1. What is the value of $(\sqrt{16})^2$?

   Ⓐ 2   Ⓑ 16   Ⓒ 32   Ⓓ 256

2. Simplify: $2\sqrt{99} - \sqrt{44} + \sqrt{176}$

   Ⓐ $-3\sqrt{11}$ Ⓑ $8\sqrt{11}$

   Ⓒ $2\sqrt{231}$ Ⓓ 55

3. What symbol should replace the "_?_" to make the following statement true?

   $$\sqrt{25 + 64 + 121} \ \underline{\ ?\ } \ \sqrt{25} + \sqrt{64} + \sqrt{121}$$

   Ⓐ =   Ⓑ ≡   Ⓒ >

   Ⓓ <

4. At what point does the line $y = \frac{1}{2}x - 3$ intersect the line in the graph?
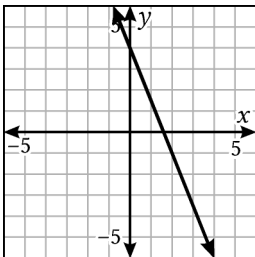
5. The final velocity of a uniformly accelerated particle is related to time by the equation $v = v_0 + at$ where a and v_0 are constants. If the relation is a linear one, and if $v = 32$ when $t = 5$, and $v = 56$ when $t = 13$, then what are the values of a and v_0?
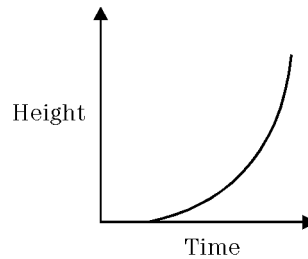
   $a = \boxed{}$ $v_0 = \boxed{}$

6. Evaluate: $\dfrac{\dfrac{n+2}{n-6}}{\dfrac{10-n}{n-4}}$ for $n = 8$

   Ⓐ 0.1   Ⓑ 1   Ⓒ 2.5   Ⓓ 10

7. Which of the following pairs of points define a line segment parallel to the x-axis? Mark each correct pair.

$(4,3), (-4,3)$	$(4,3), (4,-3)$
$(-4,-3), (4,-3)$	$(3,4), (-3,-4)$

8. The graph shows how the height of a container being filled with water changes over time. Which of the following containers being filled could it graphically be representing?


   Ⓐ   Ⓑ

   Ⓒ   Ⓓ

9. Does the relationship represent a function? Justify your answer.

x	y
30	60
40	50
50	45
60	32

10. If $y = f(x)$ is shifted 2 units left and 7 units down, what is the resulting equation?

11. The size of a fungal colony is modeled by the equation $z(t) = \frac{3}{2}t^2 + 17$, where z is the size of the colony in microns and t is the time in hours. Determine the size of the colony in $5\frac{1}{2}$ hours.
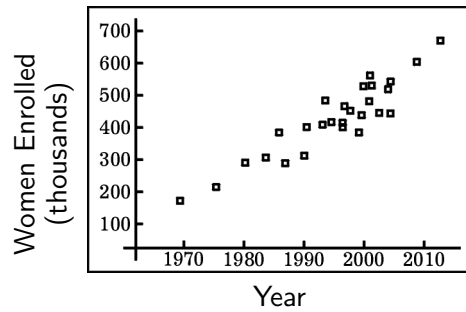
   (A) $62\frac{3}{8}$ (B) $25\frac{3}{4}$ (C) $28\frac{3}{8}$ (D) $58\frac{3}{8}$

12.
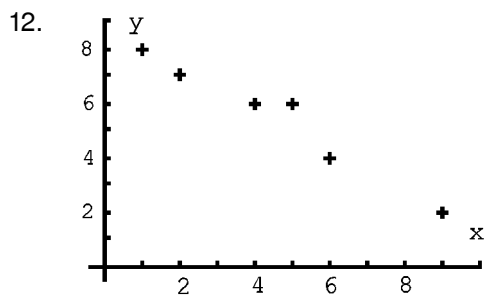
What are the mean coordinates of this scatter plot?

   (A) $(4.5, 5.5)$ (B) $(6.0, 5.0)$

   (C) $(6.0, 5.5)$ (D) $(6.5, 6.5)$

13.

The graph shows the number of women enrolled in engineering at universities over time. What type of correlation fits the data?

   (A) strong positive

   (B) strong negative

   (C) weak negative

   (D) there is no correlation

14. Selena graphed the data she collected in her Chemistry class and needs to find the line of best fit. If the data and line are shown on the graph, what is the equation of her line of best fit?
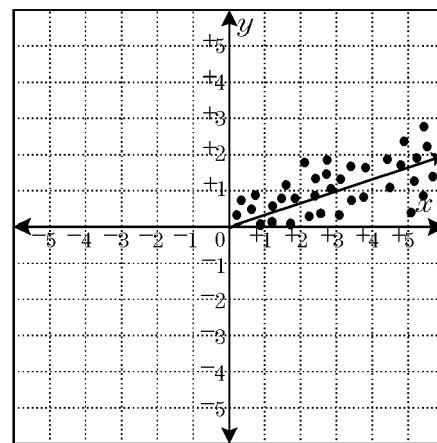
   (A) $y = 3x$ (B) $y = \frac{1}{3}x$

   (C) $y = -\frac{1}{3}x + 1$ (D) $y = -3x + 1$

15. Jaret has a box of 20 drywall screws, where 12 of the screws are $1\frac{5}{8}$ inches long and 8 of the screw are 2 inches long. If Jaret randomly reaches in and selects two screws, what is the probability that *both* screws are 2 inches long?

Ⓐ $\frac{14}{95}$　　Ⓑ $\frac{3}{76}$　　Ⓒ $\frac{11}{400}$　　Ⓓ $\frac{3}{4}$

16. The planning commission of a certain town compiled the following information from the census regarding married couples living in single-family dwellings. It was found that in 30% of these households, both the husband and wife worked, and that 10% of these couples were renting. In 50% of the households, only the husband worked, and 20% of these couples were renting. In 15% of the households, only the wife worked, and 70% of these couples were renting. In the households where neither worked, 95% were renting.

   a) Find the probability that a randomly selected couple from this group is not renting. Round your answer to the nearest thousandth. ☐

   b) If a randomly chosen couple from this group is renting, find the probability that only the wife is working. Round your answer to the nearest thousandth. ☐

17. Which describes all regular polygons?

   Ⓐ four sides equal and two angles equal

   Ⓑ all sides equal and all angles equal

   Ⓒ three sides equal and one right angle

   Ⓓ one pair of parallel sides

18. Two adjacent angles make up a vertex of an equilateral triangle as shown. The measure of one of the angles is 15° more than twice the other. What are the measures of the two angles?

   Ⓐ 15° and 45°

   Ⓑ 18° and 42°

   Ⓒ 25° and 35°

   Ⓓ 30° and 30°
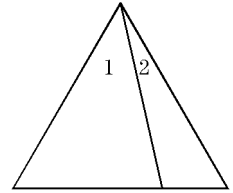
19. In quadrilateral *ABCD*, *AD* = *BC*, and *AB* = *DC*. For each of the following statements, determine whether it is true or false.

	true	false
The diagonals are equal	○	○
The diagonal bisects each other	○	○
Both pairs of opposite angles are congruent	○	○

20. Plot the following ordered pairs on the graph: $(2, 0)$, $(2, 1)$, $(2, 2)$, and $(2, -6)$. If you connect the points plotted on the graph, the result is best described as which of the following?
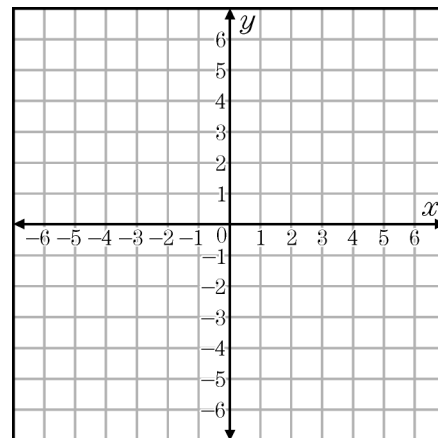
   Ⓐ one straight vertical line

   Ⓑ two straight vertical lines

   Ⓒ points that form a slanted line

   Ⓓ one straight horizontal line

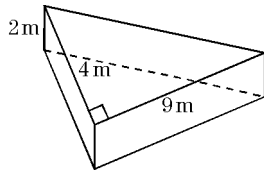21. In the diagram, $\overline{AE}$ and $\overline{BD}$ bisect each other. Which congruence relationship justifies that $\triangle ABC \cong \triangle ECD$?
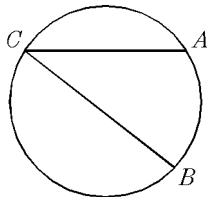
A   D
   C
B   E
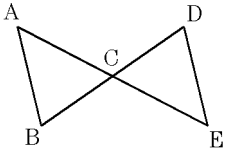
22. What is the volume of this triangular prism?

   Ⓐ $72 \, m^3$

   Ⓑ $144 \, m^3$

   Ⓒ $36 \, m^3$

   Ⓓ $15 \, m^3$

    $2\,m$ $4\,m$ $9\,m$

23. In the diagram, $\overline{CB}$ contains the center of the circle, $m\angle ACB = 40$ and $\overparen{AC}$ has a length of 10π units. What is the length of $\overline{CB}$?
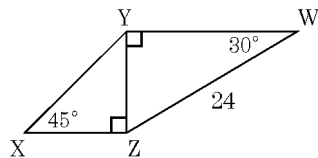
   Ⓐ   24 units

   Ⓑ   28 units

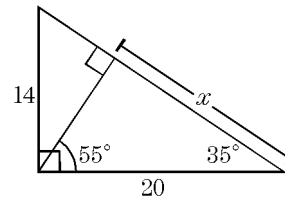   Ⓒ   36 units

   Ⓓ   42 units

    C   A   B

24. Find the equation of the circle whose center is on the line $x + 4 = 0$, and is tangent to the y-axis at $(0, -2)$.

25. Find the length of $\overline{XZ}$ in the figure.

   Ⓐ $2\sqrt{2}$

   Ⓑ   12

   Ⓒ $12\sqrt{2}$

   Ⓓ $12\sqrt{3}$

    Y   W $30°$ 24 $45°$ X   Z

26. Which of the following equations can be used to find the length of x?

    14   x $55°$ $35°$ 20

   Ⓐ $\sin 35° = \dfrac{x}{14}$ Ⓑ $\sin 35° = \dfrac{14}{x}$

   Ⓒ $\cos 35° = \dfrac{x}{20}$ Ⓓ $\tan 55° = \dfrac{x}{30}$

27. Express $\dfrac{1}{2 - i}$ as an equivalent fraction with a real denominator.

   Ⓐ $\dfrac{2 - i}{5}$ Ⓑ $\dfrac{2 + i}{3}$

   Ⓒ $\dfrac{2 + i}{5}$ Ⓓ $\dfrac{2 - i}{3}$

28. Fill in the blank with the value that makes the matrix equation true.

$$2\begin{bmatrix} 2 & 1 \\ 6 & 2 \\ -1 & 6 \end{bmatrix} + \begin{bmatrix} \square & -8 \\ -8 & 2 \\ 4 & 6 \end{bmatrix} = \begin{bmatrix} -1 & -6 \\ 4 & 6 \\ 2 & 18 \end{bmatrix}$$

   Ⓐ -5 Ⓑ -3

   Ⓒ -2 Ⓓ   undefined

29. If $\sqrt[M]{X^N} = 7^{2/3}$ then what is the value of M?

   Ⓐ $\frac{2}{3}$ Ⓑ 2   Ⓒ 3   Ⓓ 7

30. An example of an equation which has *no* real root is:

   Ⓐ $2x^2 - 5x - 8 = 0$ Ⓑ $2x^2 = 5x$

   Ⓒ $2x^2 + 5x - 8 = 0$ Ⓓ $2x^2 - 5x + 8 = 0$

31. The Orpheum Theater seats 600 people. Lately, the theater has been filled every night. The owner wants to raise the price, which is now \$5, but he knows with higher prices he will lose customers. He uses the following equation to estimate how much in dollars, y, he will make if he raises the price by x dollars.

$$y = 3000 + 350x - 50x^2$$

If the owner wants to make \$3500, what is the least amount he can raise the price of tickets?

Ⓐ \$3.00   Ⓑ \$5.00

Ⓒ \$2.00   Ⓓ \$2.50

32. Solve $5x^2 - 5x - 6 = 0$ to 2 decimal places.

Ⓐ −0.70, 1.70   Ⓑ −1.70, −0.70

Ⓒ 0.70, 1.70   Ⓓ −1.70

33. Find all rational roots of $2x^3 + x^2 - 6x - 3 = 0$.

34. The equation $\sqrt{y + 5} = 7 - y$ has:

Ⓐ only one real root

Ⓑ two positive roots

Ⓒ one positive root and one negative root

Ⓓ no real roots

35. Find the value(s) of x which will satisfy the equation $\sqrt{x + 3} = 3 - x$.

36. Complete the following arithmetic sequence.

$$\square, 4, \square, \square, 15$$

Ⓐ $\frac{1}{3}$; $7\frac{2}{3}$; $11\frac{1}{3}$ Ⓑ $1\frac{1}{4}$; $6\frac{3}{4}$; $9\frac{1}{2}$

Ⓒ 2; 6; 10   Ⓓ $\frac{8}{3}$; 6; 9

37. Gary started a petition. On Wednesday, he got three friends to sign the petition. On Thursday, each of the friends got three more people to sign. On Friday, each person who signed on Thursday got three more people to sign. If this pattern continues, how many people (including Gary) will have signed the petition by the end of Monday? Show how you arrived at your answer.

38. Factor $60a^4b + 36a^3b^2 - 15a^2b^3 - 9ab^4$ completely.

39. Factor $25x^3y^2 - 9x^3$ completely.

40. Express in simplest form: $\dfrac{a - \dfrac{1}{b}}{\dfrac{1}{a} - b}$

41. The equation of the axis of symmetry of the graph of $y = 2x^2 - 3x + 7$ is:

Ⓐ $y = -\frac{3}{4}$ Ⓑ $y = \frac{3}{4}$

Ⓒ $x = -\frac{3}{4}$ Ⓓ $x = \frac{3}{4}$

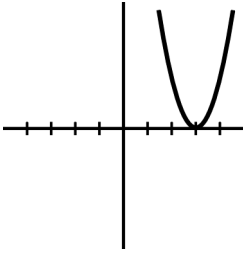42. Rationalize the denominator: $\dfrac{2 + \sqrt{3}}{4 - \sqrt{3}}$

Ⓐ $\dfrac{11 + 6\sqrt{3}}{7}$ Ⓑ $\dfrac{11 + 6\sqrt{3}}{13}$

Ⓒ $\dfrac{11 + 6\sqrt{3}}{19}$ Ⓓ $3 + 2\sqrt{3}$

43. What is the domain of the function?

$$y = 2x^2$$

Ⓐ $x < 0$ Ⓑ $x \geq 0$

Ⓒ $x \leq 0$ Ⓓ all real numbers

44. Here is the graph of $f(x)$:

Which of the following equations will transform $f(x)$ into $g(x)$, where $g(x)$ is compressed horizontally and shifted down 6 units?

Ⓐ $g(x) = \frac{1}{3}f(x) - 6$ Ⓑ $g(x) = \frac{1}{3}f(x + 6)$
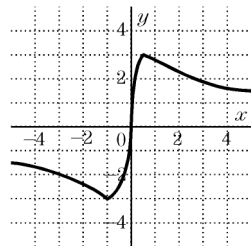
Ⓒ $g(x) = 3f(x + 6)$ Ⓓ $g(x) = 3f(x) - 6$

45. The graph of $(\frac{1}{2})^x = y$ lies only in _____ .

Ⓐ quadrant I

Ⓑ quadrant II

Ⓒ quadrants I and II

Ⓓ quadrants I and IV

46. Sketch the graph of $P(x) = 2x^3 - 3x^2 - 8x + 12$ for $-3 \leq x \leq 3$ and estimate any real zeros.

47. Which of the following is the equation of an asymptote for the function graphed?

Ⓐ $x = -3$

Ⓑ $x = 0$

Ⓒ $x = 3$

Ⓓ $y = 0$

48. Find the area between 144 and 180 under a normal curve with mean of 150 and $\sigma = 25$.

Ⓐ 0.5511   Ⓑ 0.7788

Ⓒ 0.4423   Ⓓ 0.4797

49. The total number of students at the Stanley Middle School who received A, B, C or D is shown on the graph below. Which statement is true about this graph?
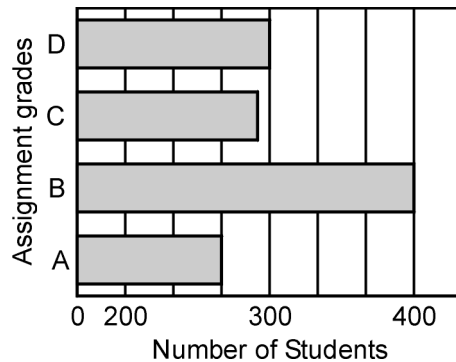
Ⓐ The number of students receiving C is close to 300.

Ⓑ The number of students receiving B is more than twice the number receiving A.

Ⓒ The number of students who received D is twice the number who received A.

Ⓓ The graph is incorrect because the scale is incorrect.

50. If you graphed the height versus vocabulary size for students in grades K–5, the positive slope indicates _____ .

Ⓐ causation

Ⓑ correlation

Ⓒ causation and correlation

Ⓓ nothing

OK OAS High School Math Samples

OK OAS High School Math Samples   12/29/2023

1.
Answer: B
Objective: A1.N.1.2
Points: 1

2.
Answer: B
Objective: A1.N.1.2
Points: 1

3.
Answer: D
Objective: A1.N.1.2
Points: 1

4.
Answer: $\left(\frac{7}{3}, -\frac{11}{6}\right)$
Objective: A1.A.1.3
Points: 1

5.
Answer: 3,17
Objective: A1.A.1.3
Points: 1

6.
Answer: D
Objective: A1.A.3.4
Points: 1

7.
Answer: 1,3
Objective: A1.A.4.2
Points: 1

8.
Answer: A
Objective: A1.A.4.4
Points: 1

9.
Answer: Yes.
Objective: A1.F.1.1
Points: 1

10.
Answer: $y = f(x + 2) - 7$
Objective: A1.F.2.2
Points: 1

11.
Answer: A
Objective: A1.F.3.2
Points: 1

12.
Answer: A
Objective: A1.D.1.2
Points: 1

13.
Answer: A
Objective: A1.D.1.2
Points: 1

14.
Answer: B
Objective: A1.D.1.2
Points: 1

15.
Answer: A
Objective: A1.D.2.1
Points: 1

16.
Answer: .718,.372
Objective: A1.D.2.1
Points: 1

17.
Answer: B
Objective: G.RL.1.1
Points: 1

18.
Answer: A
Objective: G.2D.1.2
Points: 1

19.
Answer: [2],[1],[1]
Objective: G.2D.1.4
Points: 1

20.
Answer: A
Objective: G.2D.1.5
Points: 1

21.
Answer: SAS
Objective: G.2D.1.8
Points: 1

22.
Answer: C
Objective: G.3D.1.1
Points: 1

23.
Answer: C
Objective: G.C.1.2
Points: 1

24.
Answer: $(x + 4)^2 + (y + 2)^2 = 16$
Objective: G.C.1.4
Points: 1

25.
Answer: B
Objective: G.RT.1.2
Points: 1

26.
Answer: C
Objective: G.RT.1.4
Points: 1

27.
Answer: C
Objective: A2.N.1.2
Points: 1

28.
Answer: A
Objective: A2.N.1.3
Points: 1

29.
Answer: C
Objective: A2.N.1.4
Points: 1

30.
Answer: D
Objective: A2.A.1.1
Points: 1

31.
Answer: C
Objective: A2.A.1.1
Points: 1

32.
Answer: A
Objective: A2.A.1.1
Points: 1

33.
Answer: $-\frac{1}{2}, \pm\sqrt{3}$
Objective: A2.A.1.4
Points: 1

34.
Answer: A
Objective: A2.A.1.5
Points: 1

35.
Answer: 1
Objective: A2.A.1.5
Points: 1

36.
Answer: A
Objective: A2.A.1.7
Points: 1

37.
Answer: 1,093 people
Objective: A2.A.1.7
Points: 1

38.
Answer: $3ab(5a + 3b)(2a + b)(2a - b)$
Objective: A2.A.2.1
Points: 1

39.
Answer: $x^3(5y + 3)(5y - 3)$
Objective: A2.A.2.1
Points: 1

40.
Answer: $-\frac{a}{b}$
Objective: A2.A.2.2
Points: 1

41.
Answer: D
Objective: A2.A.2.3
Points: 1

42.
Answer: B
Objective: A2.A.2.4
Points: 1

43.
Answer: D
Objective: A2.F.1.1
Points: 1

44.
Answer: D
Objective: A2.F.1.2
Points: 1

45.
Answer: C
Objective: A2.F.1.4
Points: 1

46.
Answer: −2, 1.5, 2
Objective: A2.F.1.5
Points: 1

47.
Answer: D
Objective: A2.F.1.6
Points: 1

48.
Answer: D
Objective: A2.D.1.1
Points: 1

49.
Answer: D
Objective: A2.D.2.1
Points: 1

50.
Answer: B
Objective: A2.D.2.2
Points: 1