

Workbook



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Types of Functions

The Linear Function (Lines) and Circles

Questions:

In exercises 1-4, a particle moves from A to B in the coordinate plane. Find the increments Δx and Δy in the particles coordinates.

Also find the distance from A to B :

- | | |
|----------------------------|---------------------------------|
| 1) A(-3,4) , B(-1,0) | 2) A(-2,-2) , B(-4,2) |
| 3) A(-3.2,-2) , B(-4.3,-2) | 4) A($\sqrt{2}$,3) , B(0,2.5) |

In exercises 5-8, describe the graph of the equations:

- | | |
|-----------------------|--------------------|
| 5) $x^2 + y^2 = 4$ | 6) $x^2 + y^2 = 9$ |
| 7) $x^2 + y^2 \leq 4$ | 8) $x^2 + y^2 = 0$ |

In exercises 9-12, plot the points and find the slope (if any) of the line they determine. Also find the common slope (if any) of the lines perpendicular to line AB:

- | | |
|----------------------|------------------------|
| 9) A(1,3) , B(-2,0) | 10) A(-2,2) , B(2,-1) |
| 11) A(1,3) , B(-2,3) | 12) A(-2,1) , B(-2,-1) |

In exercises 13-16, find an equation for (a) the vertical line and (b) the horizontal line through the given point:

- | | |
|------------------------------------|------------------------|
| 13) $\left(-1, \frac{4}{3}\right)$ | 14) $(\sqrt{2}, -1.3)$ |
| 15) $(0, -\sqrt{2})$ | 16) $(-\pi, 0)$ |

In exercises 17-20, write an equation for each line described:

- 17) Passes through $(-1,1)$ with slope -4.

18) Passes through $(2, -2)$ with slope $\frac{1}{2}$.

19) Passes through $(3, 4)$ and $(-2, 8)$.

20) Passes through $(-8, 0)$ and $(-1, 3)$.

In exercises 21-24, write an equation for each line described:

21) Has slope -2 and y intercept 6.

22) Has slope $\frac{1}{2}$ and y intercept -4.

23) Passes through $(-10, -4)$ and has no slope.

24) Passes through $\left(\frac{1}{4}, 5\right)$ and has no slope.

In exercises 25-26, write an equation for each line described:

25) Has y intercept 5 and x intercept -2.

26) Has y intercept -3 and x intercept 1.

In exercises 27-30, write an equation for each line described:

27) Passes through $(4, -2)$ and is parallel to the line $4x + 10y = 30$.

28) Passes through $(-\sqrt{2}, -4)$ and is parallel to the line $2\sqrt{x} + 5y = \sqrt{5}$.

29) Passes through $(2, 5)$ and is perpendicular to the line $6x - 4y = 15$.

30) Passes through $(0, 1)$ and is perpendicular to the line $13x - 8y = 13$.

In exercises 31-34, find the lines x and y intercepts and use this information to graph the line:

31) $4x + 5y = 20$

32) $2x + y = -4$

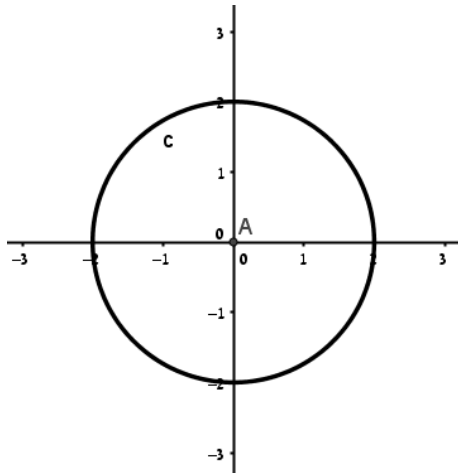
33) $\sqrt{4x} - \sqrt{3}y = \sqrt{12}$

34) $x - 1.5y = -3$

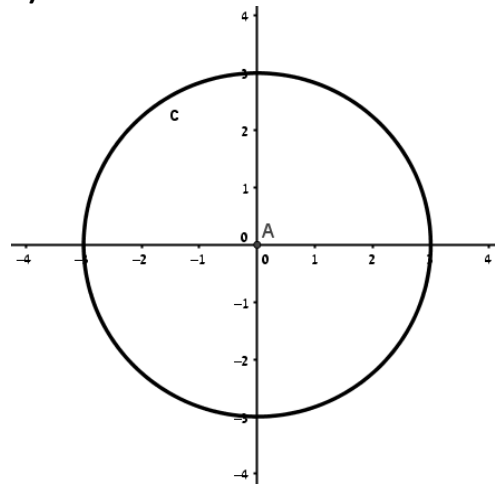
Answer Key:

- 1) $\Delta x = 2, \Delta y = -4, d = \sqrt{20}$
- 2) $\Delta x = -2, \Delta y = 4, d = \sqrt{20}$
- 3) $\Delta x = -1.1, \Delta y = 0, d = 1.1$
- 4) $\Delta x = -\sqrt{2}, \Delta y = -0.5, d = 1.5$

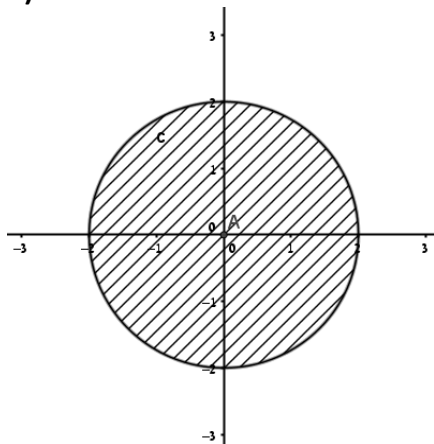
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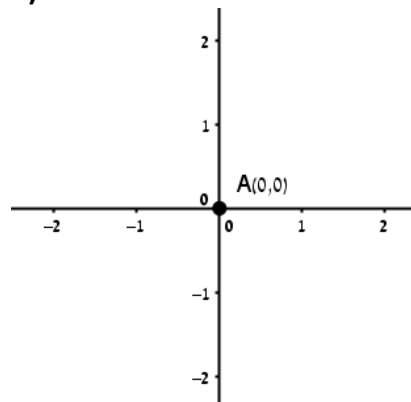
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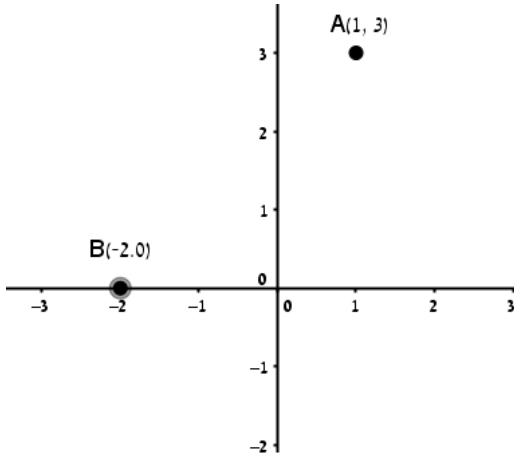
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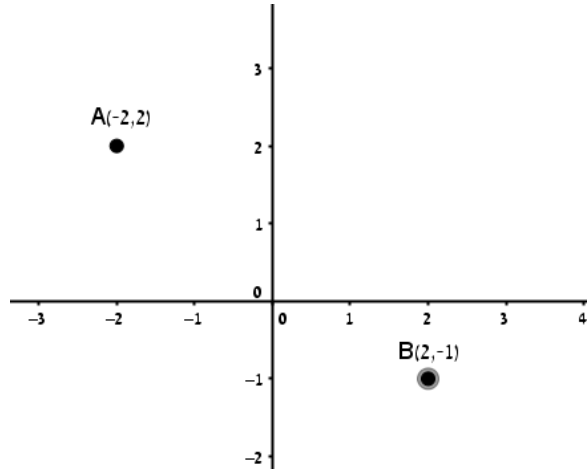
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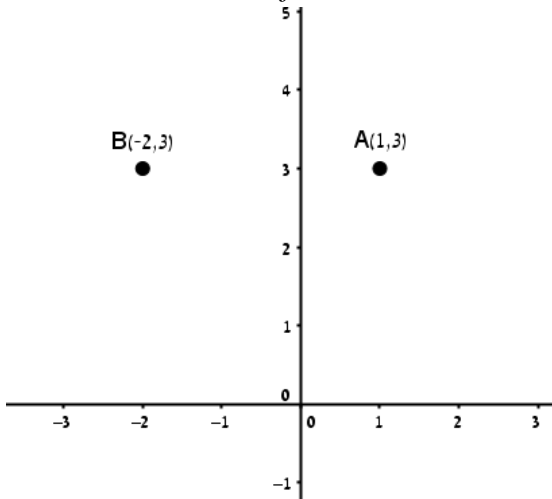
9) $a = 3, m = -\frac{1}{3}$



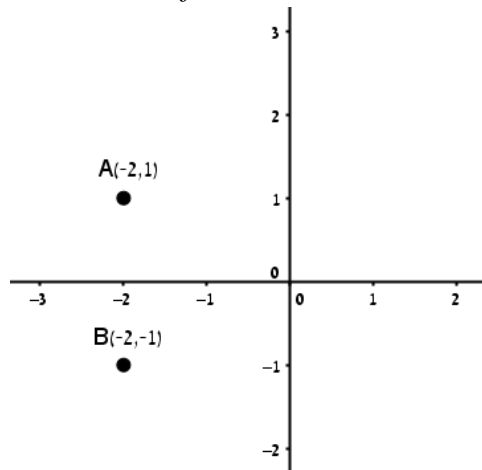
10) $a = \frac{-3}{4}, m = \frac{4}{3}$



11) $a = 0, m = \text{undefined}$



12) $a = \text{undefined}, m = 0$



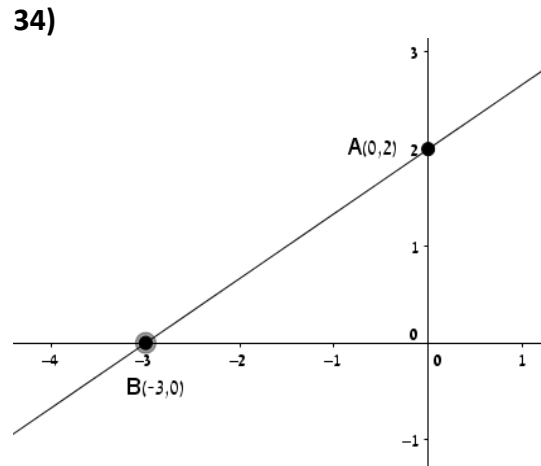
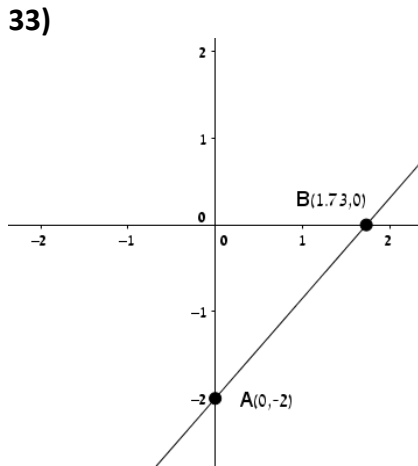
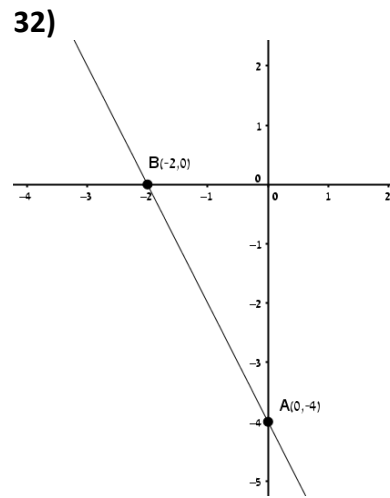
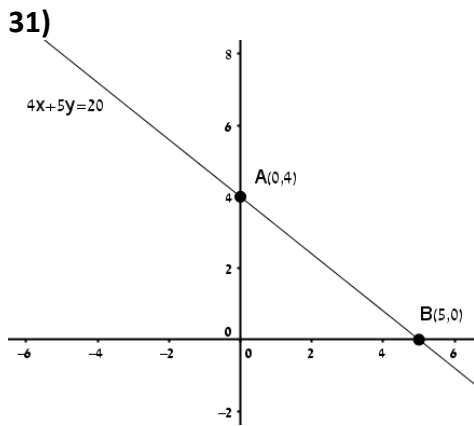
13) Vertical: $x = -1$, Horizontal: $y = \frac{4}{3}$.

14) Vertical: $x = 0$, Horizontal: $y = -\sqrt{2}$.

15) Vertical: $x = \sqrt{2}$, Horizontal: $y = -1.3$.

16) Vertical: $x = -\pi$, Horizontal: $y = 0$.

- 17) $y = -4x - 5$ 18) $y = \frac{1}{2}x - 3$ 19) $y = -\frac{4}{5}x + 6.4$
 20) $y = \frac{3}{7}x + \frac{24}{7}$ 21) $y = -2x + 6$ 22) $y = \frac{1}{2}x - 4$
 23) $y = -4$ 24) $x = \frac{1}{4}$ 25) $y = 2.5x + 5$
 26) $y = 3x - 3$ 27) $y = \frac{-2}{5}x - \frac{2}{5}$ 28) $y = \frac{-\sqrt{2}}{5}x + 3\frac{3}{5}$
 29) $y = -\frac{2}{3}x + 6\frac{1}{3}$ 30) $y = -\frac{8}{13}x + 1$



The Quadratic Function (Parabola)

Questions:

- 1) Answer the following questions:
 - a. Graph the parabola $y = -x^2 + 2x + 3$.
Label the vertex, axis, and intercepts in each case.
 - b. Solve: $-x^2 + 2x + 3 < 0$.

- 2) Answer the following questions:
 - a. Graph the parabola $y = 2x^2 + 3x - 5$.
Label the vertex, axis, and intercepts in each case.
 - b. Solve: $2x^2 + 3x - 5 \leq 0$.

- 3) Answer the following questions:
 - a. Graph the parabola $y = x^2 + x - 1$.
Label the vertex, axis, and intercepts in each case.
 - b. Solve: $x^2 + x + 1 < 0$.

- 4) Answer the following questions:
 - a. Graph the parabola $y = -x^2 + 4x - 5$.
Label the vertex, axis, and intercepts in each case.
 - b. Solve: $-x^2 + 4x - 5 < 0$.

- 5) Answer the following questions:
 - a. Graph the parabola $y = x^2 + 3x + 2$.
Label the vertex, axis, and intercepts in each case.
 - b. Solve: $x^2 + 3x + 2 > 5 + x$.

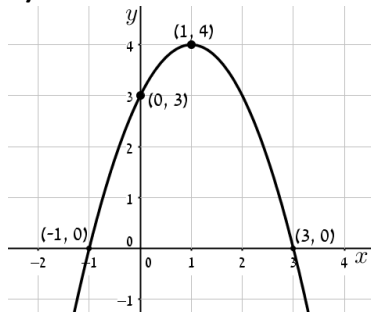
- 6) Answer the following questions:
 - a. Graph the parabola $y = -x^2 - x + 6$ and the line $y = -3x + 3$.
 - b. Solve: $-x^2 - x + 6 < -3x + 3$.

Answer Key:

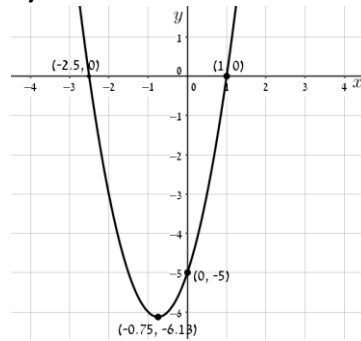
- 1) b. $x < -1, x > 3$ 2) b. $-2.5 \leq x \leq 1$ 3) b. no x . Empty set
 4) b. all x 5) b. $x < -3, x > 1$ 6) b. $x < -1, x > 3$

Final drawings:

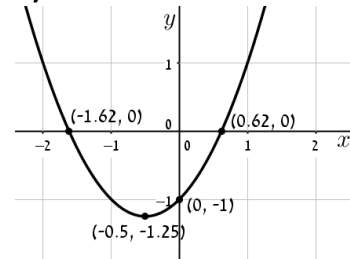
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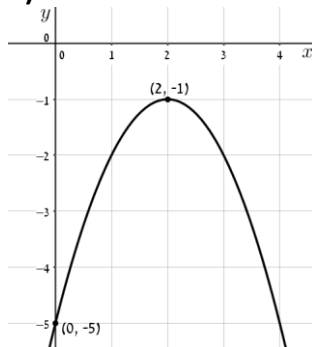
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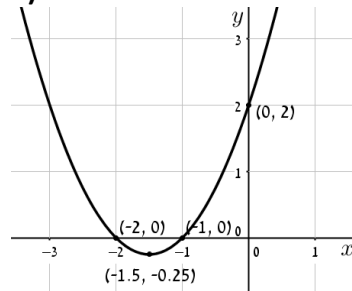
3) section a:



4) section a:



5) section a:



6) section a:

