Midterm Practice Problem Set **ANSWER KEY**

Part I Questions

1. At a concert, $720 was collected for hot dogs, hamburgers, and soft drinks. All three items sold for $1.00 each. Twice as many hot dogs were sold as hamburgers. Three times as many soft drinks were sold as hamburgers. The number of soft drinks sold was:

   (1) 120 (2) 240 **(3) 360** (4) 480

x = # of hamburgers = **120**
$2x$ = # of hot dogs = **240**
$3x$ = # of soft drinks = **360**

$x + 2x + 3x = 720$
$6x = 720$
$x = 120$

2. If $t^2 < t < \sqrt{t}$, then t could be:

   (1) - ¼ (2) 0 **(3) ¼** (4) 4

$\left(\frac{1}{4}\right)^2 < \frac{1}{4} < \sqrt{\frac{1}{4}}$

$\frac{1}{16} < \frac{1}{4} < \frac{1}{2}$

3. The formula for potential energy is $P = mgh$, where P is potential energy, m is mass, g is gravity and h is height. Which expression can be used to represent g?

   (1) $P - m - h$ (2) $P - mh$ (3) $\frac{P}{m} - h$ **(4)** $\frac{P}{mh}$

$\frac{P}{mh} = \frac{mgh}{mh}$

$g = \frac{P}{mh}$

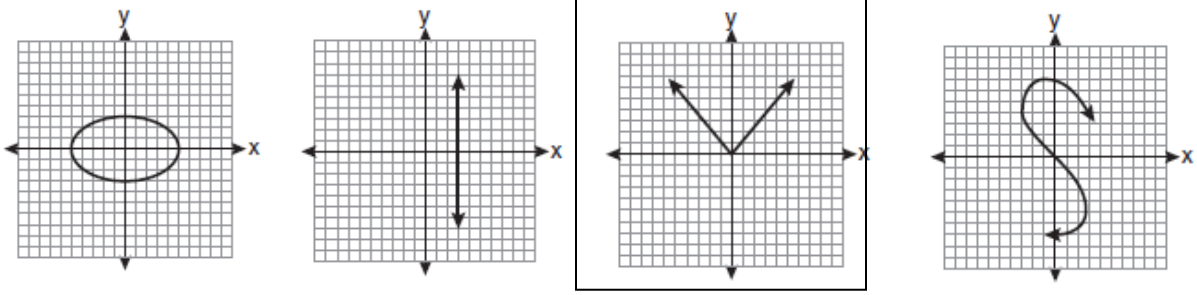
4. What is an equation of a line that is parallel to the x–axis and contains the point (4,-2)?

   (1) x = 4 (2) x = -2 (3) y = 2 **(4) y = -2**

Horizontal lines are parallel to x-axis → $y = b$

5. Which graph represents a function?

   (1) (2) **(3)** (4)



Vertical line test – no two points are lined up vertically.

6. Which of the following sets of numbers is closed under subtraction?

   (1) natural numbers
   (2) odd integers
   (3) whole numbers
   (4) rational numbers

(1) $5 - 8 = -3$ X
(2) $5 - 3 = 2$ X
(3) $6 - 8 = -2$ X

Part II Questions

7. What is the y-intercept of the line whose equation is 2x – 3y – 12 = 0?

$2x-3y-12=0$

$-3y=-2x+12$

$y=\frac{2}{3}x-4$

The *y*-intercept is -4.

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8. Solve: $\frac{x}{-2}<6$

$-2\bullet-\frac{x}{2}<6\bullet-2$

$x>-12$

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9. **Write** an inequality to represent the following situation.

A yearbook company promises to give the junior class a picnic if they spend at least $28,000 on yearbooks and class rings. Each yearbook costs $25, and each class ring costs $140. How many yearbooks and class rings must the junior class buy to get their picnic?

y = # of yearbooks
c = # of class rings

$25y + 140c \geq 28000$

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10. Simplify: $\frac{(3xy^4)(x^{-2}y^6z)}{x^{-3}y^5}$

$\frac{3x^{-1}y^{10}z}{x^{-3}y^5}$

$3x^2y^5z$

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11. Solve for *h*: $A - hb = hc$

$A-hb=hc$

$A=hb+hc$

$A=h(b+c)$

$h=\frac{A}{b+c}$

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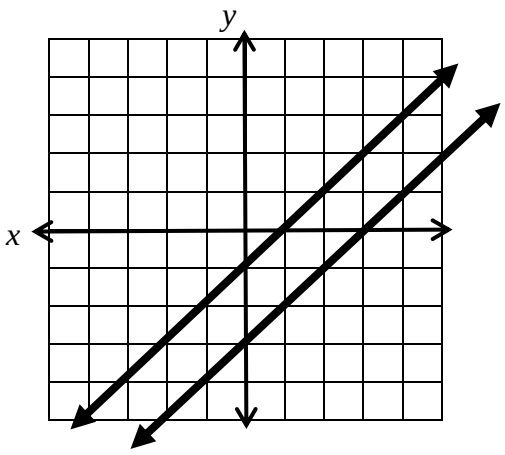
12. How many solutions does this linear system have?



This linear system has no solution since parallel lines will never intersect.

13. Simplify and express in standard form: $(\frac{1}{3}x^2+4x-3)[(2x^2+6x+5)-(6x^2+3x+5)]$

$(\frac{1}{3}x^2+4x-3)[2x^2+6x+5-6x^2-3x-5]$

$(\frac{1}{3}x^2+4x-3)(-4x^2+3x)$

	$-4x^2$	$+3x$
$\frac{1}{3}x^2$	$-\frac{4}{3}x^4$	$+x^3$
$+4x$	$-16x^3$	$+12x^2$
-3	$+12x^2$	$-9x$

$$\boxed{-\frac{4}{3}x^4-15x^3+24x^2-9x}$$

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14. Is the following table a function?

Input	Output
1	2
2	1
3	5
3	4

No this table does not represent a function because the input 3 has two distinct outputs, 5 and 4.

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15. Write the equation of a line that is parallel to $y = 2x - 5$ and has a y-intercept of -3.

slope: 2 (same slope as the parallel line $y = 2x - 5$)
y-intercept: -3 (given)

$$\boxed{y = 2x - 3}$$

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16. What is the slope of a line containing the points (3, 4) and (-6, 10)?

$$\frac{\Delta y}{\Delta x}=\frac{10-4}{-6-3} \longrightarrow \frac{6}{-9} \longrightarrow \boxed{-\frac{2}{3}}$$

Part III Questions

17. Evaluate $\frac{x^2-4y}{2}$ when $x = 4$ and $y = -3$

$$\frac{4^2-4(-3)}{2} \rightarrow \frac{16+12}{2} \rightarrow \frac{28}{2}=\boxed{14}$$

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18. Solve for x. $\frac{x-5}{4}=\frac{2x-10}{3}$

cross – multiply :

$$4(2x-10)=3(x-5)$$
$$8x-40=3x-15$$
$$5x-40=-15$$
$$5x=25$$
$$\boxed{x=5}$$

19. Solve: $\frac{3x}{5} - \frac{x+1}{2} = 6$

multiply by the LCD (10):

$$10\left(\frac{3x}{5}\right) - 10\left(\frac{x+1}{2}\right) = 10(6)$$
$$2(3x) - 5(x+1) = 60$$
$$6x - 5x - 5 = 60$$
$$x - 5 = 60$$
$$\boxed{x = 65}$$

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20. Solve: $2|x-2| = 6$

isolate the absolute value expression:

$$2|x-2| = 6$$
$$|x-2| = 3$$

$x - 2 = 3$ $\qquad$ $x - 2 = -3$

$\boxed{x = 5}$ $\qquad$ $\boxed{x = -1}$

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21. Simplify: $2x(x-4)^2$

$$2x(x-4)(x-4)$$
$$2x(x^2 - 4x - 4x + 16)$$
$$2x(x^2 - 8x + 16)$$
$$\boxed{2x^3 - 16x^2 + 32x}$$