U1 L2 Graphs of Equations — Practice

Name: _____ HR: _____

Group A — Sketching Graphs by Plotting Points

Complete each table of values, then plot the solution points on the grid and sketch the graph.

1. $y = 3x - 5$

x:	-1	0	1	2	3
y:	-8	-5	-2	1	4

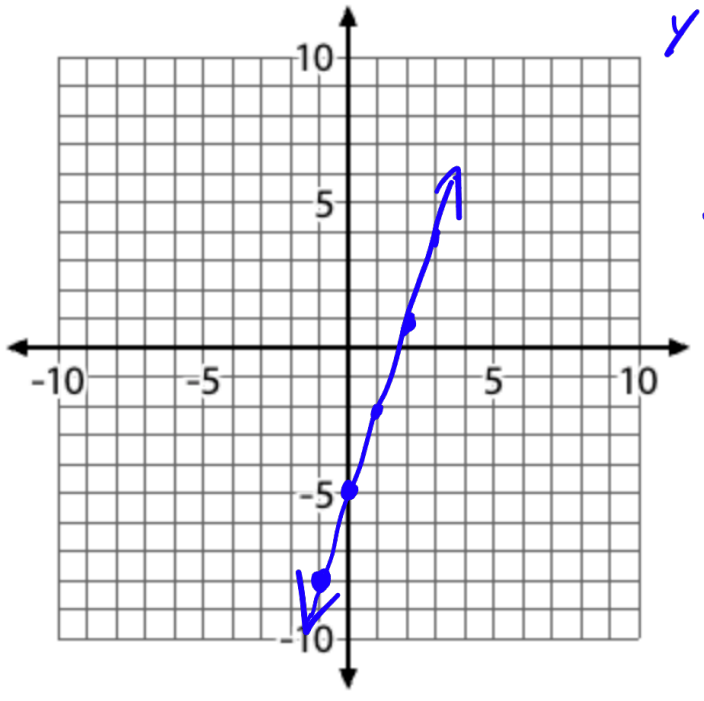
$y(-1) = 3(-1) - 5 = -3 - 5 = -8$

$y(0) = 3(0) - 5 = 0 - 5 = -5$

$y(1) = 3(1) - 5 = 3 - 5 = -2$

$y(2) = 3(2) - 5 = 6 - 5 = 1$

$y(3) = 3(3) - 5 = 9 - 5 = 4$



2. $y = x^2 - 3x$

$a=1 \quad b=-3$

$x = \frac{-b}{2a} = \frac{--3}{2(1)} = \frac{3}{2} = 1.5$

x:	-1	0	1	2	3	4
y:	4	0	-2	-2	0	4

$y(-1) = (-1)^2 - 3(-1) = 1 + 3 = 4$

$y(0) = 0^2 - 3(0) = 0$

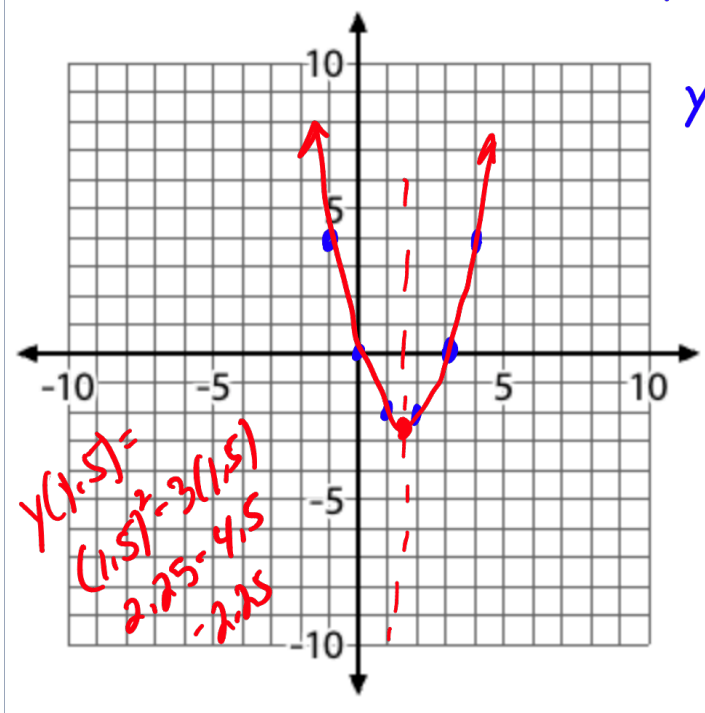
$y(1) = (1)^2 - 3(1) = 1 - 3 = -2$

$y(2) = (2)^2 - 3(2) = 4 - 6 = -2$

$y(3) = (3)^2 - 3(3) = 9 - 9 = 0$

$y(4) = (4)^2 - 3(4) = 16 - 12 = 4$

$y(1.5) = (1.5)^2 - 3(1.5) = 2.25 - 4.5 = -2.25$



Group B — x- and y-Intercepts

Find the x- and y-intercepts of each equation algebraically. Show your work.

3. $y = 5x - 6$

$y = mx + b$

x-int: $(\frac{6}{5}, 0)$, $(1.2, 0)$

y-int: $(0, -6)$

$0 = 5x - 6$

$+6 \quad +6$

$\frac{6}{5} = \frac{5x}{5}$

$\frac{6}{5} = x$

$y = 5(0) - 6$

$y = -6$

4. $y = \sqrt{x+4}$

radical EQUATION

x-int: $(y=0)$

$(0)^2 = (\sqrt{x+4})^2$

$0 = x + 4$

$-4 \quad -4$

$-4 = x$

$x = -4$ OR $(-4, 0)$

y-int: $(x=0)$

$y = \sqrt{0+4}$

$y = \sqrt{4}$

$y = 2$

$(0, 2)$

5. $y = |3x - 7|$

x-int: $(y=0)$

$0 = |3x - 7|$

$3x - 7 = 0$

$3x = 7$

$x = \frac{7}{3}$

$(\frac{7}{3}, 0)$

$(2\frac{1}{3}, 0)$

$(2.\overline{3}, 0)$

$0 = |A|$

$8 = |3x - 7|$

$8 = |A|$

$3x - 7 = 8$ OR $3x - 7 = -8$

y-int: $y = |3(0) - 7| = |-7| = 7$

$(0, 7)$

6. $y = 2x^3 - 4x^2$

x-int:

0, 2

y-int = 0

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Group C — Testing for Symmetry

Use the algebraic tests to check each equation for symmetry with respect to the x-axis, the y-axis, and the origin. One, none, or more than one may apply.

7. $y = x^2$

y with −y

x-axis: $-y = x^2$, $y = -x^2$

y-axis: $y = (-x)^2$, $y = x^2$

origin: $-y = (-x)^2$, $-y = x^2$

Symmetric about: y-axis

8. $x = y^2$

x-axis: $x = (-y)^2$, $x = y^2$

y-axis: $-x = y^2$, $x = -y^2$

−x & −y: $-x = (-y)^2$, $-x = y^2$

Symmetric about: x-axis

9. $xy = 4$

x, −y → $x(-y) = 4$, $x(-1 \cdot y) = 4$, $-1 \cdot xy = 4$

No x-symmetry

No y-symm: $-x \cdot y = 4$, $-xy = 4$

$(-x)(-y) = 4$, $xy = 4$

Symmetric about: origin

10. $y = x + 1$

x-axis: $-y = x + 1$

y-axis: $y = -x + 1$

origin: $-y = (-x + 1)$, $y = x - 1$

Symmetric about: None

Group D — Writing Equations of Circles

Write the standard-form equation of each circle.

11. Center (0, 0), radius 3

$(x-h)^2 + (y-k)^2 = r^2$

Center: (h, k)

$(x-0)^2 + (y-0)^2 = 3^2$

$x^2 + y^2 = 9$ — or 3^2

12. Center (−4, 5), radius 2

$(x-h)^2 + (y-k)^2 = r^2$

$(x-(-4))^2 + (y-5)^2 = 2^2$

$(x+4)^2 + (y-5)^2 = 4$

$r = 2$

13. Center (3, 8); the point (−9, 13) lies on the circle. (Hint: use the Distance Formula to find r.)

$C(h, k) = (3, 8)$

$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

$\sqrt{(-12)^2 + (5)^2} = \sqrt{144 + 25} = \sqrt{169} = 13$

$r = 13$, $r^2 = 13^2$

$(x-h)^2 + (y-k)^2 = r^2$

14. The endpoints of a diameter are (3, 2) and (−9, −8). (Hint: find the center first.)

$M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = (-3, -3)$

(3, 2), (−9, −8), MP, r

radius = Dist. from center to either point

$r = \sqrt{(-3-3)^2 + (-3-2)^2}$

$= \sqrt{36 + 25} = \sqrt{61}$

$(x-(-3))^2 + (y-(-3))^2 = 61$

Group E — Mixed Applications

Show your work.

15. The force F (in pounds) required to stretch a spring x inches from its natural length is modeled by:

$$F = \frac{5}{4}x,\ 0 \le x \le 20$$

Find the force required to stretch the spring 12 inches.

$F = \frac{5}{4} \cdot 12$

$= 5 \cdot 3 = 15$ pounds

16. A circular sprinkler waters a lawn out to a radius of 15 feet. On a map where the sprinkler sits at the origin, write the standard-form equation of the circle representing the watered area.

$r = 15$ feet, (0, 0)

$(x-0)^2 + (y-0)^2 = (15)^2$

$x^2 + y^2 = 225$