student needs at least 12 credits: x lecture + y lab. Write the inequality.

at least $\rightarrow \geq$

Answer: $x + y \geq 12$

71. [U6·L1 — Simplifying Exponents] Simplify: $x^7 \cdot x^2$

$$7+2$$

Answer: x^9

72. [U6·L1 — Simplifying Exponents] Simplify: $x^9 \div x^4$

$$9-4$$

Answer: x^5

73. [U6·L2 — Zero and Negative Exponents] Evaluate: $12^1 + 4$

$$1+4$$

Answer: 5

74. [U6·L2 — Zero and Negative Exponents] Write 3^{-2} as a fraction.

$$1/3^2$$

Answer: $1/9$

75. [U6·L3 — Exponential Growth and Decay] A sample triples each day, starting at 2. How many after 3 days?

$$2 \cdot 3^3 = 2 \cdot 27$$

Answer: 54

76. [U6·L3 — Exponential Growth and Decay] Is multiplying by 1.2 each step growth or decay?

factor > 1

Answer: Growth

77. [U6·L4 — Introduction to Exponential Functions] For $y = 5 \cdot 3^x$, find y when $x = 2$.

$$5 \cdot 9$$

Answer: 45

78. [U6·L4 — Introduction to Exponential Functions] In $y = 100 \cdot (0.5)^x$, is this growth or decay?

$$b = 0.5 < 1$$

Answer: Decay

79. [U6·L5 — Percent Review] Find 40% of 150.

$$0.40 \times 150$$

Answer: 60

80. [U6·L5 — Percent Review] What percent is 9 out of 60?

$$9/60 = 0.15$$

Answer: 15%

81. [U6·L6 — Percent Increase and Decrease] A \$60 item increases 20%. Find the new price.

$$60 \times 1.20$$

Answer: \$72

82. [U6·L6 — Percent Increase and Decrease] An \$80 item is 25% off. Find the sale price.

$$80 \times 0.75$$

Answer: \$60

83. [U6·L7 — Exponential Models from Percent] A savings of \$500 grows 3% per year. Write the model A after t years.

$$b = 1.03$$

Answer: $A = 500(1.03)^t$

84. [U6·L7 — Exponential Models from Percent] A \$1200 laptop loses 15%/year. Write the model V after t years.

$$b = 0.85$$

Answer: $V = 1200(0.85)^t$

85. [U6·L8 — Linear versus Exponential] Sequence 4, 8, 16, 32 — linear or exponential?

$\times 2$ each

Answer: Exponential

86. [U6·L8 — Linear versus Exponential] Sequence 10, 7, 4, 1 — linear or exponential?

–3 each

Answer: Linear

87. [U6·L9 — Geometric Sequences] Find the common ratio of 5, 15, 45, 135.

15/5

Answer: 3

88. [U6·L9 — Geometric Sequences] Find the 4th term of the geometric sequence 2, 8, 32, ...

$r=4$; $32 \cdot 4$

Answer: 128

89. [U7·L1 — Introduction to Polynomials] Add: $(2x^2 + 3x - 4) + (5x^2 - x + 6)$

$7x^2 + 2x + 2$

Answer: $7x^2 + 2x + 2$

90. [U7·L1 — Introduction to Polynomials] Write in standard form: $7 + 4x^3 - x$

highest power first

Answer: $4x^3 - x + 7$

91. [U7·L2 — Multiplying Polynomials] Multiply: $(x + 4)(x + 2)$

$x^2 + 2x + 4x + 8$

Answer: $x^2 + 6x + 8$

92. [U7·L2 — Multiplying Polynomials] Expand: $(x + 5)^2$

$x^2 + 10x + 25$

Answer: $x^2 + 10x + 25$

93. [U7·L3 — Factoring — GCF] Factor out the GCF: $8x^2 + 12x$

GCF $4x$

Answer: $4x(2x + 3)$

94. [U7·L3 — Factoring — GCF] Factor out the GCF: $15x^3 + 10x^2$

GCF $5x^2$

Answer: $5x^2(3x + 2)$

95. [U7·L4 — Factoring — Conjugate Pairs] Factor: $x^2 - 36$

diff of squares

Answer: $(x + 6)(x - 6)$

96. [U7·L4 — Factoring — Conjugate Pairs] Factor: $4x^2 - 25$

$(2x)^2 - 5^2$

Answer: $(2x + 5)(2x - 5)$

97. [U7·L5 — Factoring Trinomials] Factor: $x^2 + 8x + 15$

$3 \cdot 5 = 15$, $3 + 5 = 8$

Answer: $(x + 3)(x + 5)$

98. [U7·L5 — Factoring Trinomials] Factor: $x^2 - 6x + 8$

$$-2 \cdot -4 = 8, -2 - 4 = -6$$

Answer: $(x - 2)(x - 4)$

99. [U7·L6 — More Work Factoring Trinomials] Factor completely: $3x^2 + 15x + 18$

$$\text{GCF } 3 \rightarrow 3(x^2 + 5x + 6)$$

Answer: $3(x + 2)(x + 3)$

100. [U7·L6 — More Work Factoring Trinomials] Factor: $x^2 + x - 12$

$$4 \cdot -3 = -12, 4 - 3 = 1$$

Answer: $(x + 4)(x - 3)$

101. [U7·L7 — Multiplying Using Area Models] Use an area model to multiply $(x + 3)(x + 4)$.

$$x^2 + 4x + 3x + 12$$

Answer: $x^2 + 7x + 12$

102. [U7·L7 — Multiplying Using Area Models] Use an area model to multiply $(3x + 2)(x + 1)$.

$$3x^2 + 3x + 2x + 2$$

Answer: $3x^2 + 5x + 2$

103. [U7·L8 — Factoring Trinomials Using Area] Factor $x^2 + 9x + 20$ (product 20, sum 9).

$$4 \cdot 5$$

Answer: $(x + 4)(x + 5)$

104. [U7·L8 — Factoring Trinomials Using Area] Factor $x^2 - 3x - 10$ (product -10 , sum -3).

$$-5 \cdot 2$$

Answer: $(x - 5)(x + 2)$

105. [U7·L9 — Checking Polynomial Work (TI-Nspire)] You factored $x^2 + 7x + 10$ as $(x+2)(x+5)$. Multiply back to check.

$$= x^2 + 7x + 10 \checkmark$$

Answer: Checks — equals $x^2 + 7x + 10$

106. [U7·L9 — Checking Polynomial Work (TI-Nspire)] Do $x^2 - 4$ and $(x-2)(x+2)$ agree at $x = 5$?

$$21 = 3 \cdot 7 = 21 \checkmark$$

Answer: Yes — both equal 21

107. [U8·L1 — Introduction to Quadratic Functions] For $f(x) = x^2 + 1$, find $f(4)$.

$$16 + 1$$

Answer: 17

108. [U8·L1 — Introduction to Quadratic Functions] What is the vertex of the basic parabola $y = x^2$?
origin

Answer: (0, 0)

109. [U8·L2 — More Work with Parabolas] Does $y = 4x^2 - 3$ open up or down?

$$a = 4 > 0$$

Answer: Up

110. [U8·L2 — More Work with Parabolas] Which is wider: $y = \frac{1}{2}x^2$ or $y = 2x^2$?

smaller $|a|$ wider

Answer: $y = \frac{1}{2}x^2$

111. [U8·L3 — The Shifted Form of a Parabola] State the vertex of $y = (x - 5)^2 + 2$.

(h,k)

Answer: (5, 2)

112. [U8·L3 — The Shifted Form of a Parabola] State the vertex of $y = (x + 3)^2 - 1$.

$h=-3, k=-1$

Answer: (-3, -1)

113. [U8·L4 — Perfect Square Trinomial Warm-Up] Expand: $(x + 6)^2$

$x^2+12x+36$

Answer: $x^2 + 12x + 36$

114. [U8·L4 — Perfect Square Trinomial Warm-Up] What number completes the square: $x^2 + 12x + \underline{\hspace{1cm}}?$

$(12/2)^2=36$

Answer: 36

115. [U8·L5 — Completing the Square] Write $x^2 + 4x - 1$ in vertex form.

$(x+2)^2-4-1$

Answer: $(x + 2)^2 - 5$

116. [U8·L5 — Completing the Square] Write $x^2 - 8x + 10$ in vertex form.

$(x-4)^2-16+10$

Answer: $(x - 4)^2 - 6$

117. [U8·L6 — The Axis of Symmetry Formula] Find the axis of symmetry of $y = x^2 - 8x + 3$.

$x=8/2$

Answer: $x = 4$

118. [U8·L6 — The Axis of Symmetry Formula] Find the vertex of $y = x^2 + 2x - 3$.

$x=-1; y=1-2-3=-4$

Answer: (-1, -4)

119. [U8·L7 — Stretching Parabolas] A parabola has vertex (0,0) and passes through (2,8). Find a in $y = ax^2$.

$8=a \cdot 4$

Answer: $a = 2$

120. [U8·L7 — Stretching Parabolas] To complete the square on $3x^2 + 12x$, what do you factor out first?

leading coefficient

Answer: Factor out 3

121. [U8·L8 — The Zeroes of a Quadratic] Find the zeroes: $(x + 2)(x - 6) = 0$

each factor 0

Answer: $x = -2$ or $x = 6$

122. [U8·L8 — The Zeroes of a Quadratic] Find the zeroes of $x^2 - 16 = 0$.

$(x-4)(x+4)$

Answer: $x = 4$ or $x = -4$

123. [U8·L9 — Zeros of a Quadratic — Extra Practice] Solve by factoring: $x^2 + 6x + 8 = 0$

$(x+2)(x+4)$

Answer: $x = -2$ or $x = -4$

124. [U8·L9 — Zeros of a Quadratic — Extra Practice] Solve by factoring: $x^2 - 8x + 15 = 0$

$(x-3)(x-5)$

Answer: $x = 3$ or $x = 5$

125. [U8·L10 — More Zero Product Law] Solve: $x(x + 5) = 0$

$x=0$ or $x+5=0$

Answer: $x = 0$ or $x = -5$

126. [U8·L10 — More Zero Product Law] Solve: $5x(x - 3) = 0$

$x=0$ or $x-3=0$

Answer: $x = 0$ or $x = 3$

127. [U8·L11 — Solving Linear-Quadratic Systems] Solve: $y = x^2 - 2$ and $y = x$.

$x^2 - 2 = x \rightarrow x^2 - x - 2 = 0 \rightarrow (x-2)(x+1)$

$x=2 \rightarrow 2$; $x=-1 \rightarrow -1$

Answer: (2, 2) and (-1, -1)

128. [U8·L11 — Solving Linear-Quadratic Systems] A line tangent to a parabola meets it at how many points?

tangent

Answer: Exactly one

129. [U8·L12 — Quadratic Word Problems] A rectangle has length x and width $x + 1$, area 20. Write the equation and find x .

$x(x+1)=20 \rightarrow x^2+x-20=0 \rightarrow (x+5)(x-4)$

$x=4$

Answer: $x = 4$

130. [U8·L12 — Quadratic Word Problems] Two consecutive integers multiply to 56. Find them.

$n(n+1)=56 \rightarrow (n-7)(n+8)$

$n=7$

Answer: 7 and 8 (or -8 and -7)

131. [U8·L13 — Additional Quadratic Word Problems] A number plus its square is 30. Find the positive value.

$$n^2+n-30=0 \rightarrow (n+6)(n-5)$$

$$n=5$$

Answer: 5

132. [U8·L13 — Additional Quadratic Word Problems] A rectangle is 2 longer than wide, area 24. Find the width.

$$w(w+2)=24 \rightarrow (w+6)(w-4)$$

$$w=4$$

Answer: width 4

133. [U8·L14 — The Factored Form of a Polynomial] State the zeroes of $y = (x + 3)(x - 5)$.

set factors 0

Answer: $x = -3$ and $x = 5$

134. [U8·L14 — The Factored Form of a Polynomial] Find the y-intercept of $y = (x - 1)(x + 4)$.

$$x=0: (-1)(4)$$

Answer: y-intercept -4

135. [U8·L16 — Graphing & Checking Quadratics (TI-Nspire)] Graphing $y = x^2 - 2x - 3$, find the vertex.

$$(x = -b/2a)$$

$$x=1; y=1-2-3=-4$$

Answer: (1, -4)

136. [U8·L16 — Graphing & Checking Quadratics (TI-Nspire)] From the graph, $y = x^2 - 2x - 3$ crosses the x-axis where?

$$(x-3)(x+1)$$

Answer: $x = 3$ and $x = -1$

137. [U9·L1 — Square Roots] Simplify: $\sqrt{48}$

$$\sqrt{(16 \cdot 3)}$$

Answer: $4\sqrt{3}$

138. [U9·L1 — Square Roots] Simplify: $\sqrt{12} \cdot \sqrt{3}$

$$\sqrt{36}$$

Answer: 6

139. [U9·L2 — Irrational Numbers] Is $\sqrt{25}$ rational or irrational?

$$=5$$

Answer: Rational ($\sqrt{25} = 5$)

140. [U9·L2 — Irrational Numbers] Is $5 - \sqrt{3}$ rational or irrational?

rational – irrational

Answer: Irrational

141. [U9·L3 — Square Root Functions and Shifting] What is the domain of $f(x) = \sqrt{x + 4}$?

$$x+4 \geq 0$$

Answer: $x \geq -4$

142. [U9·L3 — Square Root Functions and Shifting] $y = \sqrt{x}$ becomes $y = \sqrt{x - 3}$. Which direction is the shift?

inside $-3 \rightarrow$ right

Answer: Right 3 units

143. [U9·L4 — Solving Quadratics by Inverse Operations] Solve: $x^2 = 64$

$$\pm\sqrt{64}$$

Answer: $x = 8$ or $x = -8$

144. [U9·L4 — Solving Quadratics by Inverse Operations] Solve: $3x^2 = 27$

$$x^2=9$$

Answer: $x = 3$ or $x = -3$

145. [U9·L5 — Area and Completing the Square] What term completes the square: $x^2 + 14x + \underline{\hspace{1cm}}$?

$$(14/2)^2=49$$

Answer: 49

146. [U9·L5 — Area and Completing the Square] Write $x^2 + 14x + 49$ as a binomial squared.

perfect square

Answer: $(x + 7)^2$

147. [U9·L6 — Finding Zeroes by Completing the Square] Solve by completing the square: $x^2 + 2x - 8 = 0$

$$(x+1)^2-1-8=0 \rightarrow (x+1)^2=9$$

Answer: $x = 2$ or $x = -4$

148. [U9·L6 — Finding Zeroes by Completing the Square] Solve: $(x + 3)^2 = 16$

$$x+3=\pm 4$$

Answer: $x = 1$ or $x = -7$

149. [U9·L7 — The Quadratic Formula] Use the quadratic formula: $x^2 + 5x + 6 = 0$

$$\text{disc}=25-24=1; x=(-5\pm 1)/2$$

Answer: $x = -2$ or $x = -3$

150. [U9·L7 — The Quadratic Formula] Find the discriminant of $x^2 - 4x + 4 = 0$ and the number of real solutions.

$$16-16=0$$

Answer: 0; one real solution (double root)

151. [U9·L8 — Final Work with Quadratic Equations] Solve $x^2 - 25 = 0$ by the best method.

$$(x-5)(x+5)$$

Answer: $x = 5$ or $x = -5$

152. [U9•L8 — Final Work with Quadratic Equations] Solve $x^2 + 4x + 4 = 0$.

$$(x+2)^2=0$$

Answer: $x = -2$ (double root)

153. [U9•L9 — Checking Roots (TI-Nspire)] Check: is $x = 3$ a solution of $x^2 - 2x - 3 = 0$? Substitute.

$$9 - 6 - 3 = 0 \checkmark$$

Answer: Yes — gives 0

154. [U9•L9 — Checking Roots (TI-Nspire)] $\sqrt{20} \approx ?$ Round to the hundredth.

$$\sqrt{20} = 2\sqrt{5} \approx 4.4721$$

Answer: ≈ 4.47

155. [U10•L1 — Graphically Representing Data] Data: 6, 6, 7, 7, 7, 8. What is the mode?

7 appears most

Answer: 7

156. [U10•L1 — Graphically Representing Data] A distribution has a long tail to the right. What is its shape called?

right tail

Answer: Skewed right

157. [U10•L2 — Quartiles and Box Plots] Find the median of 3, 6, 9, 12, 15.

middle value

Answer: 9

158. [U10•L2 — Quartiles and Box Plots] For 1, 3, 5, 7, 9, 11, 13, 15, find Q1 and Q3.

lower 1, 3, 5, 7 $\rightarrow$ Q1=4; upper 9, 11, 13, 15 $\rightarrow$ Q3=12

Answer: Q1 = 4, Q3 = 12

159. [U10•L3 — Measures of Central Tendency] Find the mean of 4, 8, 10, 14.

$$36/4$$

Answer: 9

160. [U10•L3 — Measures of Central Tendency] Find the median of 2, 5, 7, 9.

avg of 5 and 7

Answer: 6

161. [U10•L4 — Variation within a Data Set] Find the IQR for Q1 = 15 and Q3 = 27.

$$27 - 15$$

Answer: 12

162. [U10•L4 — Variation within a Data Set] Two sets have SD 1.5 and SD 6. Which is more consistent (less spread)?

smaller SD

Answer: The set with SD 1.5

163. [U10•L5 — Outliers] With $Q1 = 20$, $Q3 = 30$ (IQR 10), below what value is an outlier?

$Q1 - 1.5 \cdot 10 = 20 - 15$

Answer: Below 5

164. [U10•L5 — Outliers] Does removing an outlier change the mean or the median more?

mean sensitive

Answer: The mean

165. [U10•L6 — Two-Way Frequency Tables] 25 of 50 students walk to school. What is the relative frequency?

$25/50$

Answer: 0.5 (50%)

166. [U10•L6 — Two-Way Frequency Tables] Conditional relative frequency compares within a single what?

row or column

Answer: Row or column

167. [U10•L7 — Bivariate Data Analysis] A scatter plot trends downward. Positive or negative correlation?

down $\rightarrow$ negative

Answer: Negative

168. [U10•L7 — Bivariate Data Analysis] A best-fit line has slope 4. What does that mean about x and y ?

rate

Answer: y rises 4 for each 1-unit rise in x

169. [U10•L8 — Linear Regression on the Calculator] A best-fit line is $y = 3x - 1$. Predict y when $x = 4$.

$3 \cdot 4 - 1$

Answer: 11

170. [U10•L8 — Linear Regression on the Calculator] In $y = 3x - 1$, what is the y -intercept in context?

value at $x=0$

Answer: -1 (the predicted y when $x = 0$)

171. [U10•L9 — Other Types of Regression] Data triples each step: 1, 3, 9, 27. Which model fits?

constant ratio

Answer: Exponential

172. [U10•L9 — Other Types of Regression] Data forms a U-shape. Which model fits best?

parabola

Answer: Quadratic

173. [U10•L10 — Quantifying Predictability] $r = 0.98$. Strong or weak, and what direction?

near 1, positive

Answer: Strong, positive

174. [U10·L10 — Quantifying Predictability] Between $r = -0.9$ and $r = 0.4$, which is the stronger relationship?

$|-0.9| > |0.4|$

Answer: $r = -0.9$

175. [U10·L11 — Residuals] A model predicts 50; actual is 46. Find the residual.

$46 - 50$

Answer: -4

176. [U10·L11 — Residuals] A residual plot shows a clear curve. Is a linear model appropriate?

pattern = poor fit

Answer: No — the pattern suggests a non-linear model

177. [U10·L12 — Statistics on the TI-Nspire] 1-Var Stats gives the mean of 8, 12, 16, 24. What is it?

$60/4$

Answer: 15

178. [U10·L12 — Statistics on the TI-Nspire] Which value does 1-Var Stats report as the middle of ordered data?

median

Answer: The median

179. [U11·L1 — Function Transformations] $g(x) = 4 \cdot f(x)$. If $f(3) = 2$, find $g(3)$.

$4 \cdot 2$

Answer: 8

180. [U11·L1 — Function Transformations] $y = 5 \cdot f(x)$ is a vertical stretch by what factor?

coefficient

Answer: 5

181. [U11·L2 — Horizontal Stretching of Functions] $g(x) = f(3x)$. Is this a horizontal stretch or compression?

factor > 1 inside

Answer: Horizontal compression

182. [U11·L2 — Horizontal Stretching of Functions] If f has a zero at $x = 8$, where is the zero of $f(4x)$?

$4x = 8$

Answer: $x = 2$

183. [U11·L3 — Discrete Functions] Number of tickets sold: continuous or discrete?

counting

Answer: Discrete

184. [U11·L3 — Discrete Functions] A model gives 3.7 cars. Is this viable in a discrete setting?

can't have partial car

Answer: No — not viable

185. [U11·L4 — Linear and Exponential Models] Points (0,3) and (1,12): fit $y = a \cdot b^x$. Find a and b .

$$a=3; 12=3b \rightarrow b=4$$

Answer: $a = 3, b = 4$

186. [U11·L4 — Linear and Exponential Models] Points (0,3) and (1,12): fit a linear model.

$$b=3, m=9$$

Answer: $y = 9x + 3$

187. [U11·L5 — Step Functions] Shipping is \$4 per pound or part of a pound. Cost for 3.2 lb?

$$\text{rounds up to } 4 \rightarrow 4 \cdot 4$$

Answer: \$16

188. [U11·L5 — Step Functions] A step function's graph looks like what shape?

flat then jump

Answer: Flat segments with jumps (like stairs)

189. [U11·L6 — Piecewise Linear Functions] $f(x)=2x$ for $x<3$ and $f(x)=6$ for $x \geq 3$. Find $f(1)$ and $f(5)$.

$$f(1)=2; f(5)=6$$

Answer: $f(1) = 2, f(5) = 6$

190. [U11·L6 — Piecewise Linear Functions] For the same f , find $f(3)$.

$$x \geq 3 \text{ branch}$$

Answer: 6

191. [U11·L7 — More Work with Piecewise Functions] $f(x)=x^2$ for $x<0$ and $f(x)=2x$ for $x \geq 0$. Find $f(-2)$.

$$x<0 \text{ branch} \rightarrow (-2)^2$$

Answer: 4

192. [U11·L7 — More Work with Piecewise Functions] For the same f , find $f(3)$.

$$x \geq 0 \text{ branch} \rightarrow 2 \cdot 3$$

Answer: 6

193. [U11·L8 — Quadratic Modeling] Height $h = -16t^2 + 48t$. When does it return to the ground ($h = 0$)?

$$-16t(t-3)=0$$

Answer: $t = 3$ seconds

194. [U11·L8 — Quadratic Modeling] A rectangle's width is x and length $12 - x$. Write its area $A(x)$.

$$w \cdot l$$

Answer: $A(x) = x(12 - x)$

195. [U11·L9 — Limits to Accuracy of Our Models] A measurement is 3.0 s (2 sig figs). A result computes to 7.844. Round appropriately.

2 sig figs

Answer: 7.8

196. [U11·L9 — Limits to Accuracy of Our Models] Can a computed answer be more precise than the data measured? Explain.

no

Answer: No — precision is limited by the least precise measurement

197. [U11·L10 — Checking Models (TI-Nspire)] To confirm $y = (x+1)^2 - 3$ has vertex $(-1, -3)$, what do you look for on the graph?

turning point

Answer: The turning point at $(-1, -3)$

198. [U11·L10 — Checking Models (TI-Nspire)] A graph confirms zeroes at $x = -2$ and $x = 3$. Write the parabola in factored form.

$(x+2)(x-3)$

Answer: $y = (x + 2)(x - 3)$