

Personalized Practice Workbook

Focus Skills: Your Mistake List

Instructions: Show work. If stuck, use the hint box, then try again.

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1) Point-Slope Form

Hint / Quick Notes

Point-slope form: $y - y_1 = m(x - x_1)$.

Steps: (1) identify m and (x_1, y_1) (2) substitute (3) simplify if needed.

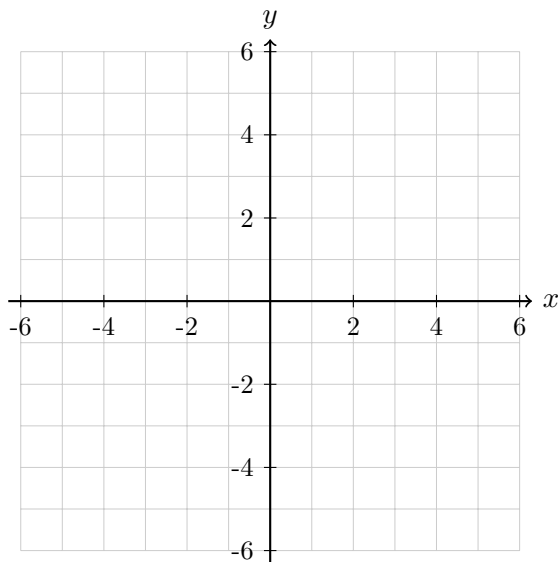
- Write the equation of the line with slope $m = 4$ passing through $(-2, 5)$ in point-slope form. Then rewrite in slope-intercept form.
- A line passes through $(3, -1)$ and $(7, 11)$. Find the slope and write the equation in point-slope form.
- Convert $y + 6 = -\frac{3}{2}(x - 4)$ to standard form $Ax + By = C$ with integers.

2) Graphing Inequalities (Room to Graph)

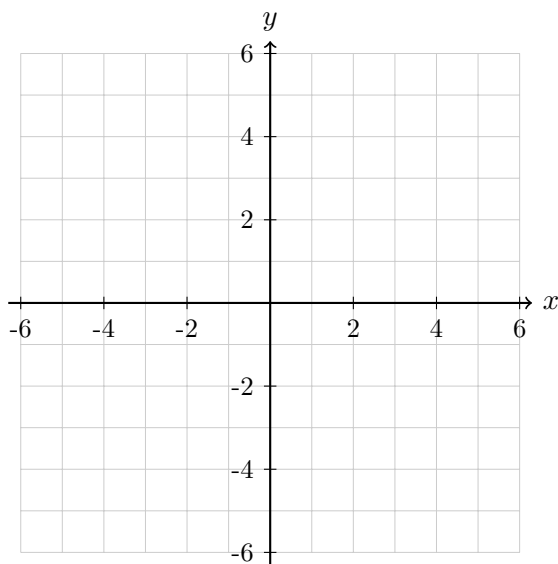
Mini-Explanation

Solid boundary line for \leq, \geq . Dashed boundary line for $<, >$.
 Shade **above** for $y >$ or $y \geq$. Shade **below** for $y <$ or $y \leq$.

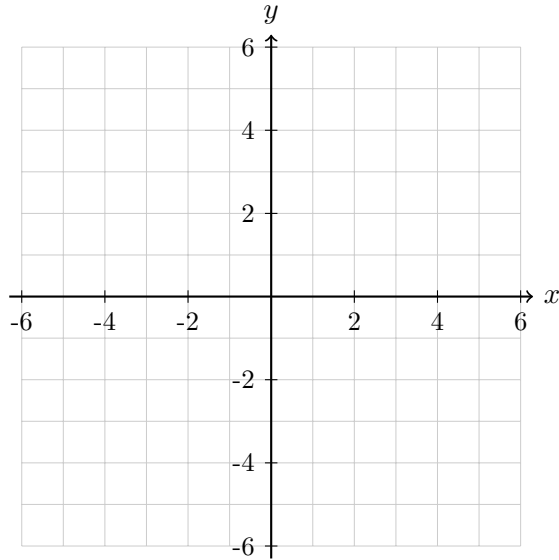
1. Graph: $y \geq -2x + 1$. Label the boundary line and shade correctly.



2. Graph: $y < \frac{1}{2}x - 3$. (Dashed line!)



3. Graph: $-3x + 2y \leq 6$. First rewrite in slope-intercept form.



3) Systems of Two-Variable Equations

Hint / Quick Notes

You can solve by substitution or elimination.
 Elimination trick: multiply one/both equations to make coefficients cancel.

1. Solve by elimination:

$$\begin{cases} 2x + 3y = 19 \\ 4x - 3y = 5 \end{cases}$$

2. Solve by substitution:

$$\begin{cases} y = 2x - 7 \\ x + y = 8 \end{cases}$$

3. Solve:

$$\begin{cases} 3x - 2y = 4 \\ 6x - 4y = 8 \end{cases}$$

(Then interpret what type of system it is.)

4) Number of Solutions: 0, 1, or Infinite

Mini-Explanation

Two lines:

- 1 solution = different slopes (intersect once).
- 0 solutions = parallel lines (same slope, different intercept).
- Infinite solutions = same line (equations equivalent).

1. Determine the number of solutions (0, 1, or infinite). Justify briefly:

$$\begin{cases} y = 3x + 2 \\ 6x - 2y = -4 \end{cases}$$

2. Determine the number of solutions:

$$\begin{cases} 2x + y = 7 \\ 4x + 2y = 10 \end{cases}$$

3. Determine the number of solutions:

$$\begin{cases} 5x - 10y = 15 \\ x - 2y = 3 \end{cases}$$

5) Parts of a Polynomial (Degree, Constant, Mono/Bi/Tri)

Hint / Quick Notes

Degree = highest exponent (after simplifying).

Constant term = term with no variable.

Monomial = 1 term, Binomial = 2 terms, Trinomial = 3 terms.

1. For $P(x) = 7x^4 - 3x^2 + 9$: state degree, leading term, leading coefficient, and constant term.
2. Classify and give degree: $Q(x) = 5x^2 - 8x$.
3. Simplify, then classify and give degree:

$$R(x) = 2x^3 + 4x^2 - 7x^3 + 1$$

6) Factoring

Hint / Quick Notes

Check in this order: GCF → difference of squares → trinomials → special patterns.
 Difference of squares: $a^2 - b^2 = (a - b)(a + b)$.

1. Factor completely: $12x^3 - 18x^2$.
2. Factor completely: $x^2 - 16$.
3. Factor completely: $2x^2 + 7x + 3$.
4. Factor completely: $x^2 - 5x - 24$.

7) DOPS (Distribution of a Product over a Sum)

Mini-Explanation

DOPS = distribute each term in one factor across the other factor.
 Example: $(a + b)(c + d) = ac + ad + bc + bd$.

1. Expand and simplify: $(3x - 5)(2x + 7)$.
2. Expand and simplify: $(x + 4)(x - 9)$.
3. Expand and simplify: $(2y - 3)^2$.

8) Simplifying Radicals & Exponent Rules

Hint / Quick Notes

$\sqrt{ab} = \sqrt{a}\sqrt{b}$ (for nonnegative a, b). Pull out perfect squares.
 Exponent rules: $a^m a^n = a^{m+n}$, $\frac{a^m}{a^n} = a^{m-n}$, $(a^m)^n = a^{mn}$, $(ab)^n = a^n b^n$, $a^{-n} = \frac{1}{a^n}$.

1. Simplify: $\sqrt{72}$.
2. Simplify: $\sqrt{18x^2}$ (assume $x \geq 0$).
3. Simplify: $\frac{(3x^2y^{-1})^2}{9xy^3}$.
4. Simplify and write with positive exponents: $(2a^{-3}b^2)(4a^5b^{-1})$.

9) Literal Equations

Hint / Quick Notes

Goal: isolate the requested variable like it's x .
 Keep operations balanced; factor the target variable if it appears in multiple terms.

1. Solve for h : $V = \pi r^2 h$.
2. Solve for x : $ax + b = cx + d$.
3. Solve for m : $y = mx + b$.

10) Sequences

Mini-Explanation

Arithmetic: common difference d . Formula: $a_n = a_1 + (n - 1)d$.
 Geometric: common ratio r . Formula: $a_n = a_1(r^{n-1})$.

1. Arithmetic sequence: $a_1 = 7$, $d = -3$. Find a_6 and write an explicit formula for a_n .
2. Geometric sequence: $a_1 = 5$, $r = 2$. Find a_8 .
3. Decide whether the sequence is arithmetic, geometric, or neither, then find the next term:

3, 6, 12, 24, ...

4. The arithmetic sequence has $a_4 = 18$ and $a_{10} = 42$. Find a_1 and d .

11) Statistics (Application / Context)

Hint / Quick Notes

Be careful with vocabulary: mean vs median, outlier impact, correlation vs causation.
 Always reference the context in your conclusion.

1. A student's quiz scores are: 70, 72, 75, 75, 76, 100.
 - Find the mean and median.
 - Which measure better represents a "typical" score? Explain using the context.

2. In a town, a survey of 60 people is taken at a gym. 42 say they “exercise at least 3 times per week.”
 - What is the sample proportion?
 - Is this likely an unbiased estimate for the whole town? Why/why not?

3. A dataset has mean 50 and standard deviation 8 (assume approximately normal).
 - Approximate the interval containing about 95% of values.
 - Interpret what that interval means in words.

4. Two variables have correlation $r = 0.86$. A headline says: “Increasing study time *causes* higher test scores.”
 - What does $r = 0.86$ actually tell you?
 - What additional evidence would you need to support a causal claim?

Answer Key (Keep this hidden during practice)

1) Point-Slope

- 1) $y - 5 = 4(x + 2) \Rightarrow y = 4x + 13$.
- 2) $m = \frac{11 - (-1)}{7 - 3} = \frac{12}{4} = 3$, so $y + 1 = 3(x - 3)$.
- 3) $y + 6 = -\frac{3}{2}x + 6 \Rightarrow y = -\frac{3}{2}x \Rightarrow 3x + 2y = 0$.

2) Inequalities

Graphing: solid for \geq, \leq ; dashed for $>, <$; shade above/below accordingly. (Visual)

3) Systems

- 1) Add: $6x = 24 \Rightarrow x = 4$. Then $2(4) + 3y = 19 \Rightarrow y = \frac{11}{3}$.
- 2) $x + (2x - 7) = 8 \Rightarrow 3x = 15 \Rightarrow x = 5, y = 3$.
- 3) Same equation (second is $2 \times$ first) \Rightarrow infinite solutions.

4) Number of Solutions

- 1) Second equation: $6x - 2y = -4 \Rightarrow y = 3x + 2$ same as first \Rightarrow infinite.
- 2) If double first: $4x + 2y = 14 \neq 10 \Rightarrow 0$ solutions.
- 3) First is $5 \times$ second \Rightarrow infinite solutions.

5) Polynomials

- 1) Degree 4; leading term $7x^4$; leading coeff 7; constant 9.
- 2) Binomial, degree 2.
- 3) $R(x) = -5x^3 + 4x^2 + 1$: trinomial, degree 3.

6) Factoring

- 1) $6x^2(2x - 3)$.
- 2) $(x - 4)(x + 4)$.
- 3) $(2x + 1)(x + 3)$.
- 4) $(x - 8)(x + 3)$.

7) DOPS

- 1) $6x^2 + 11x - 35$.
- 2) $x^2 - 5x - 36$.
- 3) $4y^2 - 12y + 9$.

8) Radicals/Exponents

- 1) $\sqrt{72} = 6\sqrt{2}$.
- 2) $\sqrt{18x^2} = 3x\sqrt{2}$ (assuming $x \geq 0$).
- 3) $\frac{(9x^4y^{-2})}{9xy^3} = x^3y^{-5} = \frac{x^3}{y^5}$.
- 4) $8a^2b^1 = 8a^2b$.

9) Literal

- 1) $h = \frac{V}{\pi r^2}$.
- 2) $ax + b = cx + d \Rightarrow (a - c)x = d - b \Rightarrow x = \frac{d - b}{a - c}$.
- 3) $m = \frac{y - b}{x}$ (if $x \neq 0$).

10) Sequences

- 1) $a_6 = 7 + 5(-3) = -8$; $a_n = 7 + (n - 1)(-3) = 10 - 3n$.
- 2) $a_8 = 5 \cdot 2^7 = 640$.
- 3) Geometric $r = 2$; next 48.
- 4) $a_{10} - a_4 = 6d = 24 \Rightarrow d = 4$. Then $a_4 = a_1 + 3d = 18 \Rightarrow a_1 = 6$.

11) Stats

- 1) Mean = $\frac{468}{6} = 78$; median = $\frac{75+75}{2} = 75$; median more typical due to 100 outlier.
- 2) $\hat{p} = \frac{42}{60} = 0.70$; biased (gym sample).
- 3) About 95%: $50 \pm 2(8) \Rightarrow [34, 66]$ (approx).
- 4) Strong positive linear association; correlation \neq causation; need controlled experiment or strong causal design.