DIRECTIONS

This section of the test is 71 items, which you will work in this booklet. Mark the correct answer as directed by your teacher. You may use a calculator that has been approved by your teacher. Only your test booklet and calculator may be used; no other materials should be on your desk.

1   Find the value of $5 + 8 \cdot 2 \div 4 - 11$.   → $5 + 16 \div 4 - 11$ → $5 + 4 - 11$ → $9 - 11$ → -2

A. $-\dfrac{23}{4}$ B. $-\dfrac{11}{2}$ C. 2   D. -2

2   Evaluate $(a - y)^2 + 2y^3$ if $a = 2$ and $y = -3$. → $(2 - (-3))^2 + 2(-3)^3 = (2+3)^2 + 2(-27)$

$= 5^2 - 54$
$= 25 - 54$
$= -29$

A. -29   B. 43   C. 79   D. -8

3   Name all the sets of numbers to which -28 belong.

A. integers   B. integers and reals

C. integers   D. integers, rationals, reals

4   Name the property illustrated in the equation $5n + (3t + 8n) = (5n = 3t) + 8n$

A. associative property of addition → ( ) Move
B. inverse property of addition → $a + (-a) = 0$ → opposites added
C. distributive → $3(x+2)$ → $3x + 3 \cdot 2$
D. commutative property of addition → the order changes $4 + 3 + 2 = 4 + 2 + 3$

5   Simplify $\dfrac{1}{3}(6x + 9) - 4(3x - 2)$. $2x + 3 - 12x + 8$ → $-10x + 11$

A. $-10x + 11$ B. $6x + 35$ C. $-6x + 17$ D. $-2x + \dfrac{17}{3}$

Pat's score on six weekly quizzes are 10, 8, 7, 9, 10, and 10.

6   What is the <u>mode</u> of the data? Most common #

        A. 8   B. 9   C. 9.5   (D.) 10

7   What is the median of the data? Middle # in order 7, 8, |9, 10| 10, 10 $\frac{9+10}{2} = \boxed{9.5}$

        A. 8   B. 9   (C.) 9.5   D. 10

8   What is the mean of the data? Average $\frac{10+8+7+9+10+10}{6} = \boxed{9}$

        A. 8.5   (B.) 9   C. 9.5   D. 10

Solve each equation.

9        $\frac{5}{2} \cdot \frac{2}{5} y = \frac{3}{14} \cdot \frac{5}{2} \rightarrow \boxed{y = \frac{15}{28}}$

        A. $\frac{28}{15}$ **B.** $\frac{35}{3}$ **C.** $\frac{3}{35}$ (D.) $\frac{15}{28}$

10       $3(5x - 1) = 3x + 3 \rightarrow \begin{array}{l} 15x - 3 = 3x + 3 \\ -3x + 3 \quad -3x + 3 \end{array} \rightarrow \frac{12x}{12} = \frac{6}{12} \quad x = \frac{6}{12}$

                                                    $\boxed{x = \frac{1}{2}}$

        (A.) $\frac{1}{2}$ **B.** 2   **C.** -2   **D.** $-\frac{1}{2}$

11       $\frac{3|x-5|}{3} = \frac{12}{3}$ $|x - 5| = 4$ $\begin{array}{l} x - 5 = 4 \\ \boxed{x = 9} \end{array}$ AND $\begin{array}{l} x - 5 = -4 \\ \boxed{x = 1} \end{array}$

        A. 9   **B.** 1   (C.) 1, 9   **D.** $\varnothing$

12       $\begin{array}{l} |y - 8| + 6 = 15 \\ \quad\quad\quad -6 \quad -6 \end{array}$ $|y - 8| = 9$ $\begin{array}{l} y - 8 = 9 \\ \boxed{y = 17} \end{array}$ $\begin{array}{l} y - 8 = -9 \\ \boxed{y = -1} \end{array}$

        A. 17   **B.** -1   (C.) 17, -1   **D.** $\varnothing$

Solve each inequality.

13 $-3(r - 11) + 15 \geq 9$ $-3r + 33 + 15 \geq 9 \rightarrow -3r + 48 \geq 9$ $\frac{-3r \geq -39}{-3}$ ← FLIP

   (handwritten: $-48 \quad -48$)   *(boxed: $r \leq 13$)*

   A. $\{r \leq 13\}$ **B.** $\{r \geq 13\}$ **C.** $\{r \leq -13\}$ **D.** $\{r \geq -13\}$

14 $|3w - 7| \leq 2$ $3w - 7 \leq 2$ $3w - 7 \geq -2$ ← FLIP

   (handwritten: $3w \leq 9$ $3w \geq 5$) $\rightarrow 5/3 \leq x \leq 3$

   (boxed: $w \leq 3$ $w \geq 5/3$)

   A. $\{\frac{5}{3} \leq w \leq 3\}$ **B.** $\{-3 \leq w \leq 3\}$

   C. $\{w \leq 3\}$ **D.** $\{$all reals$\}$

15   Which of the following is the solution set of $2x - 5 \leq 10$ or $33 - 4x > 5$?

   (handwritten: $2x \leq 15$ $\boxed{x \leq 15/2}$ $\frac{-4x \geq -28}{-4} \quad \frac{}{-4}$ $\boxed{x \leq 7}$ ← FLIP)

   A. $\{x \leq \frac{15}{2}$ or $x < 7\}$ **B.** $\{7 < x \leq \frac{15}{2}\}$

   C. $\{$all reals$\}$ **D.** $\{\varnothing\}$

   (handwritten: The best answer is actually $\boxed{x \leq 15/2}$)

16   Identify the graph of $8.5 > 6.1 + .6y$. $\frac{2.4 > 0.6y}{0.6 \quad 0.6}$ $4 > y \rightarrow y < 4$ ← open

   (handwritten: $-6.1 \quad -6.1$)

   A. *(number line with open circle at 4, shaded right; marks -2 to 6)*   **B.** *(number line with closed circle at 4, shaded right; marks -2 to 6)*

   C. *(number line with closed circle at 4, shaded left; marks -2 to 6)*   **D.** *(number line with open circle at 4, shaded left; marks -2 to 6)*

17   Give the domain of $h = \{(0, 0), (1, 1), (2,0)\}$, and tell if h is a function.

   (handwritten: → x values) *(handwritten: → if x's do not repeat)*

   A. $\{0, 1, 0\}$; h is a function   **B.** $\{0, 1, 0\}$; h is not a function
   C. $\{0, 1, 2\}$; h is a function   **D.** $\{0, 1, 2\}$; h is not a function

18   If $f(x) = x^2 - 2x - 2$, find $f(-3)$. $f(-3) = (-3)^2 - 2(-3) - 2 = 9 + 6 - 2 = 15 - 2 = \boxed{13}$

   A. 1   **B.** -13   **C.** -5   **D.** 13

19   Which equation is a <u>linear</u> equation?

→Not linear

     A. $3x - 2y = 5$ **B.** $y = x^2 - 3x + 1$ **C.** $xy = 60$ **D.** $x = y^2 + 1$

20   Write $3y + 5x + 1 = 0$ in standard form. → $Ax + By = C$ x & y same side   No dec. or frac.

     A must be pos.

     A. $5x + 3y = -1$ **B.** $5x + 3y + 1 = 0$ **C.** $3y = -5x - 1$ **D.** $y = -\dfrac{5}{3}x - \dfrac{1}{3}$

21   What is the slope of the line whose equation is $2x = 4 - y$? $2x - 4 = -y$ Mult by -1 $-2x + 4 = y$

     $y = -2x + 4$

     A. 1   **B.** 2   **C.** -2   **D.** -1 $y = mx + b$

                                  Slope   y-int.

22   What is the y-intercept of the line whose equation is $5y = 7x - 1$?

     $\dfrac{5}{5} \quad \dfrac{7}{5} \quad \dfrac{1}{5}$ $y = \dfrac{7}{5}x - \dfrac{1}{5}$ → y-int.

     A. $-\dfrac{1}{5}$ **B.** $\dfrac{1}{5}$ **C.** 1   **D.** -1

23   What is the x-intercept of the line whose equation is $y = -2x + 1$ Subst. zero for y & solve for x

     A. 1   **B.** $-\dfrac{1}{2}$ **C.** $\dfrac{1}{2}$ **D.** -1 $0 = -2x + 1$

                                        $\dfrac{-1}{-2} = \dfrac{-2x}{-2}$ $\boxed{x = \frac{1}{2}}$

                                             This is the pt. $(\frac{1}{2}, 0)$

                                $x_1 \, y_1 \quad\quad x_2 \, y_2$

24   What is the slope of the line passing through $(0, 2)$ and $(8, 8)$?

     A. 8   **B.** $\dfrac{3}{4}$ **C.** $-\dfrac{3}{4}$ **D.** -8

     $\boxed{m = \dfrac{y_2 - y_1}{x_2 - x_1}}$ $m = \dfrac{8-2}{8-0} = \dfrac{6}{8} = \dfrac{3}{4}$

         Slope

                                                   Point

25   What is the standard form of the equation for a line that passes through $(0, 7)$ and that has a slope of

                                                                    $x_1 \, y_1$

  Slope $-\dfrac{4}{5}$?   Point-slope form   → $y - 7 = -\dfrac{4}{5}(x - 0)$ → $y = -\frac{4}{5}x + 7$ mult by 5

            $\boxed{y - y_1 = m(x - x_1)}$ $y - 7 = -\frac{4}{5}x$ $5y = -4x + 35$ add 4x

     A. $5y - 35 = -4x$ **B.** $y - 7 = -\dfrac{4}{5}x$ **C.** $-\dfrac{4}{5}x + y = 7$ **D.** $4x + 5y = 35$ $\boxed{4x + 5y = 35}$

$x_1\ y_1$

26 What is the slope-intercept form for the equation of a line that passes through (0, 0) and is parallel to a line whose equation is $2x + 3y = 6$?

Need slope from here. Solve for y.

Same slope

A. $2x + 3y = 0$ B. $3y = 2x$ C. $y = \dfrac{2}{3}x$ (D.) $y = -\dfrac{2}{3}x$

$3y = -2x + 6$ $m = -\frac{2}{3}$ use $(0,0)$

$y = -\frac{2}{3}x + 2$ $y - y_1 = m(x - x_1) \rightarrow y - 0 = -\frac{2}{3}(x - 0)$ $\boxed{y = -\frac{2}{3}x}$

27 For which pair of equations are the lines perpendicular? Slopes are opposite reciprocals

Same m - parallel   reciprocals

A. $y = 2x - 5$ and $y = 2x + 5$ B. $y = \dfrac{1}{2}x + 1$ and $y = 2x + 5$

C. $y = -2x + 1$ and $y = 2x - 5$ (D.) $y = -2x + 1$ and $y = \dfrac{1}{2}x + 1$

Opposite m opposite reciprocals

Find the slope-intercept form for each graph described.

$x_1\ y_1$

28 Slope = -4 and passes through (-3, 0).   use pt.-slope form 1st $y - y_1 = m(x - x_1)$

A. $y = 4x - 3$ B. $y = -4x$ C. $x - \dfrac{1}{4}y = 3$ (D.) $y = -4x - 12$

$y - 0 = -4(x + 3)$

$y = -4x - 12$

$x_1\ y_1$

29 Passes through (5, -2) and (10, 1). Find slope 1st then Pt-slope form (pick either point given)

A. $y = 5x - 3$ (B.) $y = \dfrac{3}{5}x - 5$ C. $y = -5x - 3$ D. $y = -\dfrac{1}{5}x - 3$

$m = \dfrac{1 - (-2)}{10 - 5} = \dfrac{3}{5}$ $y - 1 = \dfrac{3}{5}(x - 10)$ $y - 1 = \dfrac{3}{5}x - 6$ $\boxed{y = \dfrac{3}{5}x - 5}$
                                         +1   +1

30 Find the graph of $3x - 2y = 10$. Solve for y 1st

$-3x$ $-3x$

(A.)   B.   C.   D.

up 3, R+2
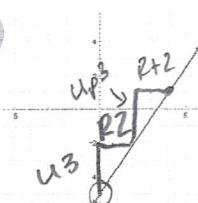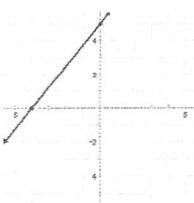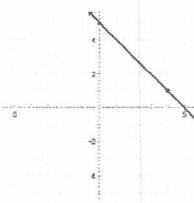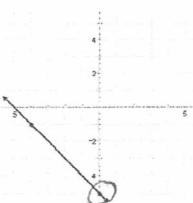
$-2y = -3x + 10$

$\dfrac{-2y}{-2} = \dfrac{-3x}{-2}\ \dfrac{10}{-2}$

$y = \dfrac{3}{2}x - 5$

y-int → Plot 1st, then use slope $m = \dfrac{3}{2} \dfrac{up\ 3}{R + 2}$ From the inter. & $y = -5$

abs. values are V-shaped

31 Find the graph of $y = |x + 2|$.

x+2=0　x=-2 ← vertex at x=-2

A. 　　　　　B. 　　　　　C. 　　　　　D.
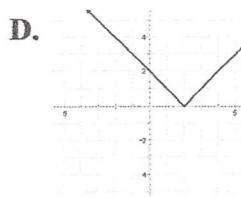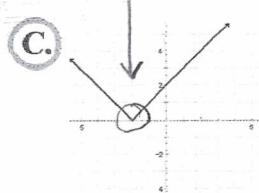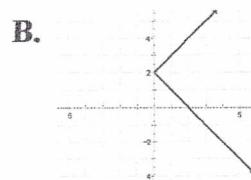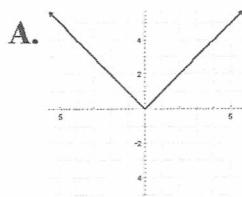
32 Which inequality is graphed at the right?

A. $y \geq 2x - 1$　　　B. $y \leq 2x - 1$

C. $y > 2x - 1$　　　D. $y < 2x - 1$
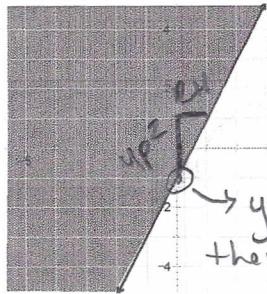
Solid line ≤ or ≥
Shaded above the line → ≥

up²

→ y-intercept y=-1　　m is up2/R+1 = 2/1
then look at slope

33 Which of the following systems is shown in the graph below?

A. $y + 2x = -4$　　　B. $y + 2x = 4$
　$y - 2x = 1$　　　　$y + 2x = 1$
C. $y - 2x = 4$　　　D. $y - 2x = 4$
　$y - 2x = 1$　　　　$y + 2x = 1$

y = -2x + 4
y = -2x + 1
↑ Same Slopes
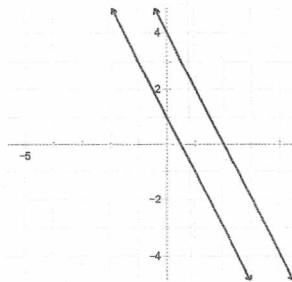
→ Since the lines are parallel, solve all equations for y & look for slopes that are the same.
• If the lines were perpendic. look for slopes that are opposite reciprocals.

34 Which expression can be substituted for y in the top equation of the system $\begin{array}{l} 5x - 2y = 8 \\ x - y = 1 \end{array}$ to solve the system by substitution?

Solve the bottom equation for y to put it into the top

-x　　-x
-y = -x + 1
y = x - 1

A. $y + 1$　　　B. $1 - y$　　　C. $-\dfrac{2}{5}x + \dfrac{5}{8}$　　　D. $x - 1$

35 You want to eliminate x by addition in the system $\begin{array}{l} (×4)\ 3x - 2y = 4 \\ 4x + 5y = 28 \end{array}$. If you multiply each side of the top equation by 4 by which number would you multiply each side of the bottom equation?

A. 3　　　B. -3　　　C. 4　　　D. -4

To eliminate w/addition you must make the x's opposites. Multiply the bottom by (-3).

(12x) - 8y = 16
(x-3) 4x + 5y = 28
12x - 8y = 16
-12x - 15y = -84
opposites →

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36 What is the value of *y* equal in the solution of the system $\begin{aligned}5x - y &= 7\\2x + 3y &= 13\end{aligned}$?

(handwritten: —eliminate x (×2) 5x - y = 7 (x-5) 2x + 3y = 13)

(handwritten: use elimination)
$$10x - 2y = 14$$
$$(+) -10x - 15y = -65$$
$$-17y = -51$$
$$\frac{-17y}{-17} = \frac{-51}{-17} \quad \boxed{y = 3}$$

   A. 3   **B.** 2   **C.** -3   **D.** -2

37 What is the value of $\begin{vmatrix}8 & 9\\3 & 4\end{vmatrix}$?

(handwritten: ← Determinant   = 8•4 ⊖ 9•3 = 32 - 27 = 5)

   A. 5   **B.** 59   **C.** 60   **D.** -5

38 Which expression represents *y* in the system?

(handwritten: cramer's rule)

(handwritten system: $\begin{aligned}3x + 2y &= 9\\2x - 3y &= -20\end{aligned}$, bottom)

(handwritten: $x = \dfrac{\begin{vmatrix}9 & 2\\-20 & -3\end{vmatrix}}{\begin{vmatrix}3 & 2\\2 & -3\end{vmatrix}}$)

(handwritten: $y = \dfrac{\begin{vmatrix}3 & 9\\2 & -20\end{vmatrix}}{\begin{vmatrix}3 & 2\\2 & -3\end{vmatrix}}$)

   A. $\dfrac{\begin{vmatrix}3 & 9\\2 & -20\end{vmatrix}}{\begin{vmatrix}3 & 2\\2 & -3\end{vmatrix}}$ **B.** $\dfrac{\begin{vmatrix}3 & 2\\2 & -3\end{vmatrix}}{\begin{vmatrix}2 & 9\\-3 & -20\end{vmatrix}}$ **C.** $\dfrac{\begin{vmatrix}3 & -20\\9 & 2\end{vmatrix}}{\begin{vmatrix}3 & 2\\2 & -3\end{vmatrix}}$ **D.** $\dfrac{\begin{vmatrix}9 & 3\\2 & -20\end{vmatrix}}{\begin{vmatrix}3 & -3\\2 & 2\end{vmatrix}}$

39 Which system of inequalities is graphed?

(handwritten: horizontal line)

   A. $y > -2$
        $y \ge -2x + 1$

   B. $y > -2$
        $y \le -2x + 1$

   C. $y \ge -2$
        $y \ge -2x + 1$

   D. $y > -2$
        $y < -2x + 1$

(handwritten: Solid line ≤ or ≥   dashed line < or >   Shaded above the line > or ≥   Shaded below the line < or ≤)
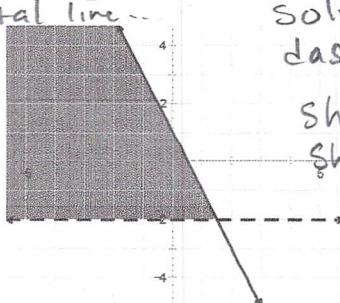
40 A feasible region has vertices at (2, 3) (5, 3), and (2, 6). The minimum value of the function $f(x, y) = 2x - y$ for this region?

(handwritten:)
$$f(2,3) = 2(2) - 3 = 4 - 3 = 1$$
$$f(5,3) = 2(5) - 3 = 10 - 3 = 7 \leftarrow maximum$$
$$f(2,6) = 2(2) - 6 = 4 - 6 = \boxed{-2}\ minimum$$

   A. -2   **B.** 7   **C.** 1   **D.** -3

41 Which ordered triple is a solution of the system shown at the right?
$$7x - 4y + z = -11$$
$$6x + 5y - z = 0$$
$$2x - 3y + 4z = 8$$

(handwritten: Substitute x, y, z into each equation. It must work out for all 3 equations   x y z)

   A. (4, 2, -1)   **B.** (-1, 2, 4)   **C.** (-1, -1, 0)   **D.** (2, 2, 2)

(handwritten:)
$$7(-1) - 4(2) + 4 = -11 \rightarrow -7 - 8 + 4 = -11 \rightarrow -11 = -11$$
$$6(-1) + 5(2) - 4 = 0 \rightarrow -6 + 10 - 4 = 0 \rightarrow 0 = 0 \quad \}\ all\ true.$$
$$2(-1) - 3(2) + 4(4) = 8 \rightarrow -2 - 6 + 16 = 8 \rightarrow 8 = 8$$

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42   What does x equal in the solution of the system at the right?

$$2x + y + z = 13$$
$$2x - y - 3z = -3$$
$$x + 2y + 4z = 20$$

we will do in class.

A. 3   **B.** 2   **C.** 4   **D.** 5

43   Name matrix N using its dimensions if $N = \begin{bmatrix} 4 & 1 & -7 & 2 \\ 2 & 8 & 3 & 0 \end{bmatrix}$

C1 C2 C3 C4 ... R1 R2

Rows × Columns
2 × 4

A. N_{4x2} **B.** N_{2x1} **C.** N_{2x4} **D.** N_{1x2}

44   What are the dimensions of $\begin{bmatrix} 2 & -1 & 6 \end{bmatrix}$?

C1 C2 C3 ... R1 ... 1×3

A. 3 x 3   **B.** 1 x 3   **C.** 1 x 1   **D.** 3 x 1

45   Find $3\begin{bmatrix} 1 & 3 & -3 \\ 2 & -1 & 4 \end{bmatrix}$.

Mult. every #
by 3

$\begin{bmatrix} 3 & 9 & -9 \\ 6 & -3 & 12 \end{bmatrix}$

A. $\begin{bmatrix} 3 & 9 & -9 \\ 6 & -3 & 12 \end{bmatrix}$ **B.** $\begin{bmatrix} 1 & 3 & -3 \\ 6 & -2 & 8 \end{bmatrix}$ **C.** $\begin{bmatrix} 3 & 9 & -9 \\ 2 & -1 & 4 \end{bmatrix}$ **D.** $\begin{bmatrix} 4 & 6 & 0 \\ 5 & 2 & 7 \end{bmatrix}$

46   Find $\begin{bmatrix} 2 & -3 & 4 \\ 1 & 5 & 7 \end{bmatrix} + \begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 5 \end{bmatrix} = \begin{bmatrix} 3 & -3 & 4 \\ 1 & 4 & 12 \end{bmatrix}$

Dimensions must be the same. 2×3 + 2×3. Add each cell together.

A. $\begin{bmatrix} 3 & -3 & 4 \\ 1 & 5 & 7 \end{bmatrix}$ **B.** $\begin{bmatrix} 2 & -3 & 4 \\ 1 & 4 & 12 \end{bmatrix}$ **C.** $\begin{bmatrix} 3 & -3 & 4 \\ 1 & 4 & 12 \end{bmatrix}$ **D.** $\begin{bmatrix} 2 & 0 & 0 \\ 0 & -5 & 35 \end{bmatrix}$

47   What is the value of $\begin{vmatrix} 1 & 8 & -2 \\ 3 & -1 & 4 \\ 2 & -3 & -1 \end{vmatrix}$?

$= 1(-1)(-1) + 8(4)(2) + (-2)(3)(-3) - (-2)(-1)(2) - (1)(4)(-3) - 8(3)(-1)$
$= 1 + 64 + 18 - 4 + 12 + 24 = 115$

A. 43   **B.** 115   **C.** 51   **D.** 123

use diagonals

48 Find the first row of $\begin{bmatrix} -1 & 2 \\ 3 & -4 \end{bmatrix} \cdot \begin{bmatrix} 0 & 1 \\ 2 & 0 \end{bmatrix}$ $= \begin{bmatrix} (-1)(0)+(2)(2) & -1(1)+2(0) \\ 3(0)+(-4)(2) & 3(1)+(-4)(0) \end{bmatrix}$ $= \begin{bmatrix} 0+4 & -1+0 \\ 0-8 & 3-4 \end{bmatrix} = \begin{bmatrix} 4 & -1 \\ -8 & -1 \end{bmatrix}$

A. $\begin{bmatrix} 0 & 2 \end{bmatrix}$ **B.** $\begin{bmatrix} 3 & -4 \end{bmatrix}$ **C.** $\begin{bmatrix} -8 \end{bmatrix}$ **D.** $\begin{bmatrix} 4 & -1 \end{bmatrix}$

Check dimensions 2x2 · 2x2 = a 2x2

Mult. Rows in 1st matrix by the columns in the second.
Same

49 What is the identity for a 2 x 2 matrix?

A. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ **B.** $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ **C.** $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ **D.** $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

50 If M_{1x4} is multiplied by N_{4x1}, what are the dimensions of the product?

A. 4 x 4 **B.** 1 x 4 **C.** 1 x 1 **D.** 4 x 1

$1 \times 4 \cdot 4 \times 1 = 1 \times 1$
Same

51 What are the dimensions of the product shown at the right? $\begin{bmatrix} 3 & -7 & 4 \\ 5 & 8 & 9 \end{bmatrix} \cdot \begin{bmatrix} 4 & 2 \\ -1 & 9 \\ 4 & 6 \end{bmatrix}$

2×3   3×2

A. 2 x 2 **B.** 2 x 3 **C.** 3 x 3 **D.** Not defined

$2 \times 3 \cdot 3 \times 2 = 2 \times 2$

52 Find the first column of the inverse of $\begin{bmatrix} 11 & 7 \\ 3 & 2 \end{bmatrix} \cdot$ $\begin{bmatrix} 2 & -7 \\ -3 & 11 \end{bmatrix}$

opp opp

A. $\begin{bmatrix} 2 \\ -7 \end{bmatrix}$ **B.** $\begin{bmatrix} -2 \\ 7 \end{bmatrix}$ **C.** $\begin{bmatrix} 2 \\ -3 \end{bmatrix}$ **D.** $\begin{bmatrix} -2 \\ 3 \end{bmatrix}$

53 For the set of data shown in the box-and-whisker plot, 11 is the

lower Quartile Q1   median-Q2   upper Quartile Q3
25% 25% 25% 25%
Lower Extreme   upper extreme

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

upper extreme - lower extreme
↓ 22-11=11
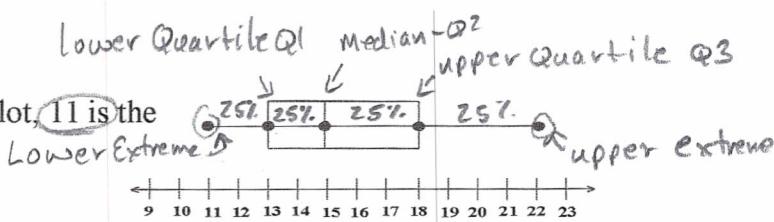
A. mean **B.** range **C.** median **D.** interquartile range

Can't tell on a box-n-whisker   *Q2 =15*   *Q3 -Q1 = 18-13=5*

54 If the augmented matrix for a system is $\begin{bmatrix} 2x + 1y & 3 \\ 3x + 2y & 1 \end{bmatrix}$ What is the system of equations?

A. $2x + y = 3$ **B.** $2x + 3y = 1$ **C.** $3x + y = 3$ **D.** $2x - y = 3$
  $3x + 2y = 1$ $3x + y = 2$ $x + 2y = 1$ $3x - 2y = 1$

55 The augmented matrix for a system is $\begin{bmatrix} 1 & 0 & | & 3 \\ 0 & 2 & | & 4 \end{bmatrix}$. What is the solution?

(handwritten: x y constant)

(handwritten: $1x + 0y = 3$ $x = 3$; $0x + 2y = 4$ $2y = 4$ $y = 2$)

A. (3, 4)   B. (3, 2)   C. (1, 2)   D. (0, 2)

56 Simplify $\dfrac{12m^6 t^{-5}}{15m^2 t^{-2}}$.

(handwritten: Reduce fraction; Division; Subtract exponents; $\dfrac{4m^{6-2}t^{-5-(-2)}}{5} = \dfrac{4m^4 t^{-3}}{5} = \dfrac{4m^4}{5t^3}$)

A. $\dfrac{4m^4 t^3}{5}$ B. $-\dfrac{3m^4}{t^3}$ C. $\dfrac{4m^4}{5t^3}$ D. $\dfrac{m^4 t^3}{3}$

57 Simplify $(7m - 8)^2$.

(handwritten: $= (7m-8)(7m-8) = 49m^2 - 56m - 56m + 64 = 49m^2 - 112m + 64$; FOIL)

A. $49m^2 + 64$ B. $49m^2 - 64$ C. $49m^2 - 112m + 64$ D. $49m^2 - 30m + 64$

58 Simplify $(3w^5)(-m)^4$.

(handwritten: $= (3w5)(m4) = 3m4w5$; $(-m)4 = (-m)(-m)(-m)(-m) = m4$)

A. $3m^4 w^5$ B. $-3m^4 w^5$ C. $-12m^4 w^5$ D. $-3w^5 + m^4$

59 Simplify $\dfrac{a^2(r^{-3}s)^{-2}}{a^5 r^3 s^3}$.

(handwritten: Mult. exponents; $= \dfrac{a^2 r^6 s^{-2}}{a^5 r^3 s^3}$; Subt. exponents $= a^{2-5} r^{6-3} s^{-2-3} = a^{-3} r^3 s^{-5}$; Move to denom. $= \dfrac{r^3}{a^3 s^5}$)

A. $\dfrac{1}{a^3 r^4 s^5}$ B. $\dfrac{r^3}{a^3 s^5}$ C. $\dfrac{r^3}{a^3 s}$ D. $\dfrac{a^3 s}{r^3}$

60 Express 86,400,000 in scientific notation.

(handwritten: $1\,2\,3\,4\,5\,6\,7$ $86,400,000.$ 8.64×10^7 Big # = pos. exp.)

A. 864×10^{-5} B. 864×10^5 C. 8.64×10^{-7} D. 8.64×10^7

61 Simplify $\dfrac{4 - 2i}{7 + 3i}$.

(handwritten: Multiply by the conjugate of denom.)

A. $\dfrac{11 - 13i}{29}$ B. $\dfrac{11 - 14i}{29}$ C. $\dfrac{13 - 17i}{29}$ D. $\dfrac{17 - 13i}{29}$

(handwritten: $\dfrac{(4-2i)(7-3i)}{(7+3i)(7-3i)} = \dfrac{28 - 12i - 14i + 6i^2}{49 - 21i + 21i - 9i^2} = \dfrac{28 - 26i - 6}{49 + 9} = \dfrac{22 - 26i}{58} \div 2 = \dfrac{11 - 13i}{29}$; FOIL; $i^2 = -1$)

62   Simplify $(3 - \sqrt{7})(5 + \sqrt{7})$. $= 15 + 3\sqrt{7} - 5\sqrt{7} - 7 = 8 - 2\sqrt{7}$

    A. $8 + \sqrt{7}$ *FOIL*   **B.** $8 - \sqrt{7}$ **C.** $8 - 2\sqrt{7}$ **D.** $8 + 2\sqrt{7}$

Factor each polynomial completely.   *What are the factors of 20 that add to 9*

    $1 \times 20 = 20$

63 $1m^2 + 9m + 20$ $m^2 + 4m + 5m + 20$ 5×4
    $m(m+4) + 5(m+4) = (m+5)(m+4)$

    A. $m(m + 29)$ **B.** $(m + 4)(m + 5)$ **C.** $(m - 4)(m - 5)$ **D.** *prime*

    $1 \times -24 = -24$ *Factors of -24 that add to +10* $n^2 - 2n + 12n - 24$
    12×-2 $n(n-2) + 12(n-2)$
    $(n+12)(n-2)$

64 $1n^2 + 10n - 24$

    A. $(n-2)(n+12)$ **B.** $(n+2)(n-12)$ **C.** $(n-4)(n-6)$ **D.** $(n+4)(n+6)$

    $3 \times -10 = -30$ *what are the factors of -30 that add to -13* $3b^2 - 15b + 2b - 10$
    -15×2 $\rightarrow 3b(b-5) + 2(b-5)$
    $(3b+2)(b-5)$

65 $3b^2 - 13b - 10$

    A. $(3b + 2)(b + 5)$ **B.** $(3b - 2)(b - 5)$ **C.** $(3b - 2)(b + 5)$ **D.** $(3b + 2)(b - 5)$

Mult. by conjugate

66   Simplify $\dfrac{6}{4 + \sqrt{2}} \cdot \dfrac{(4 - \sqrt{2})}{(4 - \sqrt{2})} = \dfrac{24 - 6\sqrt{2}}{16 - 4\sqrt{2} + 4\sqrt{2} - 2} = \dfrac{24 - 6\sqrt{2}}{14} \div \dfrac{\div 2}{\div 2} = \dfrac{12 - 3\sqrt{2}}{7}$

    A. $\dfrac{12 - 6\sqrt{2}}{7}$ **B.** $\dfrac{4 - \sqrt{2}}{2}$ **C.** $\dfrac{4 - \sqrt{2}}{3}$ **D.** $\dfrac{12 - 3\sqrt{2}}{7}$

Mult. by conjugate

67   Simplify $\dfrac{(n - v)}{\left(n^{\frac{1}{2}} - v^{\frac{1}{2}}\right)} \cdot \dfrac{\left(n^{1/2} + v^{1/2}\right)}{\left(n^{1/2} + v^{1/2}\right)} = \dfrac{n^{3/2} + nv^{1/2} - n^{1/2}v - v^{3/2}}{n - v} = \dfrac{n^{3/2} - v^{3/2} + nv^{1/2} - n^{1/2}v}{n - v}$

    FOIL

    A. $n^{\frac{1}{2}} + v^{\frac{1}{2}}$ **B.** $n^{\frac{1}{2}} - v^{\frac{1}{2}}$ **C.** $\dfrac{n^{\frac{3}{2}} - v^{\frac{3}{2}} + nv^{\frac{1}{2}} - n^{\frac{1}{2}}v}{n - v}$ **D.** $\dfrac{n - 2n^{\frac{1}{2}}v^{\frac{1}{2}} + v}{n - v}$

68   Divide using long division: $(x^4 + x^3 - 7x^2 + 13x + 4) \div (x^2 + 4x + 1)$

$$
\begin{array}{r}
x^2 - 3x + 4 \\
x^2+4x+1 \overline{\smash{)}\ x^4 + x^3 - 7x^2 + 13x + 4} \\
\ominus\ x^4 + 4x^3 + x^2 \\
\hline
-3x^3 - 8x^2 + 13x \\
\oplus\ -3x^3 - 12x^2 - 3x \\
\hline
4x^2 + 16x + 4 \\
\ominus\ 4x^2 + 16x + 4 \\
\hline
0
\end{array}
$$

    A. $x^2 - 3x - 4 + \dfrac{32x + 13}{x^2 + 4x + 1}$ **B.** $x^2 + 3x - 18 + \dfrac{62x + 22}{x^2 + 4x + 1}$

    C. $x^2 - 3x + 4$ **D.** $x^2 - 3x + 4 - \dfrac{8}{x^2 + 4x + 1}$

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69   Solve $\sqrt[3]{x-4} - 12 = -7$

$\sqrt[3]{x-4} = 5 \rightarrow (\sqrt[3]{x-4})^3 = (5)^3 \rightarrow x-4 = 125$

$x = 129$

    A. 19   **B.** 121   **C.** 129   **D.** ∅

70   Simplify $(4-2i)^2$.

$(4-2i)(4-2i) = 16 - 8i - 8i + 4i^2 = 16 - 16i - 4 = \boxed{12 - 16i}$

FOIL

    A. 12   **B.** 20   **C.** $12 - 16i$ **D.** $20 - 16i$

71   Divide using synthetic division: $(2x^4 + 6x^3 + 5x - 6) \div (x + 2)$

no x^2 term

$x + 2 = 0$
$x = -2$

$-2 | \quad 2 \quad 6 \quad 0 \quad 5 \quad -6$

$ \quad -4 \quad -4 \quad 8 \quad -26$

Mult $ \quad 2 \quad 2 \quad -4 \quad 13 \quad |-32$

$2x^3 + 2x^2 - 4x + 13 - \dfrac{32}{x+2}$

    A. $2x^3 + 2x^2 - 4x + 13 - \dfrac{32}{x+2}$ **B.** $2x^2 + 2x + x - 8$

    C. $2x^2 + 2x + x - \dfrac{8}{x+2}$ **D.** $2x^3 + 2x^2 + x - \dfrac{8}{x+2}$

If you finish early, you may go back and check your work.

STOP