Final Exam Pre-Assesment

Name: _____ **Date:** _____

1. Choose the statement(s) which is (are) true of a normal distribution.

   I. it is symmetric about the mean

   II. the shape of the graph of a normal distribution is mound-shaped

   III. 99.7% of the data is within 2 standard deviation of the mean

   A. I only B. III only

   C. I and II only D. II and III only

2. Simplify: $\dfrac{x^2 - x - 6}{x^2 - 5x + 6}$

   A. -3 B. -1 C. $\dfrac{x+2}{x-2}$ D. $\dfrac{x-2}{x+2}$

3. A club has 30 male and 70 female members. If a committee of 30 is being formed by random selection, to ensure that there is a proportional representation of males and females in the club a stratified random sample is used to select the committee. What is the number of males that must be chosen?

   A. 9 B. 25 C. 15 D. 16

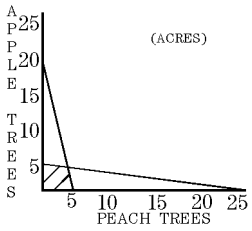
4. Find the sum of the first 7 terms of the geometric series $3 + 6 + 12 + \cdots$.

   A. 99 B. 189 C. 381 D. 765

5. If $(a + bi) + (2 - i) = 3 + i$, find the value of b.

   A. 2 B. 0 C. 1 D. $\frac{1}{2}$

6. A 20-acre orchard is planted with apple and peach trees. At most \$10,000 can be spent on planting costs. Planting cost for apple trees \$400/acre and for peach trees \$1000/acre. Choose the best graph that shows the area of each crop that can be planted.

   A.
   

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   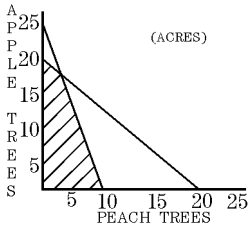

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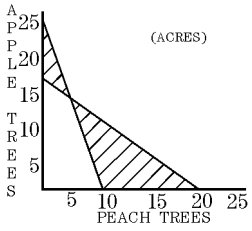
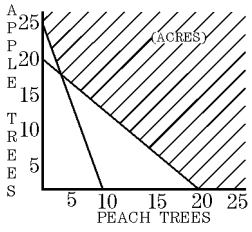
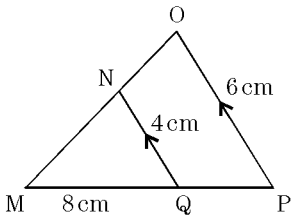
   

   D.
   

7. In the figure, $\overline{NQ}$ is parallel to $\overline{OP}$ and $NQ = 4$, $OP = 6$, and $MQ = 8$. How long is $\overline{MP}$?

   A. 4 B. 10

   C. 12 D. 16

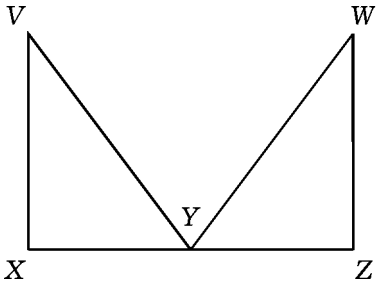
   

8. Given: $VY = WY$

$VX = WZ$

Y is the midpoint of $\overline{XZ}$

Prove: $\triangle VXY \cong \triangle WYZ$



statement	reason
Y is the midpoint of $\overline{XZ}$	(1)
$XY = YZ$	(2)
$VY = WY$	(3)
$VX = WZ$	(4)
$\triangle VXY \cong \triangle WYZ$	(5)

In the above proof, what is reason (2)?

A. definition of angle midpoint

B. definition of midpoint

C. definition of bisector

D. definition of perpendicular bisector

9. Use synthetic division to find the remainder when $x^4 + 2x^3 - 4x^2 - 5$ is divided by $x + 3$.

A. -14 B. 14 C. 4 D. 94

10. Consider the graph of $y = -3|x|$. What will be the effect on the graph if -3 is replaced with 3?

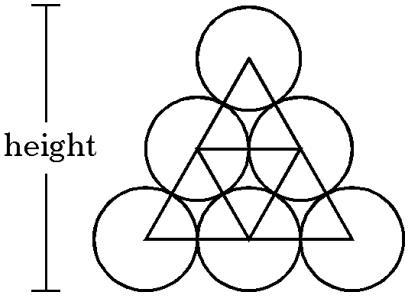
A. a flip over the x-axis

B. a horizontal shift of 1 unit to the left

C. a vertical shift

D. no change

11. You are creating a cheese log display at the deli. Each log has a diameter of 4 inches. When viewed from the end, the display forms the pyramid pattern shown below.



If you use 45 cheese logs, what is the approximate height of the display?

A. 28 in B. 32 in C. 36 in D. 42 in

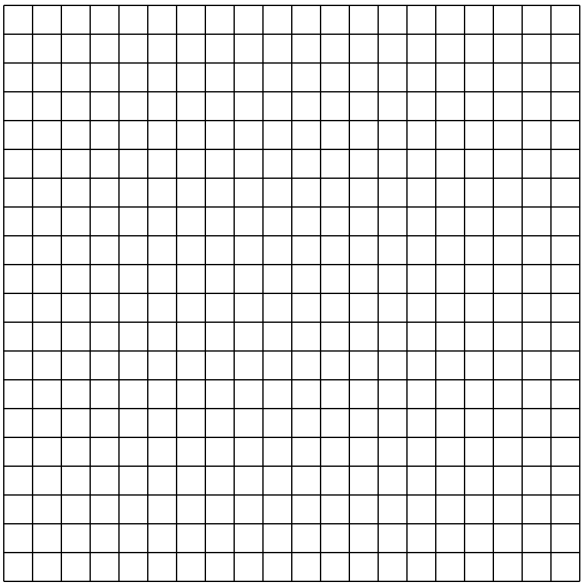
12. In two petri dishes, a sample of bacteria covers an area of $5\,\text{mm}^2$. Each dish contains a different growth medium. The different growth rates—in mm^2 per day—are approximated by the functions:

Dish 1: $f(t) = 5 + \left(\frac{\pi}{2}\right) t^2$

Dish 2: $g(t) = 5 + \left(\frac{\pi}{2}\right)^{1.3t}$

Graph the results for the first 10 days.

On which day does the area in Dish 2 begin to exceed Dish 1?



A. Day 5 B. Day 6 C. Day 8 D. Day 9

13. Find the sum of the first 5 terms of the geometric series $1 + 3 + 9 + \cdots$.

A. 40 B. 121 C. 364 D. 1093

14. Tracy wants to use an expression that will give her an odd integer. Which expression should she use?

A. $5x + 1$ B. $4x + 1$ C. $3x$ D. x^2

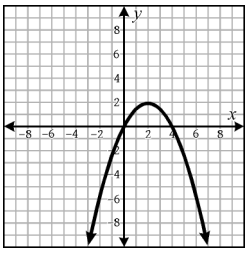
15. Given the graph, determine the number of distinct real solutions.

A. no solution

B. one solution

C. two solutions

D. not enough information



16. When $2x^2 + x + c$ is divided by $x + k$, the quotient is $2x + 5$ and the remainder is 7. Find c and k.

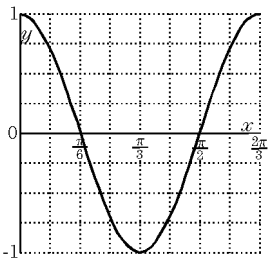
A. $k = 1,\ c = -3$ B. $k = -5,\ c = -6$

C. $k = 2,\ c = 3$ D. $k = -2,\ c = -3$

17. Express $\frac{11\pi}{3}$ radians in degrees.

A. 145° B. 330° C. 630° D. 660°

18. Which is an equation for the graph shown?



A. $y = \cos\frac{2\pi}{3}x$

B. $y = \cos 3x$

C. $y = \cos\frac{1}{3}x$

D. $y = \cos\frac{1}{2}x$

19. If X is normally distributed with $\mu = 155$ and $\sigma = 11$, find $P(145 < X < 159)$.

A. 0.3133 B. 0.5255

C. 0.7877 D. 0.4592

20. Find the quotient and remainder of $(x^3 + 8x^2 + 19x + 13) \div (x + 3)$.

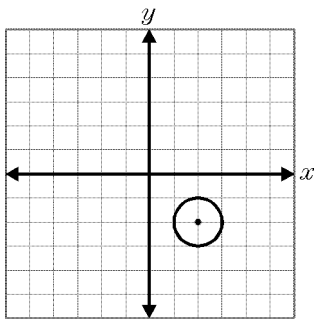
A. $(x^2 + 5x + 4)$ R -1

B. $(x^2 + 11x + 52)$ R 169

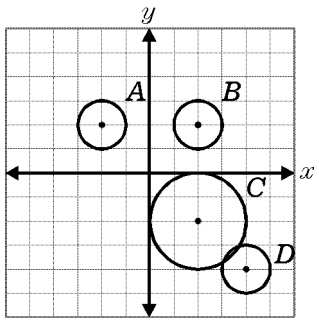
C. $(x^2 + 5x + 4)$ R 1

D. $(x^2 + 11x + 52)$ R -1

21. The circle shown has an equation in the form of $(x - h)^2 + (y - k)^2 = 1$.



If the values of h and k were doubled, which of the following is the graph of the new circle?



A. *A* B. *B* C. *C* D. *D*

22. Find the center and radius of the circle $x^2 + y^2 + 4x - 6y + 12 = 0$.

A. $(-2, 3);\ 2\sqrt{3}$ B. $(2, -3);\ 2\sqrt{3}$

C. $(-2, 3);\ 1$ D. $(2, -3);\ 1$

23. What should be added to both sides of the equation to complete the square for $x^2 + 4x = 5$?

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

24. Write an expression to represent any angle coterminal with the angle 170° (n is an integer).

A. $360^\circ + n(170^\circ)$ B. $170^\circ + n(360^\circ)$

C. $170^\circ + n(180^\circ)$ D. $n(240^\circ)$

25. Express $\tan(-310^\circ)$ as a function of a positive acute angle in terms of $\tan x$.

A. $\tan 50^\circ$ B. $-\tan 40^\circ$

C. $-\tan 50^\circ$ D. $\tan 40^\circ$

26. Convert to radians: 315°

A. $\frac{7\pi}{4}$ B. $\frac{5\pi}{4}$ C. $\frac{11\pi}{6}$ D. $\frac{5\pi}{3}$

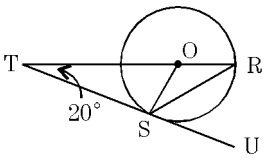
27. Solve: $2 = \frac{\sqrt{2(3-x)}}{4}$

A. -13 B. -29 C. -32 D. Ø

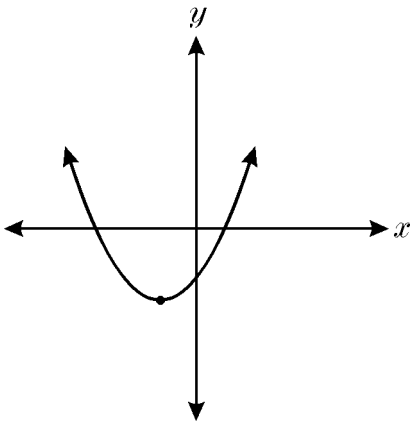
28. In circle O, $\overline{TS}$ is tangent to the circle at S and $m\angle OTS = 20^\circ$. What is the measure, in degrees, of minor arc $\overset{\frown}{RS}$?

A. 70 B. 110

C. 120 D. 160



29. How many solutions are shown by the graph of the quadratic function?



A. zero B. one C. two D. three

30. Solve $a(x) = b(x)$ for x:

$a(x) = -4x - 11$ $b(x) = -\frac{1}{2}x + 3$

A. 5 B. 4 C. 1 D. -4

31. *Sampling error* is represented by the equation $SE = 2\sqrt{\frac{p(1-p)}{n}}$, where p equals the proportion saying yes.

a) What happens to the sampling error for a population when you quarter the size of the sample?

b) If $p = 0.03$, then what sample size gives a sampling error of 8%?

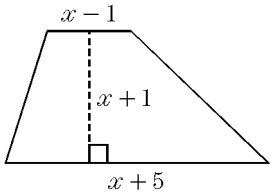
32. Given the trapezoid shown, express the area in terms of x.

A. $3x + 5$

B. $2x + 3$

C. $x^2 + 3x + 2$

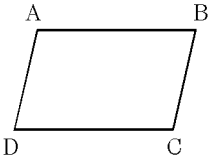
D. $x^2 - 2x + 2$



33. Given: $AB = DC$

$\overline{AB} \parallel \overline{DC}$

Prove: $m\angle DAC = m\angle BCA$



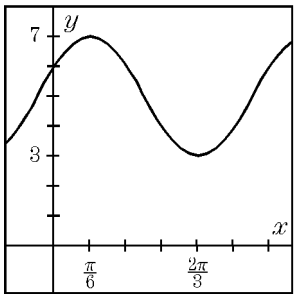
statement	reason
Join $\overline{AC}$	
$\overline{AB} \parallel \overline{DC}$	(1)
$AB = DC$	(2)
$m\angle BAC = m\angle DCA$	(3)
$AC = AC$	(4)
$\triangle ADC \cong \triangle CBA$	(5)
$m\angle DAC = m\angle BCA$	(6)

In the above proof, what is reason (6)?

A. CPCTC B. ASA C. SAS

D. alternate interior angles

34. For the graph shown, what is the equation in the form $y = a\cos b(x - c) + d$?



A. $2\cos\left(x - \frac{\pi}{6}\right) + 5$ B. $2\cos 2\left(x - \frac{\pi}{6}\right) + 5$

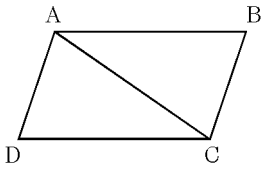
C. $2\cos 2\left(x + \frac{\pi}{6}\right) + 5$ D. $2\cos\left(x + \frac{\pi}{6}\right) + 5$

35. Given: $\overline{AB} \parallel \overline{DC}$
$AB = DC$

Prove: $m\angle DAC = m\angle BCA$

Statement	Reason
$\overline{AB} \parallel \overline{DC}$	(1)
$AB = DC$	(2)
$m\angle BAC = m\angle DCA$	(3)
$AC = AC$	(4)
$\triangle ADC \cong \triangle CBA$	(5)
$m\angle DAC = m\angle BCA$	(6)

In the above proof, what is reason (6)?



A. CPCTC

B. SSS

C. ASA

D. alternate interior angles

36. What is the inverse of $y = 4x^2 + 2$?

A. $y = \pm\frac{\sqrt{x+2}}{4}$ B. $y = \pm\frac{\sqrt{x+2}}{2}$

C. $y = \pm\frac{\sqrt{x-2}}{4}$ D. $y = \pm\frac{\sqrt{x-2}}{2}$

37. What impact does a have on the graph of $f(x) = a|x + 4| - 5$ if the value of a changes from $a = 1$ to $a = 2$.

A. The vertex remains unchanged, but the slopes of the two sides become steeper.

B. The vertex changes from $(-4, -5)$ to $(-8, -5)$.

C. The graph is unchanged.

D. The vertex remains unchanged, but the slopes of the two sides are not as steep.

38. Given:

$$g(x) = x(x + 5)(x - 5)(x + 1)^2$$

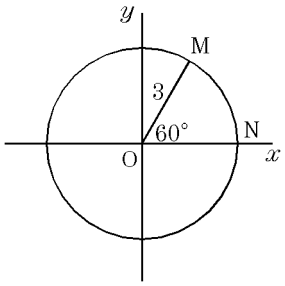
Which is *not* a solution to the function?

A. -5 B. -1 C. $\frac{1}{2}$ D. 5

39. If $m\angle NOM = 60°$, then what is the length of the minor arc $\overset{\frown}{NM}$?

A. $\frac{\pi}{4}$ B. $\frac{\pi}{2}$

C. π D. 2π



40. Multiply: $(3x + 2)(3x - 2)$

A. $3x^2 - 2$ B. $9x^2 - 4$

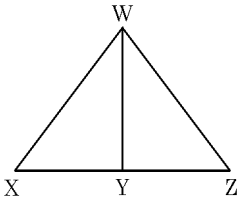
C. $9x^2 - 12x + 4$ D. $9x^2 + 12x - 4$

41. Given: $\overline{WY}$ is the angle bisector of $\angle XWZ$
$m\angle XYW = m\angle ZYW$

Prove: $\triangle WXY \cong \triangle WZY$

statement	reason
$\overline{WY}$ is the $\angle$ bisector of $\angle XWZ$	(1)
$m\angle XWY = m\angle ZWY$	(2)
$WY = WY$	(3)
$m\angle XYW = m\angle ZYW$	(4)
$\triangle WXY \cong \triangle WZY$	(5)

In the above proof, what is reason (1)?



A. given

B. definition of angle bisector

C. definition of a perpendicular bisector

D. definition of a perpendicular

42. Solve for x: $3x^2 - 11x + 6 = 0$

A. $\frac{2}{3}, -5$ B. $\frac{3}{2}, \frac{1}{5}$ C. $3, \frac{2}{3}$ D. $-5, 3$

43. Complete the square to find the standard form for this circle:

$x^2 - 10x + y^2 + 14y - 7 = 0$

A. $(x + 5)^2 + (y + 7)^2 = 9$

B. $(x - 5)^2 + (y + 7)^2 = 81$

C. $(x - 5)^2 + (y - 7)^2 = 9$

D. $(x + 5)^2 + (y - 7)^2 = 81$

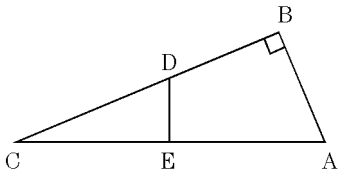
44. Triangle ABC is a right triangle. $\overline{DE}$ is perpendicular to $\overline{AC}$ and bisects $\overline{AC}$. If $AB = 10$ and $BC = 24$, then how long is $\overline{DE}$?

A. $5\frac{5}{12}$

B. $10\frac{2}{5}$

C. 12

D. $33\frac{4}{5}$



45. The equation $x^2 + 2x = 3(x + 2)$ has two solutions. What are they?

A. $-4, 3$ B. $-3, 5$ C. $-3, 4$ D. $-2, 3$

46. What is the amplitude of the graph defined by $y = 2\cos\frac{x}{2}$?

A. 2 B. $\frac{1}{2}$ C. 1 D. 4

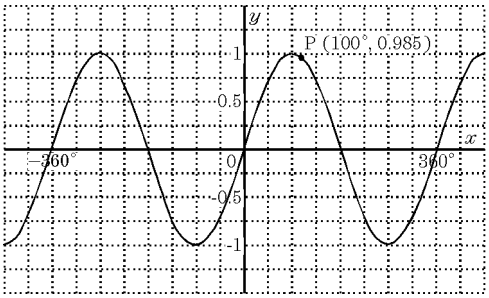
47. If $(-3, 1)$ is in the function $f(x)$, then which of the following points will be in the function $f^{-1}(x)$?

A. $(1, -3)$ B. $(3, 1)$

C. $(3, -1)$ D. $(-1, -3)$

48. The grid shows the coordinates of one point on the graph of $y = \sin x$.

Write the x-coordinates of four other points on the graph that have the same y-coordinate as this point.



A. $-280°, -260°, 80°, 440°$

B. $-80°, -100°, -260°, -280°$

C. $-80°, -100°, 80°, 260°$

D. $-100°, 80°, 260°, 440°$

49. Determine the solution set of the equation $x(x^2 + 1)(x^2 - 4) = 0$.

A. $\{-2, 2\}$

B. $\{-2, -1, 0, 1, 2\}$

C. $\{-2, 0, 2\}$

D. $\{0, 1, -1\}$

50. Express the product in standard form.

$(5 - 2i)(3 + 4i)$

A. $23 + 14i$ B. $23 - 14i$

C. $7 + 14i$ D. $-7 - 14i$

51. Given: $\overline{VT}$ bisects $\overline{RW}$
$\overline{RW}$ bisects $\overline{TV}$

Prove: $\triangle RSV \cong \triangle WST$

Statement	Reason
$\overline{VT}$ bisects $\overline{RW}$	(1)
$RS = WS$	(2)
$m\angle RSV = m\angle WST$	(3)
$\overline{RW}$ bisects $\overline{TV}$	(4)
$TS = VS$	(5)
$\triangle RSV \cong \triangle WST$	(6)

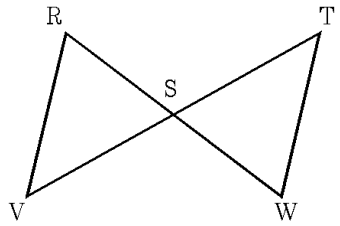
In the proof, what is the reason for (6)?

A. AAA

B. AAS

C. ASA

D. SAS



52. Consider solving $x^2 + 14x + 3 = 0$ by completing the square.

$x^2 + 14x +$ _____ $= -3 +$ _____

What is the number that goes in the blanks?

A. -21 B. 21 C. 49 D. 196

53. A circle has a circumference of 12 cm. The measure of a central angle of the circle is 60 degrees. What is the length of the arc associated with this angle?

A. 1 cm B. 2 cm C. 4 cm D. 6 cm

54. P is a point on the terminal arm of an angle θ in standard position. Suppose $\theta = -750°$. Where is P located?

A. in quadrant I

B. in quadrant II

C. in quadrant IV

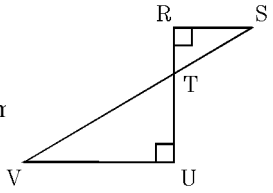
D. on the positive y-axis

55. In the figure. $RS = 6$, $RT = 4$, and $TU = 6$. What is the length of $\overline{UV}$?

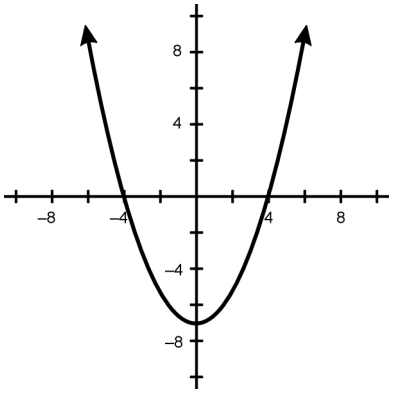
A. 15 B. 10

C. 9

D. not enough inform



56. Given the graph of $g(x) = f(x) - 7$. What is the name for the parent function $f(x)$?



A. linear B. exponential

C. square root D. quadratic

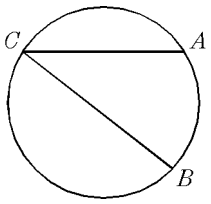
57. In the diagram, $\overline{CB}$ contains the center of the circle, $m\angle ACB = 40$ and $\overset{\frown}{AC}$ has a length of 10π units. What is the length of $\overline{CB}$?

A. 24 units

B. 28 units

C. 36 units

D. 42 units



58. The equation of a circle is in the form:

$$(x - h)^2 + (y - k)^2 = 25$$

If the circle is centered in Quadrant II, what *must* be true of h and k?

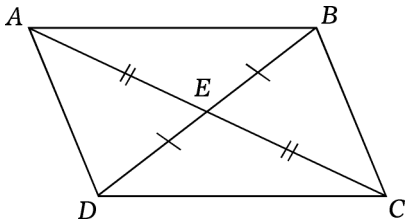
A. $h > 0$ and $k > 0$ B. $h < 0$ and $k < 0$

C. $h < 0$ and $k > 0$ D. $h > 0$ and $k < 0$

59. Given: $\overline{AC}$ and $\overline{BD}$ bisect each other

Prove: $\overline{AD} \parallel \overline{BC}$

Which of the following statements is *not* needed, if the proof makes use of the other three?



A. $\triangle AED \cong \triangle CED$

B. $AB = DC$

C. $m\angle AEB = m\angle DEC$

D. $AE = EC$ and $DE = EB$

60. Convert x degrees to radians.

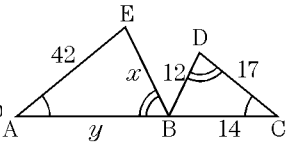
A. $\frac{\pi x}{180}$ B. $\frac{180}{\pi x}$ C. $\frac{180x}{\pi}$ D. $\frac{90}{\pi x}$

61. Find the value of y.

A. 4 B. 36

C. 51

D. not enough info



62. What type of function has the possibility of one x-intercept?

I. linear

II. quadratic

III. absolute value

A. I only B. II only

C. II and III only D. I, II, and III

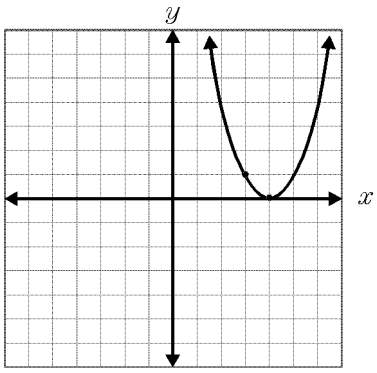
63. Three students took 3 different kinds of tests with the following results:

Marco scored 125	Amy scored 97	Monica scored 257
$\bar{x} = 111$	$\bar{x} = 85$	$\bar{x} = 233$
σ=12	σ=9	σ=21

Who has the lowest relative score?

A. Monica B. Amy C. Marco D. Marco and Amy

64. The graph of $y = (x-4)^2$ is shown below.



What is the *minimum* y-value graphed?

A. 4 B. 1 C. 0 D. 6

65. What is the equation of the inverse of $y = \frac{3}{x+2}$?

A. $y = \frac{3}{x} - 2$ B. $y = \frac{1}{3}x + \frac{2}{3}$

C. $y = -\frac{3}{x+2}$ D. $y = -\frac{3}{x} - \frac{3}{2}$

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1.
Answer: C
Objective: S.ID.4

2.
Answer: C
Objective: A.APR.6

3.
Answer: A
Objective: S.IC.4

4.
Answer: C
Objective: A.SSE.4

5.
Answer: A
Objective: N.CN.2

6.
Answer: B
Objective: A.CED.3

7.
Answer: C
Objective: G.SRT.5

8.
Answer: B
Objective: G.CO.10

9.
Answer: A
Objective: A.APR.2

10.
Answer: A
Objective: F.BF.3

11.
Answer: B
Objective: G.MG.3

12.
Answer: C
Objective: F.LE.3

13.
Answer: B
Objective: A.SSE.4

14.
Answer: B
Objective: N.RN.3

15.
Answer: C
Objective: F.IF.4

16.
Answer: D
Objective: A.APR.2

17.
Answer: D
Objective: F.TF.1

18.
Answer: B
Objective: F.TF.5

19.
Answer: D
Objective: S.ID.4

20.
Answer: C
Objective: A.APR.2

21.
Answer: D
Objective: G.GPE.1

22.
Answer: C
Objective: G.GPE.1

23.
Answer: D
Objective: A.REI.4A

24.
Answer: B
Objective: F.TF.2

25.
Answer: A
Objective: F.TF.2

26.
Answer: A
Objective: F.TF.1

27.
Answer: B
Objective: A.REI.2

28.
Answer: B
Objective: G.C.5

29.
Answer: C
Objective: F.IF.4

30.
Answer: B
Objective: A.REI.11

31.
Answer: it is doubled; ≈ 132
Objective: S.IC.4

32.
Answer: C
Objective: A.APR.1

33.
Answer: A
Objective: G.CO.11

34.
Answer: B
Objective: F.TF.5

35.
Answer: A
Objective: G.CO.10

36.
Answer: D
Objective: F.BF.4A

37.
Answer: A
Objective: F.BF.3

38.
Answer: C
Objective: A.APR.3

39.
Answer: C
Objective: G.C.5

40.
Answer: B
Objective: A.APR.1

41.
Answer: A
Objective: G.CO.10

42.
Answer: C
Objective: A.REI.4B

43.
Answer: B
Objective: G.GPE.1

44.
Answer: A
Objective: G.SRT.5

45.
Answer: D
Objective: A.REI.4B

46.
Answer: A
Objective: F.TF.5

47.
Answer: A
Objective: F.BF.4A

48.
Answer: A
Objective: F.IF.4

49.
Answer: C
Objective: A.APR.3

50.
Answer: A
Objective: N.CN.2

51.
Answer: D
Objective: G.CO.10

52.
Answer: C
Objective: A.REI.4A

53.
Answer: B
Objective: G.C.5

54.
Answer: C
Objective: F.TF.2

55.
Answer: C
Objective: G.SRT.5

56.
Answer: D
Objective: F.BF.3

57.
Answer: C
Objective: G.C.5

58.
Answer: C
Objective: G.GPE.1

59.
Answer: B
Objective: G.CO.11

60.
Answer: A
Objective: F.TF.1

61.
Answer: C
Objective: G.SRT.5

62.
Answer: D
Objective: F.IF.4

63.
Answer: A
Objective: S.ID.4

64.
Answer: C
Objective: F.IF.4

65.
Answer: A
Objective: F.BF.4A