Eastern School District

Mathematics 2200
Common Mathematics Assessment

Sample 2013

Name: _____

Mathematics Teacher: _____

27 Selected Response	27 marks
11 Constructed Response	40 marks
FINAL	**67 Marks**

TIME: 2 HOURS

NOTE

Diagrams are not necessarily drawn to scale.

FORMULAE

$t_n = t_1 + (n-1)d \quad , n \in N$

$t_n = t_1 r^{n-1} \quad , n \in N$

$S_n = \frac{n}{2}(t_1 + t_n)$

$S_n = \frac{t_1(r^n - 1)}{r - 1}$

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

1. How many terms are in the sequence $\{3, 1, -1, \ldots, -91\}$

   (A) 43
   (B) 45
   (C) 46
   (D) 48

$t_n = t_1 + d(n-1)$

2. In an arithmetic sequence, $t_3 = m$ and $t_4 = n$. Which expression represents t_6?

   (A) $2m - n$
   (B) $2n - m$
   (C) $3n - m$
   (D) $3n - 2m$

3. Which describes the series $\left\{-19, -\frac{19}{2}, -\frac{19}{4}, -\frac{19}{8}, \ldots\right\}$?

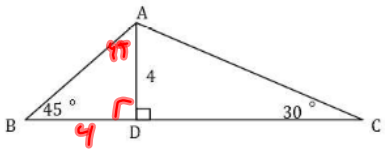
   (A) convergent with a sum of -38
   (B) convergent with no sum
   (C) divergent with a sum of -38
   (D) divergent with no sum

$-1 < r < 1$

infinite geometric sum

$\frac{t_1}{1-r}$

4. What is the exact length of BC?



   (A) 6
   (B) 12
   (C) $4 + 4\sqrt{3}$
   (D) $4\sqrt{2} + 4\sqrt{3}$

5. The point $(6, -8)$ lies on the terminal arm of an angle θ in standard position. What is the value of $\sin\theta$?

   (A) $-\frac{4}{3}$

SOH CAH TOA

B) $-\frac{4}{5}$

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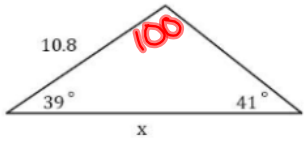
6. Solve: $\cos\theta = -0.6947$, where $0° \le \theta \le 360°$

(A) $\theta = 46°$ and $\theta = 134°$
(B) $\theta = 46°$ and $\theta = 314°$
(C) $\theta = 134°$ and $\theta = 226°$
(D) $\theta = 226°$ and $\theta = 314°$

7. What is the length of x?



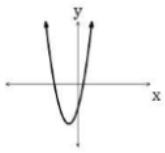
$\frac{\sin 100}{x} = \frac{\sin 41}{10.8}$

(A) 7.2
(B) 10.4
(C) 11.3
(D) 16.2

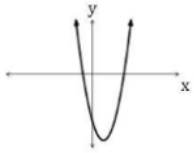
opens up

8. Which represents the function $y = 2x^2 - 4x - 5$?

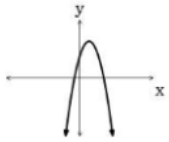
(A)



(B)



(C)



$\frac{-b}{2a} = \frac{-(-4)}{2(2)}$

$= \frac{4}{4} = 1$

(1,)

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9. Which represents a parabola with y-intercept -15 and vertex $(1, -5)$?

(A) $f(x) = -20(x-1)^2 - 5$
(B) $f(x) = -20(x+1)^2 + 5$
(C) $f(x) = -10(x-1)^2 - 5$
(D) $f(x) = -10(x+1)^2 + 5$

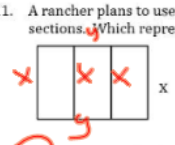
$y = a(x-1)^2 - 5$
let $x = 0$ to find
$y = -15$

10. If $y = 2x^2 + 12x + 10$ is written in the form $y = a(x-p)^2 + q$, what is the value of q?

(A) -26
(B) -8
(C) 1
(D) 28

$y = (2x^2 + 12x + 10)$
$y = 2(x^2 + 6x + 9) + 10 - 18$
$+18$
-8

11. A rancher plans to use 430 m of fencing to build a cattle enclosure with three equal sections. Which represents the total area of the enclosure in terms of its width, x?



(A) $A = x(215 - 2x)$
(B) $A = x(215 - x)$
(C) $A = x(430 - 2x)$
(D) $A = x(430 - x)$

$4x + 2y = 430$
$2y = 430 - 4x$
$y = (215 - 2x)$
$A = lw \Rightarrow x(215 - 2x)$

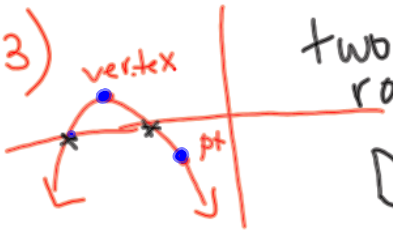
12. Theresa's incorrect solution to the equation $4x^2 - 7x - 3 = 0$ is shown. In which step does the **first** error occur?

Step 1 $x = \frac{7 \pm \sqrt{(-7)^2 - (4)(4)(-3)}}{2(4)}$
Step 2 $x = \frac{7 \pm \sqrt{49 - 48}}{8}$
Step 3 $x = \frac{7 \pm \sqrt{1}}{8}$
Step 4 $x = 1, x = \frac{3}{4}$

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

+

#13)



two unequal real roots

$D > 0$

(B)

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14. Solve: $2x(x-3)+5(x-3)=0$

(A) $x=-3,\ x=-\frac{5}{2}$

(B) $x=-3,\ x=\frac{5}{2}$

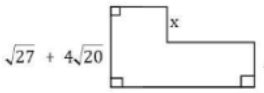
(C) $x=3,\ x=-\frac{5}{2}$

(D) $x=3,\ x=\frac{5}{2}$

$(2x+5)(x-3)=0$

$x=-\frac{5}{2}$ $x=3$

15. Determine a simplified expression for the value of x:



(A) $2\sqrt{3}+\sqrt{5}$

(B) $2\sqrt{3}+3\sqrt{5}$

(C) $4\sqrt{3}+\sqrt{5}$

(D) $4\sqrt{3}+3\sqrt{5}$

$\sqrt{27}+4\sqrt{20}-(\sqrt{125}+\sqrt{3})$

$3\sqrt{3}+4(2\sqrt{5})-5\sqrt{5}-\sqrt{3}$

$3\sqrt{3}+8\sqrt{5}-5\sqrt{5}-\sqrt{3}$

$2\sqrt{3}+3\sqrt{5}$

16. Write $4x^3y^2\sqrt{5xy}$ as an entire radical.

(A) $\sqrt{20x^7y^5}$

(B) $\sqrt{20x^{10}y^5}$

(C) $\sqrt{80x^7y^5}$

(D) $\sqrt{80x^{10}y^5}$

$\sqrt{(4x^3y^2)(4x^3y^2)\,5xy}$

$\sqrt{80x^7y^5}$

17. Simplify completely: $\frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}}$

(A) $3\sqrt{2}-2\sqrt{3}$

(B) $3\sqrt{2}+2\sqrt{3}$

$\frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}}\cdot\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ conjugate

$\frac{\sqrt{18}-\sqrt{12}}{3-2}=\frac{3\sqrt{2}-2\sqrt{3}}{1}$

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18. Simplify completely: $\frac{\sqrt[3]{2}}{\sqrt[3]{6}}$ $= 0.693$

0.48 (A) $\frac{\sqrt[3]{3}}{3}$

0.693 (B) $\frac{\sqrt[3]{9}}{3}$

(C) $\frac{\sqrt[3]{12}}{6}$ 0.382

0.693 (D) $\frac{\sqrt[3]{72}}{6}$

$\frac{1}{\sqrt[3]{3}} \cdot \frac{\sqrt[3]{3}}{\sqrt[3]{3}} \cdot \frac{\sqrt[3]{3}}{\sqrt[3]{3}} = \frac{\sqrt[3]{9}}{3}$

19. Simplify completely: $\frac{1}{x} - \frac{2}{x+6}$

(A) $-\frac{1}{x}$

(B) $-\frac{1}{2x+6}$

(C) $\frac{-1}{x(x+6)}$

(D) $\frac{-x+6}{x(x+6)}$

C.D $x(x+6)$

$\frac{x+6}{x(x+6)} - \frac{2x}{x(x+6)} = \frac{-x+6}{x(x+6)}$

20. Simplify completely: $\frac{9x-\frac{1}{x}}{6+\frac{2}{x}}$

(A) $\frac{3x-1}{2}$

(B) $\frac{3x+1}{2}$

(C) $\frac{9x-1}{8}$

(D) $\frac{9x-1}{2(3x+1)}$

numerator: $\frac{9x^2}{x} - \frac{1}{x}$ $\frac{9x^2-1}{x}$

denom: $6 + \frac{2}{x}$ $\frac{6x}{x} + \frac{2}{x}$ $\frac{6x+2}{x}$

21. Simplify completely: $\frac{25-x^2}{x^2} \cdot \frac{x^2-2x}{x^2+3x-10}$

$\frac{(5-x)(5+x)}{x^2} \cdot \frac{x(x-2)}{(x+5)(x-2)}$

$= \frac{5-x}{x}$

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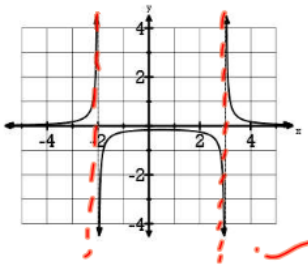
22. The graph shown represents the reciprocal of which quadratic function?



(A) $f(x) = x^2 - 5x + 6$
(B) $f(x) = x^2 + 5x + 6$
(C) $f(x) = x^2 - x - 6$
(D) $f(x) = x^2 + x - 6$

asymptotes $\frac{1}{f(x)}$ undefined
x-intercepts of $f(x)$
$x = -2$ & $x = 3$
$(x+2)(x-3) = 0$
$x^2 - x - 6 = 0$

23. What is the range of $y = |x + 5|$?

(A) $\{y | y > -5, y \in \mathbb{R}\}$
(B) $\{y | y \geq -5, y \in \mathbb{R}\}$
(C) $\{y | y > 0, y \in \mathbb{R}\}$
(D) $\{y | y \geq 0, y \in \mathbb{R}\}$

24. Which is a solution to the system $\begin{cases} \frac{1}{2}x^2 + x - y = 13 \\ x^2 - 2x + y = 7 \end{cases}$?

(A) $(-2, -1)$
(B) $(2, -9)$
(C) $(4, -1)$
(D) $(6, -11)$

elimination
$\frac{3}{2}x^2 - x = 20$
$\frac{3}{2}x^2 - x - 20 = 0$
$3x^2 - 2x - 40 = 0$
→ quadratic formula or factor

25. The first four steps of an incorrect solution to the system $\begin{cases} 4x^2 + 3x - 2y = 4 \\ x^2 - 2x - y = 1 \end{cases}$ are shown. Identify the step in which the **first** error occurs.

Step 1 : $\begin{cases} 4x^2 + 3x - 2y = 4 \\ -2x^2 + 4x + 2y = 1 \end{cases}$ -2

Step 2: $2x^2 + 7x = 5$

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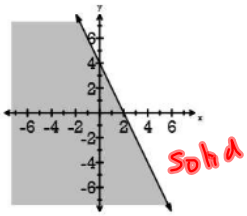
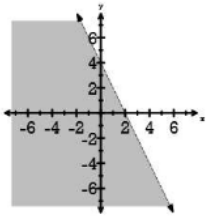
26. Which represents the inequality $2x + y > 4$?

(A)

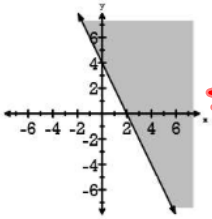


y > -2x + 4
dotted
solid

(B)

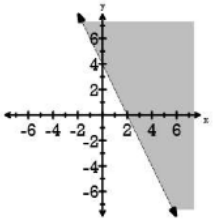


(C)



solid

(D)



27. Which is a solution to $y > -2(x-1)^2 + 3$?

(A) (0, 2)

x y

check pt.

$2 > -2(0-1)^2 + 3$

$2 > -2 + 3$

$2 > 1$