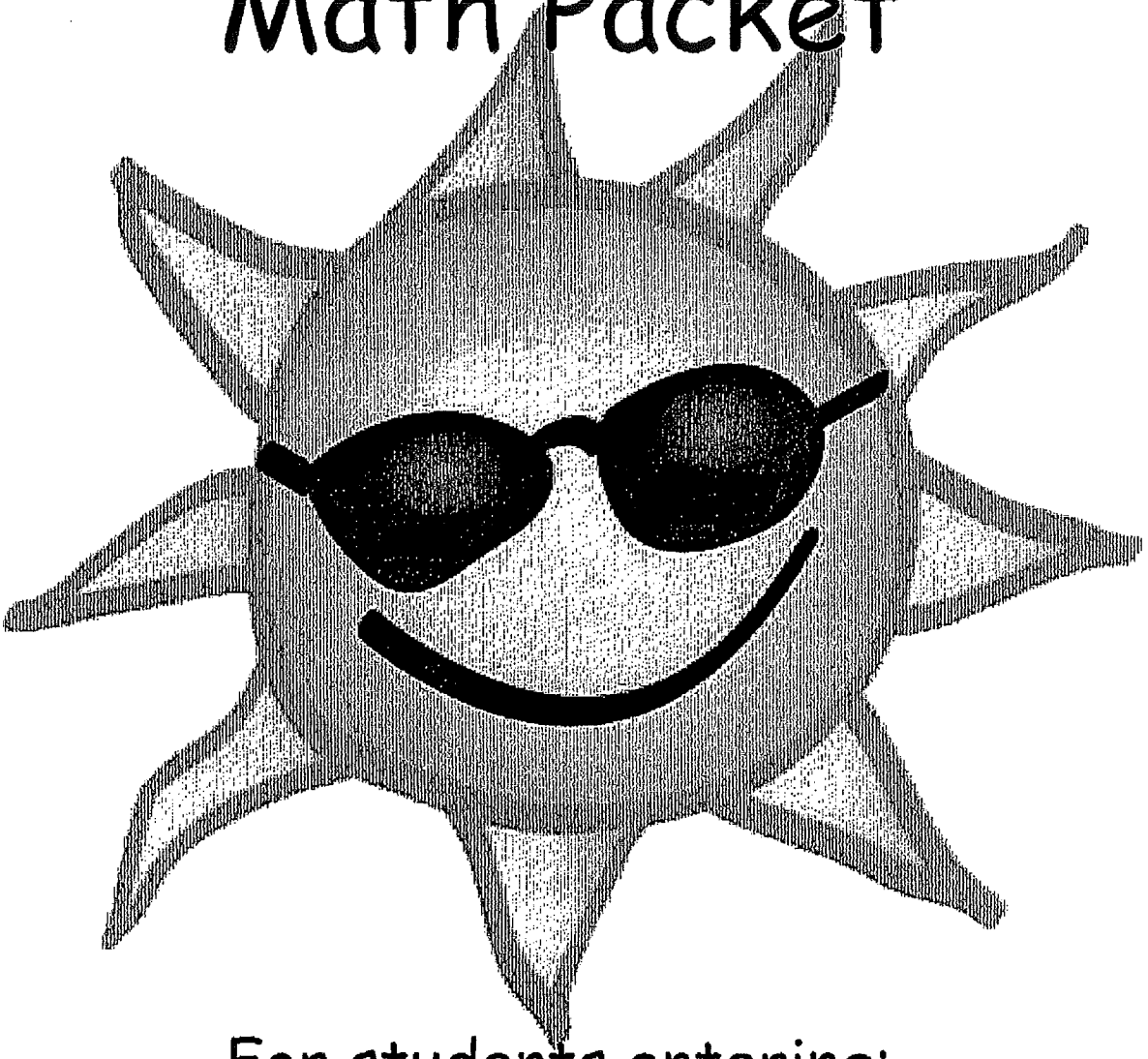
Summer

Math Packet



For students entering:

Advanced Algebra 1 Honors

Name: Answer Key

Dear Students and Parents,

When schools work together with families to support learning, children are inclined to succeed in school. Three decades of research have shown that parental participation in schooling does improve student learning!

Please encourage and help your child to work on this packet over the summer. Attached is a pacing guideline to help with planning. Please refer to the page numbers listed at the BOTTOM RIGHT hand side of the packet

The answer key is also located on our website. The completed packet should be given to your son/daughter's math teacher on Friday September 18th.

Dates	What am I doing?	Check if Pages are complete
June 15th- June 18th	Page 1-2	
June 22nd - June 25th	Page 3-4	
June 29th - July 2nd	Page 5-6	
July 6th - July 9th	Page 7-8	
July 13th - July 16th	Page 9-10	
July 20th - July 23rd	Page 11-12	
July 27th - July 30th	Page 13-14	
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August 10th - August 14th	Page 17-18	
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Properties of Exponents

Simplify. Your answer should contain only positive exponents.

1) $2m^2 \cdot 2m^3$

$4m^5$

2) $m^4 \cdot 2m^{-3}$

$2m$

3) $4r^{-3} \cdot 2r^2$

$\frac{8}{r}$

4) $4n^4 \cdot 2n^{-3}$

$8n$

5) $2k^4 \cdot 4k$

$8k^5$

6) $2x^3y^{-3} \cdot 2x^{-1}y^3$

$4x^2$

7) $2y^2 \cdot 3x$

$6y^2x$

8) $4v^3 \cdot vu^2$

$4v^4u^2$

9) $4a^3b^2 \cdot 3a^{-4}b^{-3}$

$\frac{12}{ab}$

10) $x^2y^{-4} \cdot x^3y^2$

$\frac{x^5}{y^2}$

11) $(x^2)^0$

1

12) $(2x^2)^{-4}$

$\frac{1}{16x^8}$

13) $(4r^0)^4$

256

14) $(4a^3)^2$

$16a^6$

15) $(3k^4)^4$

$81k^{16}$

16) $(4xy)^{-1}$

$\frac{1}{4xy}$

17) $(2b^4)^{-1}$

$\frac{1}{2b^4}$

18) $(x^2y^{-1})^2$

$\frac{x^4}{y^2}$

19) $(2x^4y^{-3})^{-1}$

$\frac{y^3}{2x^4}$

20) $(3m)^{-2}$

$\frac{1}{9m^2}$

21) $\frac{r^2}{2r^3}$

$\frac{1}{2r}$

22) $\frac{x^{-1}}{4x^4}$

$\frac{1}{4x^5}$

23) $\frac{3n^4}{3n^3}$

n

24) $\frac{m^4}{2m^4}$

$\frac{1}{2}$

25) $\frac{3m^{-4}}{m^3}$

$\frac{3}{m^7}$

26) $\frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$

$\frac{2x^2}{3yz^7}$

27) $\frac{4x^0y^{-2}z^3}{4x}$

$\frac{z^3}{y^2x}$

28) $\frac{2h^3j^{-3}k^4}{3jk}$

$\frac{2h^3k^3}{3j^4}$

29) $\frac{4m^4n^3p^3}{3m^2n^2p^4}$

$\frac{4m^2n}{3p}$

30) $\frac{3x^3y^{-1}z^{-1}}{x^{-4}y^0z^0}$

$\frac{3x^7}{yz}$

CHALLENGE

More Properties of Exponents

Simplify. Your answer should contain only positive exponents.

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

$\frac{1}{x^{20}}$

2) $(x^4)^{-3} \cdot 2x^4$

$\frac{2}{x^8}$

3) $(n^3)^3 \cdot 2n^{-1}$

$2n^8$

4) $(2v)^2 \cdot 2v^2$

$8v^4$

5) $\frac{2x^2y^4 \cdot 4x^2y^4 \cdot 3x}{3x^{-3}y^2}$

$8x^8y^6$

6) $\frac{2y^3 \cdot 3xy^3}{3x^2y^4}$

$\frac{2y^2}{x}$

7) $\frac{x^3y^3 \cdot x^3}{4x^2}$

$\frac{x^4y^3}{4}$

8) $\frac{3x^2y^2}{2x^{-1} \cdot 4yx^2}$

$\frac{3xy}{8}$

9) $\frac{x}{(2x^0)^2}$

$\frac{x}{4}$

10) $\frac{2m^{-4}}{(2m^{-4})^3}$

$\frac{m^8}{4}$

11) $\dfrac{(2m^2)^{-1}}{m^2}$

$\dfrac{1}{2m^4}$

12) $\dfrac{2x^3}{(x^{-1})^3}$

$2x^6$

13) $(a^{-3}b^{-3})^0$

1

14) $x^4y^3 \cdot (2y^2)^0$

x^4y^3

15) $ba^4 \cdot (2ba^4)^{-3}$

$\dfrac{1}{8b^2a^8}$

16) $(2x^0y^2)^{-3} \cdot 2yx^3$

$\dfrac{x^3}{4y^5}$

17) $\dfrac{2k^3 \cdot k^2}{k^{-3}}$

$2k^8$

18) $\dfrac{(x^{-3})^4x^4}{2x^{-3}}$

$\dfrac{1}{2x^5}$

19) $\dfrac{(2x)^{-4}}{x^{-1} \cdot x}$

$\dfrac{1}{16x^4}$

20) $\dfrac{(2x^3z^2)^3}{x^3y^4z^2 \cdot x^{-4}z^3}$

$\dfrac{8x^{10}z}{y^4}$

21) $\dfrac{(2pm^{-1}q^0)^{-4} \cdot 2m^{-1}p^3}{2pq^2}$

$\dfrac{m^3}{16p^2q^2}$

22) $\dfrac{(2hj^2k^{-2} \cdot h^4j^{-1}k^4)^0}{2h^{-3}j^{-4}k^{-2}}$

$\dfrac{h^3j^4k^2}{2}$

Writing in Scientific Notation

Write each number in scientific notation.

1) 0.000006

6×10^{-6}

2) 5400000

5.4×10^{6}

3) 60

6×10^{1}

4) 0.009

9×10^{-3}

5) 6.7

6.7×10^{0}

6) 0.0000002

2×10^{-7}

7) 2000000

2×10^{6}

8) 71×10^{3}

7.1×10^{4}

Write each number in standard notation.

9) 0.9×10^{-1}

0.09

10) 2×10^{-1}

0.2

11) 2×10^{5}

200000

12) 804×10^{2}

80400

13) 2.66×10^{4}

26600

14) 1.5×10^{-2}

0.015

15) 7.75×10^{-1}

0.775

16) 8.3×10^{7}

83000000

Answer key

Simplify and express in scientific notation:

Example 1

$(1.2 \times 10^2) + (3.04 \times 10^5)$

$= (1.2 \times 10^2) + (3.04 \times 10^2) \times 10^3$

$= (1.2 \times 10^2) + (3040 \times 10^2)$

$= 3041.2 \times 10^2$

$= \mathbf{3.0412 \times 10^5}$

Example 2

$(5.54 \times 10^{-6}) - (2.32 \times 10^{-8})$

$= (5.54 \times 10^{-8}) \times 10^2 - (2.32 \times 10^{-8})$

$= (554 \times 10^{-8}) - (2.32 \times 10^{-8})$

$= 551.68 \times 10^{-8}$

$= \mathbf{5.5168 \times 10^{-6}}$

Simplify each problem and express the answer in scientific notation.

1) $(2.3 \times 10^4) + (4.16 \times 10^7)$

Answer : **4.1623×10^7**

2) $(9.4 \times 10^2) + (3.8 \times 10^{-1})$

Answer : **9.4038×10^2**

3) $(6.07 \times 10^{-1}) - (4.52 \times 10^{-2})$

Answer : **5.618×10^{-1}**

4) $(7.98 \times 10^7) - (1.24 \times 10^5)$

Answer : **7.9676×10^7**

5) $(5.692 \times 10^{-4}) + (8.8 \times 10^{-5})$

Answer : **6.572×10^{-4}**

6) $(4.6 \times 10^2) - (2 \times 10^{-2})$

Answer : **4.5998×10^2**

7) $(9.18 \times 10^9) - (3.9 \times 10^6)$

Answer : **9.1761×10^9**

8) $(1.7 \times 10^{-1}) + (6.504 \times 10^2)$

Answer : **6.5057×10^2**

Answer key

Simplify and express in scientific notation:

Example 1

$(5 \times 10^6)(7 \times 10^9)$

$(5 \times 10^6)(7 \times 10^9) = 35 \times 10^6 \times 10^9$

$= 35 \times 10^{15}$

$= \mathbf{3.5 \times 10^{16}}$

Example 2

$$\frac{9 \times 10^8}{8 \times 10^{-2}} = \frac{9}{8} \times 10^8 \times 10^2$$

$$= \mathbf{1.125 \times 10^{10}}$$

Simplify each problem and express the answer in scientific notation.

1) $(2 \times 10^7)(9 \times 10^{-3})$

Answer : $\mathbf{1.8 \times 10^5}$

2) $\dfrac{15 \times 10^{-5}}{4 \times 10^{-7}}$

Answer : $\mathbf{3.75 \times 10^2}$

3) $\dfrac{15 \times 10^{-7}}{16 \times 10^{-5}}$

Answer : $\mathbf{9.375 \times 10^{-3}}$

4) $(9 \times 10^8)(7 \times 10^5)$

Answer : $\mathbf{6.3 \times 10^{14}}$

5) $(8 \times 10^{-7})(3 \times 10^{-6})$

Answer : $\mathbf{2.4 \times 10^{-12}}$

6) $\dfrac{7 \times 10^{-3}}{16 \times 10^2}$

Answer : $\mathbf{4.375 \times 10^{-6}}$

7) $\dfrac{4 \times 10^8}{1 \times 10^4}$

Answer : $\mathbf{4 \times 10^4}$

8) $(4 \times 10^3)(4 \times 10^7)$

Answer : $\mathbf{1.6 \times 10^{11}}$

Answer key

Simplify each problem and express the answer in scientific notation.

1) $\frac{3.2 \times 10^4}{1.6 \times 10^2}$

Answer : 2×10^2

2) $(7.1 \times 10^{-2}) + (5.02 \times 10^{-4})$

Answer : 7.1502×10^{-2}

3) $(4.8 \times 10^6) - (9.7 \times 10^4)$

Answer : 4.703×10^6

4) $(6.18 \times 10^{-1})\ (8.7 \times 10^2)$

Answer : 5.3766×10^2

5) $(5.98 \times 10^{-2}) + (3.4 \times 10^{-4})$

Answer : 6.014×10^{-2}

6) $\frac{2.15 \times 10^7}{5 \times 10^3}$

Answer : 4.3×10^3

7) $(2.08 \times 10^{-7})\ (8.1 \times 10^{-5})$

Answer : 1.6848×10^{-11}

8) $\frac{5.4 \times 10^2}{1.2 \times 10^{-1}}$

Answer : 4.5×10^3

9) $(6.5 \times 10^7) - (3.1 \times 10^4)$

Answer : 6.4969×10^7

10) $(1.98 \times 10^{-3}) + (5.2 \times 10^{-6})$

Answer : 1.9852×10^{-3}

Systems of Equations Word Problems

1) Find the value of two numbers if their sum is 12 and their difference is 4.

4 and 8

2) The difference of two numbers is 3. Their sum is 13. Find the numbers.

5 and 8

3) Flying to Kampala with a tailwind a plane averaged 158 km/h. On the return trip the plane only averaged 112 km/h while flying back into the same wind. Find the speed of the wind and the speed of the plane in still air.

Plane: 135 km/h, Wind: 23 km/h

4) The school that Stefan goes to is selling tickets to a choral performance. On the first day of ticket sales the school sold 3 senior citizen tickets and 1 child ticket for a total of $38. The school took in $52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

senior citizen ticket: $8, child ticket: $14

5) The sum of the digits of a certain two-digit number is 7. Reversing its digits increases the number by 9. What is the number?

34

6) A boat traveled 210 miles downstream and back. The trip downstream took 10 hours. The trip back took 70 hours. What is the speed of the boat in still water? What is the speed of the current?

boat: 12 mph, current: 9 mph

7) The state fair is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 8 vans and 8 buses with 240 students. High School B rented and filled 4 vans and 1 bus with 54 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

Van: 8, Bus: 22

8) The senior classes at High School A and High School B planned separate trips to New York City. The senior class at High School A rented and filled 1 van and 6 buses with 372 students. High School B rented and filled 4 vans and 12 buses with 780 students. Each van and each bus carried the same number of students. How many students can a van carry? How many students can a bus carry?

Van: 18, Bus: 59

9) Brenda's school is selling tickets to a spring musical. On the first day of ticket sales the school sold 3 senior citizen tickets and 9 child tickets for a total of $75. The school took in $67 on the second day by selling 8 senior citizen tickets and 5 child tickets. What is the price each of one senior citizen ticket and one child ticket?

senior citizen ticket: $4, child ticket: $7

10) Matt and Ming are selling fruit for a school fundraiser. Customers can buy small boxes of oranges and large boxes of oranges. Matt sold 3 small boxes of oranges and 14 large boxes of oranges for a total of $203. Ming sold 11 small boxes of oranges and 11 large boxes of oranges for a total of $220. Find the cost each of one small box of oranges and one large box of oranges.

small box of oranges: $7, large box of oranges: $13

11) A boat traveled 336 miles downstream and back. The trip downstream took 12 hours. The trip back took 14 hours. What is the speed of the boat in still water? What is the speed of the current?

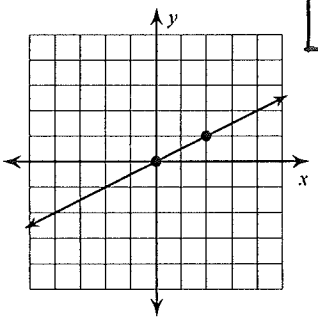
boat: 26 mph, current: 2 mph

(

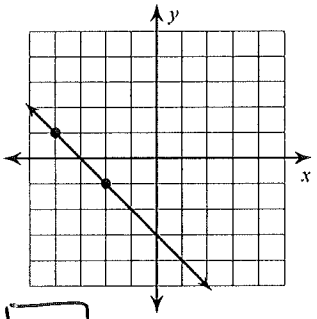
Finding Slope From a Graph

Find the slope of each line.

1) $\frac{1}{2}$

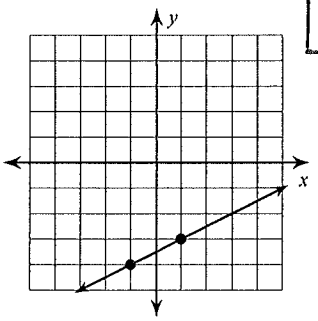


2)

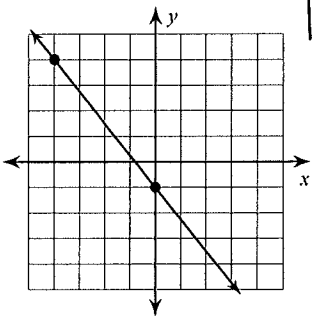


-1

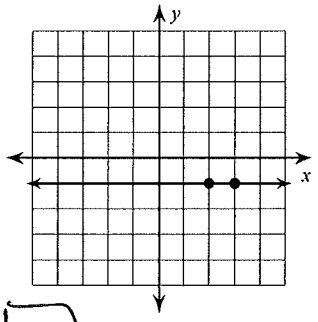
3) $\frac{1}{2}$



4) $-\frac{5}{4}$



5)



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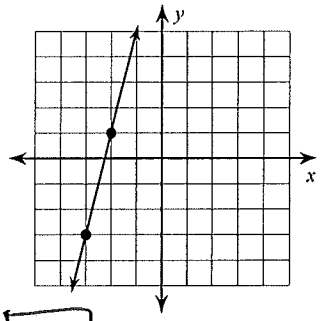
6)



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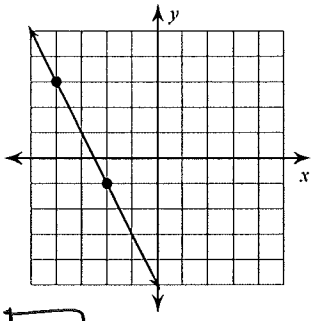
7)



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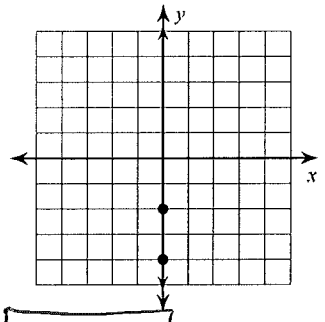
8)



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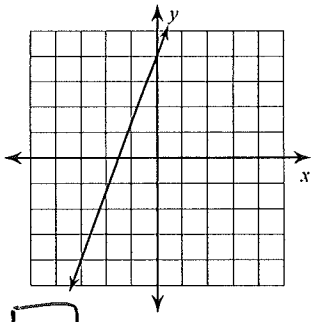
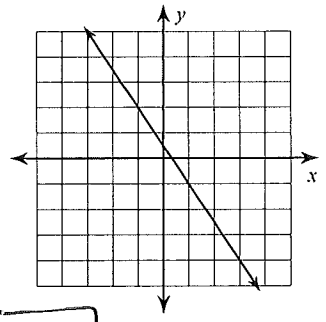
9)



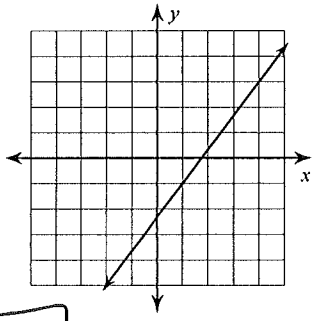
$\frac{8}{3}$

10)



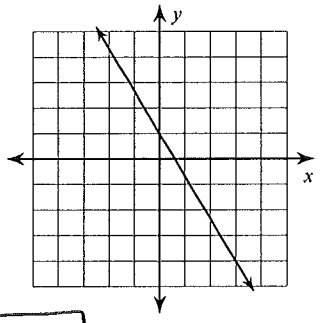
$-\frac{3}{2}$

11)



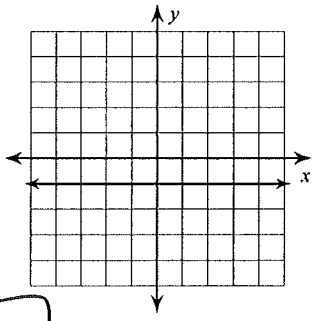
$\frac{4}{3}$

12)



$-\frac{5}{3}$

13)



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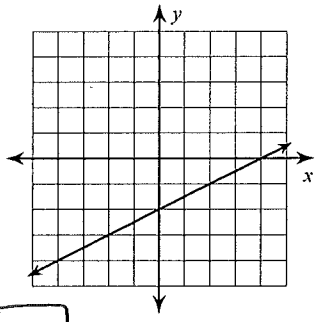
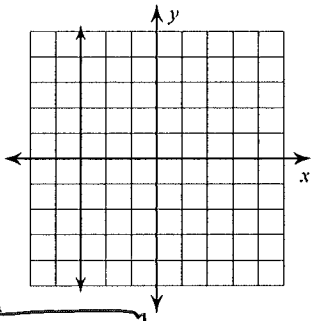
14)



$\frac{1}{2}$

15)



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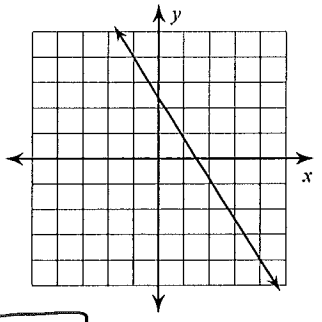


$-\frac{8}{5}$

Finding Slope From Two Points

Find the slope of the line through each pair of points.

1) (19, –16), (–7, –15)

$-\frac{1}{26}$

2) (1, –19), (–2, –7)

-4

3) (–4, 7), (–6, –4)

$\frac{11}{2}$

4) (20, 8), (9, 16)

$-\frac{8}{11}$

5) (17, –13), (17, 8)

Undefined

6) (19, 3), (20, 3)

0

7) (3, 0), (–11, –15)

$\frac{15}{14}$

8) (19, –2), (–11, 10)

$-\frac{2}{5}$

13

9) $(6, -10), (-15, 15)$

$-\frac{25}{21}$

10) $(12, -18), (-15, -18)$

0

11) $(3, -20), (5, 8)$

14

12) $(15, 8), (-17, 9)$

$-\frac{1}{32}$

13) $(-19, 12), (-9, 1)$

$-\frac{11}{10}$

14) $(12, 2), (-7, 5)$

$-\frac{3}{19}$

15) $(6, -12), (15, -3)$

1

16) $(9, 3), (19, -17)$

-2

Finding Slope From an Equation

Find the slope of each line.

1) $y = -\frac{5}{2}x - 5$

$-\frac{5}{2}$

2) $y = -\frac{4}{3}x - 1$

$-\frac{4}{3}$

3) $y = -x + 3$

-1

4) $y = -4x - 1$

-4

5) $2x - y = 1$

2

6) $x + 2y = -8$

$-\frac{1}{2}$

7) $8x + 3y = -9$

$-\frac{8}{3}$

8) $4x + 5y = -10$

$-\frac{4}{5}$

9) $x - y = -2$

1

10) $4x - 3y = 9$

$\frac{4}{3}$

11) $3x + 2y = 6$

$-\frac{3}{2}$

12) $4x - 5y = 0$

$\frac{4}{5}$

13) $y = -1$

0

14) $x + 5y = -15$

$-\frac{1}{5}$

15) $-2y - 10 + 2x = 0$

1

16) $x + 5 + y = 0$

-1

17) $3x + 20 = -4y$

$-\frac{3}{4}$

18) $-15 - x = -5y$

$\frac{1}{5}$

19) $-1 = -2x + y$

2

20) $-x - 1 = y$

-1

21) $0 = 5y - x$

$\frac{1}{5}$

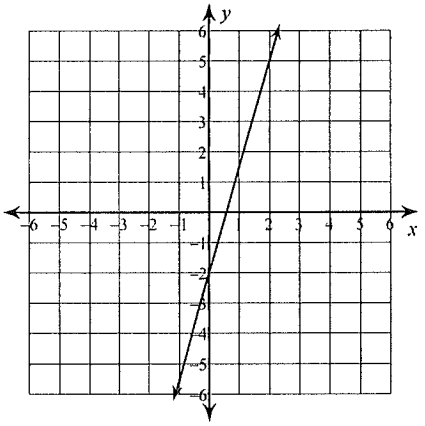
22) $-30 + 10y = -2x$

$-\frac{1}{5}$

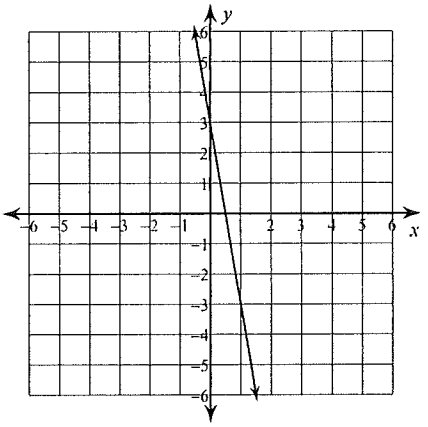
Graphing Lines

Sketch the graph of each line.

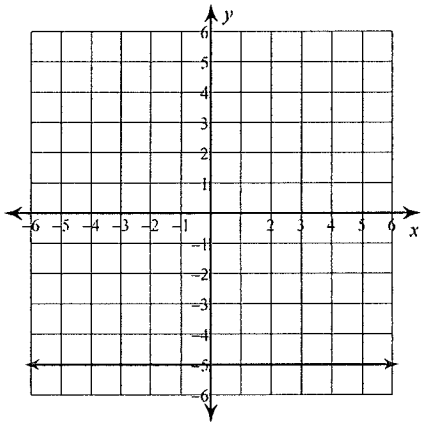
1) $y = \frac{7}{2}x - 2$



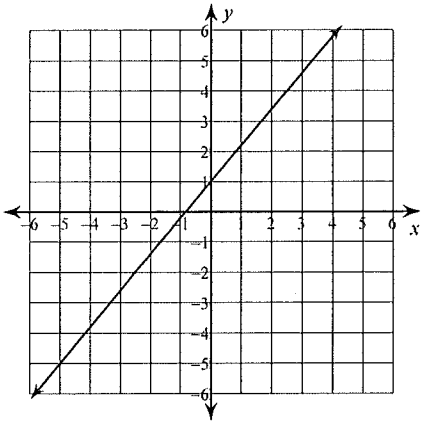
2) $y = -6x + 3$



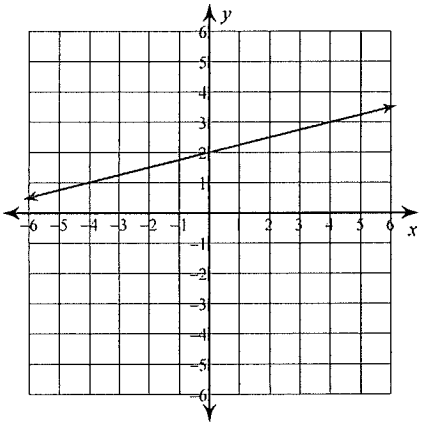
3) $y = -5$



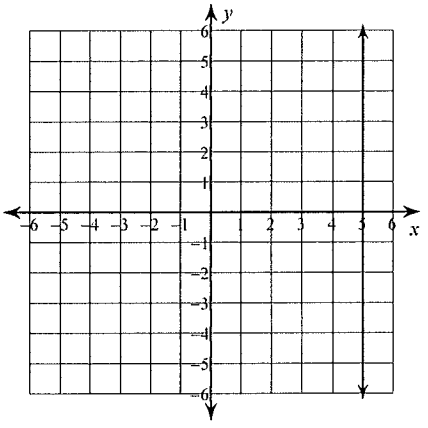
4) $y = \frac{6}{5}x + 1$



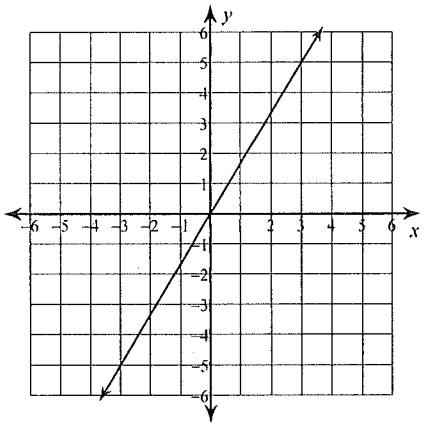
5) $y = \frac{1}{4}x + 2$



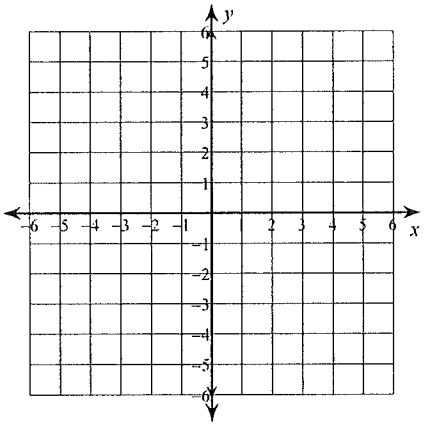
6) $x = 5$



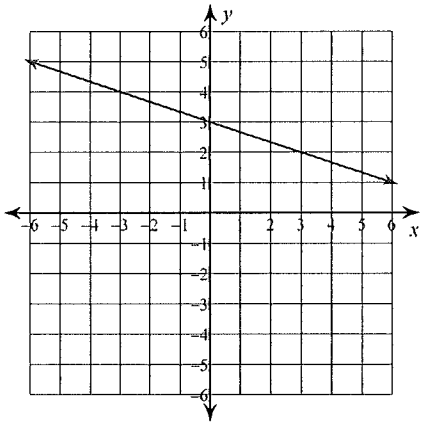
7) $y = \frac{5}{3}x$



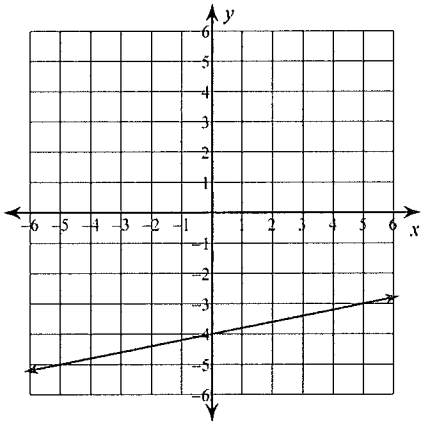
8) $x = 0$



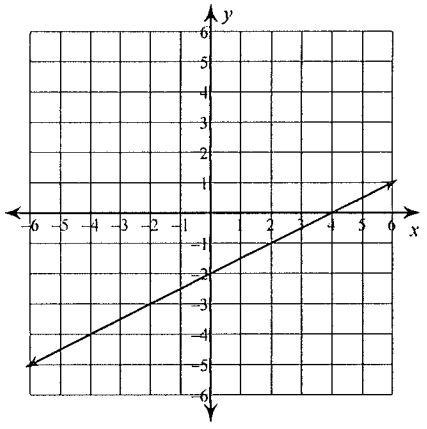
9) $y = -\frac{1}{3}x + 3$



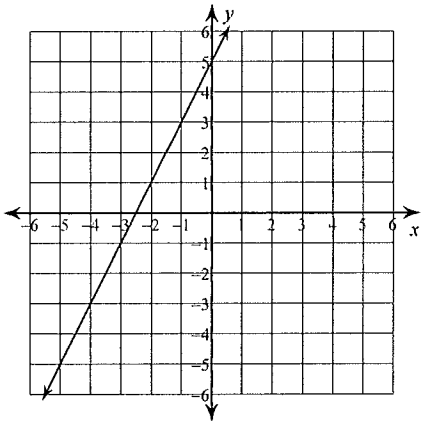
10) $y = \frac{1}{5}x - 4$



11) $y = \frac{1}{2}x - 2$



12) $y = 2x + 5$



Writing Linear Equations

Write the slope-intercept form of the equation of each line.

1) $3x - 2y = -16$

$y = \frac{3}{2}x + 8$

2) $13x - 11y = -12$

$y = \frac{13}{11}x + \frac{12}{11}$

3) $9x - 7y = -7$

$y = \frac{9}{7}x + 1$

4) $x - 3y = 6$

$y = \frac{1}{3}x - 2$

5) $6x + 5y = -15$

$y = -\frac{6}{5}x - 3$

6) $4x - y = 1$

$y = 4x - 1$

7) $11x - 4y = 32$

$y = \frac{11}{4}x - 8$

8) $11x - 8y = -48$

$y = \frac{11}{8}x + 6$

$Ax + By = C$

Write the standard form of the equation of the line through the given point with the given slope.

9) through: $(1, 2)$, slope $= 7$

$7x - y = 5$

10) through: $(3, -1)$, slope $= -1$

$x + y = 2$

11) through: $(-2, 5)$, slope $= -4$

$4x + y = -3$

12) through: $(3, 5)$, slope $= \frac{5}{3}$

$5x - 3y = 0$

13) through: $(2, -4)$, slope $= -1$

$x + y = -2$

14) through: $(2, 5)$, slope = undefined

$x = 2$

15) through: $(3, 1)$, slope $= \frac{1}{2}$

$x - 2y = 1$

16) through: $(-1, 2)$, slope $= 2$

$2x - y = -4$

Write the slope-intercept form of the equation of the line described.

17) through: $(4, 2)$, parallel to $y = -\frac{3}{4}x - 5$

$y = -\frac{3}{4}x + 5$

18) through: $(-3, -3)$, parallel to $y = \frac{7}{3}x + 3$

$y = \frac{7}{3}x + 4$

19) through: $(-4, 0)$, parallel to $y = \frac{3}{4}x - 2$

$y = \frac{3}{4}x + 3$

20) through: $(-1, 4)$, parallel to $y = -5x + 2$

$y = -5x - 1$

21) through: $(2, 0)$, parallel to $y = \frac{1}{3}x + 3$

$y = \frac{1}{3}x - \frac{2}{3}$

22) through: $(4, -4)$, parallel to $y = -x - 4$

$y = -x$

23) through: $(-2, 4)$, parallel to $y = -\frac{5}{2}x + 5$

$y = -\frac{5}{2}x - 1$

24) through: $(-4, -1)$, parallel to $y = -\frac{1}{2}x - 1$

$y = -\frac{1}{2}x - 3$