Mathematics 2201
Common Mathematics Assessment

June 12, 2013

Name: _____

Mathematics Teacher: _____

28 Selected Response	28 marks
13 Constructed Response	42 marks
FINAL	**70 Marks**

TIME: 2 HOURS

NOTE

Diagrams are not necessarily drawn to scale.

FORMULAE

$\frac{sinA}{a} = \frac{sinB}{b} = \frac{sinC}{c}$	$a^2 = b^2 + c^2 - 2bccosA$	$cosA = \frac{b^2 + c^2 - a^2}{2bc}$

$\sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{n}}$	$z = \frac{x - \mu}{\sigma}$	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Selected Response: Choose the appropriate response on the answer sheet or SCANTRON.

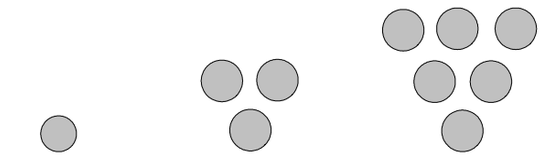
1. What is a statement that is believed to be true but not yet proven?

   (A) Conjecture
   (B) Counterexample
   (C) Deductive Reasoning
   (D) Inductive Reasoning

2. Which is a counterexample to the statement "The sum of two consecutive integers is always greater than each of the two integers"?

   (A) $-4 + (-5) = -9$
   (B) $4 + (-5) = -1$
   (C) $-4 + 5 = 1$
   (D) $4 + 5 = 9$

3. How many circles are in the **5th diagram** in the sequence below:



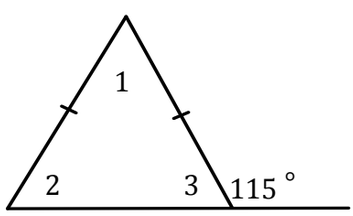
1st Diagram 2nd Diagram 3rd Diagram

   (A) 9
   (B) 10
   (C) 14
   (D) 15

4. If two non-parallel lines are cut by a transversal, which pair of angles is always equal?

   (A) Alternate Interior
   (B) Corresponding
   (C) Supplementary
   (D) Vertically Opposite

5. A student was asked to find the measure of $\angle 1$. In which step did he make the first error?



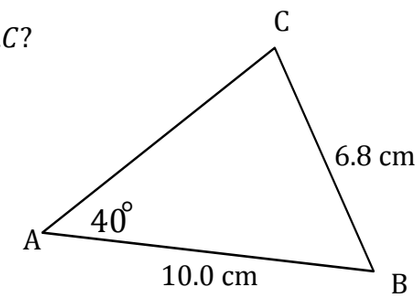
Solution
Step 1: $\angle 3 = 180° - 115°$
Step 2: $\angle 3 = 65°$
Step 3: $\angle 1 = \angle 3$
Step 4: $\angle 1 = 65°$

   (A) 1
   (B) 2
   (C) 3
   (D) 4

6. How many sides does a convex polygon have if the sum of its interior angles is 1440° ?

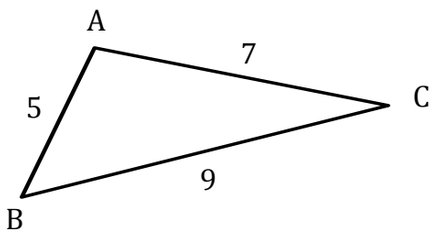
(A) 4
(B) 6
(C) 8
(D) 10

7. What is the measure of $\angle C$?



(A) 20°
(B) 26°
(C) 69°
(D) 71°

8. Which equals the measure of $\angle A$?



(A) $\cos^{-1}\left(\frac{5^2+9^2-7^2}{2(5)(9)}\right)$

(B) $\cos^{-1}\left(\frac{7^2+5^2-9^2}{2(7)(5)}\right)$

(C) $\cos^{-1}\left(\frac{9^2+5^2-7^2}{2(9)(5)}\right)$

(D) $\cos^{-1}\left(\frac{9^2+7^2-5^2}{2(9)(7)}\right)$

9. Simplify completely: $5\sqrt{7}+3\sqrt{28}$

(A) $11\sqrt{7}$
(B) $17\sqrt{7}$
(C) $11\sqrt{14}$
(D) $8\sqrt{35}$

10. Simplify completely: $\sqrt[3]{-8x^{17}}$

(A) $-2x^2\sqrt[3]{x^5}$
(B) $-2x^5\sqrt[3]{x^2}$
(C) $2x\sqrt[3]{-2x^8}$
(D) $2x^8\sqrt[3]{-2x}$

11. Write $3x^3\sqrt{5x}$ as an entire radical.

(A) $\sqrt{15x^4}$
(B) $\sqrt{15x^7}$
(C) $\sqrt{45x^4}$
(D) $\sqrt{45x^7}$

12. A student was asked to simplify $\frac{x\sqrt{18x^3}}{3}$ but did not complete a correct solution. Which step contains her first error?

Solution:

Step 1: $\frac{x\sqrt{9\cdot 2\cdot x^2\cdot x}}{3}$

Step 2: $\frac{x\cdot 9x^2\sqrt{2x}}{3}$

Step 3: $\frac{9x^3\sqrt{2x}}{3}$

Step 4: $3x^3\sqrt{2x}$

(A) 1
(B) 2
(C) 3
(D) 4

13. Simplify completely: $\frac{5\sqrt{32}}{2\sqrt{3}}$

(A) $\frac{10\sqrt{6}}{3}$

(B) $\frac{40\sqrt{6}}{3}$

(C) $\frac{5\sqrt{96}}{6}$

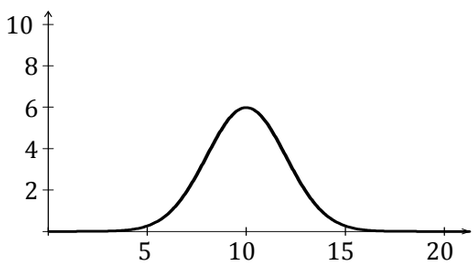
(D) $\frac{10\sqrt{96}}{12}$

14. What are the restrictions on the variable for $\sqrt{x+2}$?

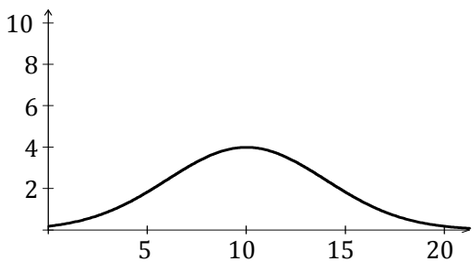
(A) $x \geq -2$
(B) $x > -2$
(C) $x \geq 2$
(D) $x > 2$

15. Which represents data with the largest standard deviation?

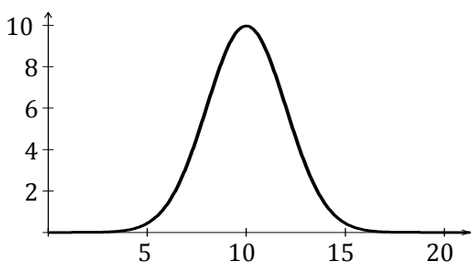
(A)



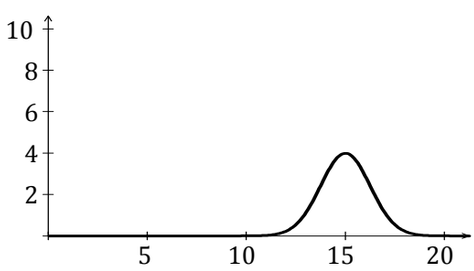
(B)



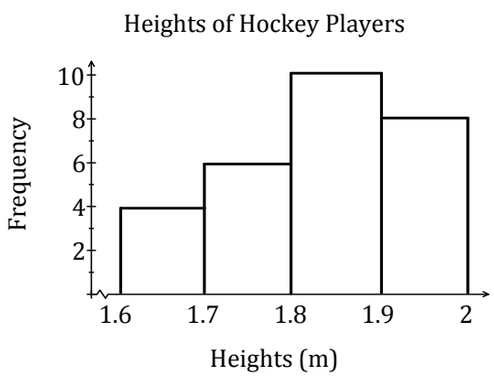
(C)



(D)



16. The histogram shown represents the heights of hockey players on a professional hockey team. How many players have a height between 1.8 m and 2.0 m?



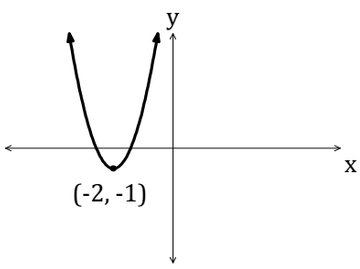
(A) 10
(B) 18
(C) 24
(D) 28

17. A set of data is normally distributed. What percent of the data is within two standard deviations of the mean?

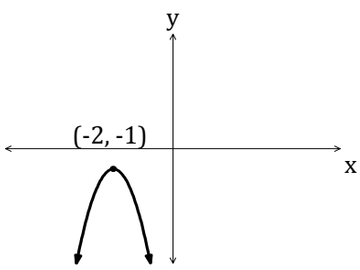
(A) 47.5
(B) 68
(C) 95
(D) 99.7

18. The function $y = -3x^2 - 12x - 13$ has axis of symmetry $x = -2$. Which represents the function?

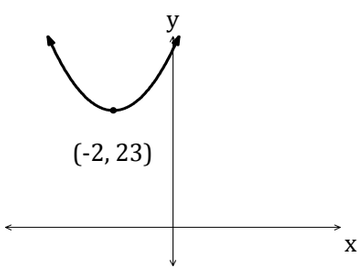
(A)



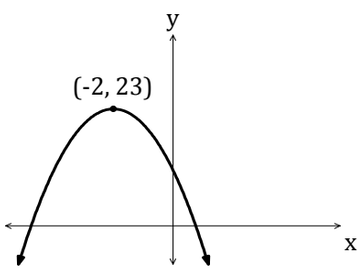
(B)



(C)



(D)



19. What is the domain and range for $f(x) = -2(x+1)^2 - 3$?

(A) $x \in \mathbb{R}$ and $f(x) \leq -3$
(B) $x \in \mathbb{R}$ and $f(x) \geq -3$
(C) $x \leq -1$ and $f(x) \in \mathbb{R}$
(D) $x \geq -1$ and $f(x) \in \mathbb{R}$

20. A parabola has x-intercepts of $(-2,0)$ and $(-8,0)$. What is the axis of symmetry?

(A) $x = -5$
(B) $x = -3$
(C) $y = -5$
(D) $y = -3$

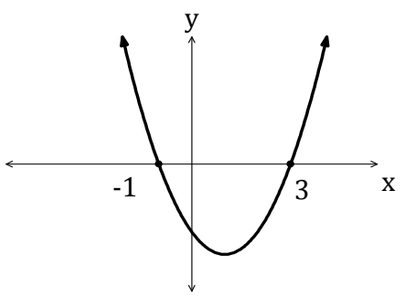
21. What is the vertex of $y = 2x^2 + 8x - 5$?

(A) $(-2, -29)$
(B) $(-2, -13)$
(C) $(2, 15)$
(D) $(2, 19)$

22. The graph of a quadratic function has vertex $(1, -4)$ and opens upward. How many x-intercepts does it have?

(A) 0
(B) 1
(C) 2
(D) 3

23. What is the equation of the function graphed below?



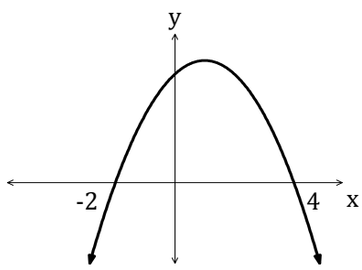
(A) $y = (x - 1)(x - 3)$
(B) $y = (x - 1)(x + 3)$
(C) $y = (x + 1)(x - 3)$
(D) $y = (x + 1)(x + 3)$

24. Which is a root of $2x^2 - 5x - 3 = 0$

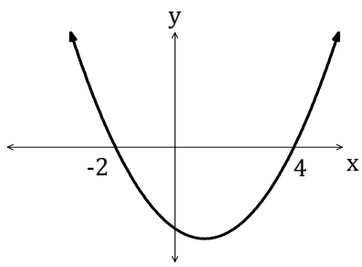
(A) -3
(B) -1
(C) 1
(D) 3

25. Which represents a quadratic function with zeros of -2 and 4 and a maximum value?

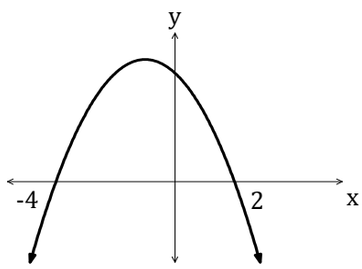
(A)



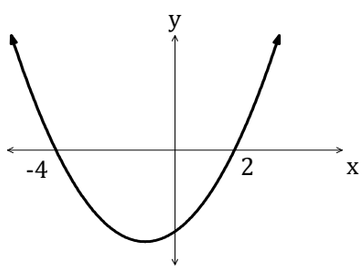
(B)



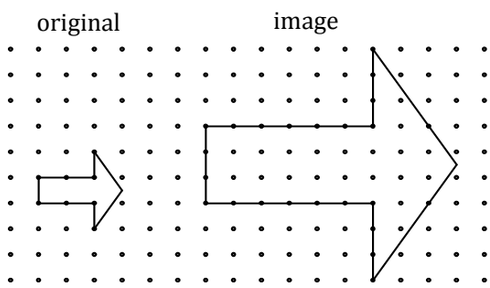
(C)



(D)



26. What is the scale factor in the figure below?



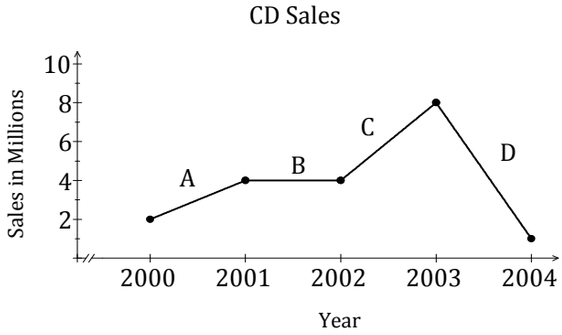
(A) $\frac{1}{3}$

(B) $\frac{1}{2}$

(C) 2

(D) 3

27. During which time period was the growth rate of CD sales the greatest in the graph shown?



(A) 2000 – 2001
(B) 2001 – 2002
(C) 2002 – 2003
(D) 2003 – 2004

28. The surface area of a cone is $34\ ft^2$. If the cone is enlarged by a scale factor of 3, what is the surface area, in ft^2, of the image?

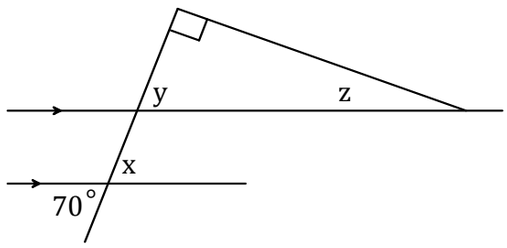
(A) 37
(B) 102
(C) 306
(D) 918

Constructed Response:
Answers to be written on this paper in the space provided. Show all workings.

29. Use **both** inductive and deductive reasoning to show that the result for the given number trick will always be the original number. [4 marks]

NUMBER TRICK	Inductive Reasoning	Deductive Reasoning
Choose a number.	_____	_____
Double it.	_____	_____
Add 6.	_____	_____
Double it	_____	_____.
Subtract 4.	_____	_____
Divide by 4.	_____	_____
Subtract 2.	_____	_____

30. Find the measure of each indicated angle. Justify your answer. [3 marks]

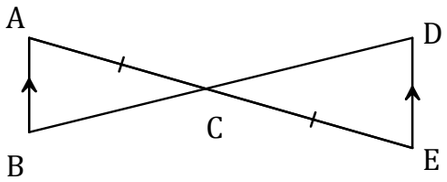


Angle Measure	Justification
$x =$ _____	_____
$y =$ _____	_____
$z =$ _____	_____

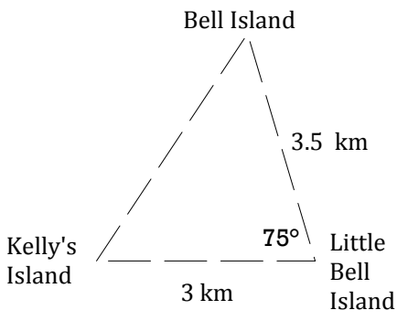
31. Use either a paragraph or two-column format to complete the given proof: [3marks]

Given: AB ∥ DE
AC = EC

Prove: Δ ABC ≅ Δ EDC



32. A boat travels from Bell Island to Kelly's Island to Little Bell Island, and returns directly back to Bell Island. What is the total distance travelled? [4 marks]



33. Simplify completely: $5\sqrt{6}\left(\sqrt{3}+3\sqrt{12}-\sqrt{2}\right)$ [3 marks]

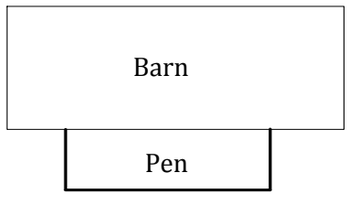
34. State the **restrictions** on *x*, **solve** the equation, and then **check** for extraneous roots. [4 marks]

$\sqrt{3x+1}\ -3=-4$

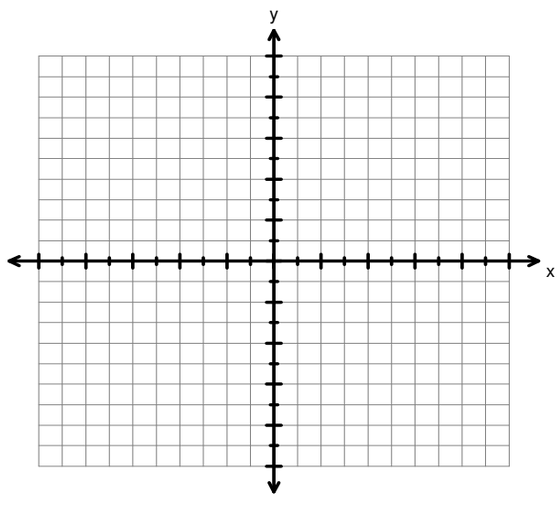
35. A factory produces automotive brake pads with a mean mass of 174 g and a standard deviation of 0.7 g. Quality control expects that the mass of the pads will lie within the acceptable range of 173.9 g and 174.1 g. What is the confidence interval and margin of error this factory uses for its quality control tests? [2 marks]

36. Jason scored 82% on a test where the class average was 74% and the standard deviation was 10.6%. If the class was normally distributed, what percentage of the class scored better than Jason? [3 marks]

37. A farmer has 300 m of chain link fencing to create a rectangular pen, using the side of a barn as one side of the pen. Algebraically determine the maximum area that can be enclosed by the pen. [4 marks]



38. Algebraically determine the **vertex** and **x-intercepts** for the function $y = x^2 - 2x - 8$. Sketch the graph, labelling all key points. [3 marks]



39. Solve the given equation. State the solution(s) in **exact** form. [3 marks]

$6x^2 = -4x + 3$

40. On another planet, the path of a rock that is thrown is given by [3 marks]
$h = -t^2 + 4t + 6$, where h is height in metres and t is time in seconds. At what time(s) would the height of the ball be 9 m?

41. Avalon Supermarket sells a box of 48 granola bars for $7.99 and a box of 8 bars for $1.99. What is the least expensive way to buy 70 granola bars? Justify your reasoning. [3 marks]

Mathematics 2201 Common Assessment – June 2013
Answer Sheet

Name: _____

Mathematics Teacher: _____

1.	A	B	C	D	15.	A	B	C	D
2.	A	B	C	D	16.	A	B	C	D
3.	A	B	C	D	17.	A	B	C	D
4.	A	B	C	D	18.	A	B	C	D
5.	A	B	C	D	19.	A	B	C	D
6.	A	B	C	D	20.	A	B	C	D
7.	A	B	C	D	21.	A	B	C	D
8.	A	B	C	D	22.	A	B	C	D
9.	A	B	C	D	23.	A	B	C	D
10.	A	B	C	D	24.	A	B	C	D
11.	A	B	C	D	25.	A	B	C	D
12.	A	B	C	D	26.	A	B	C	D
13.	A	B	C	D	27.	A	B	C	D
14.	A	B	C	D	28.	A	B	C	D