

Name: Answer Key

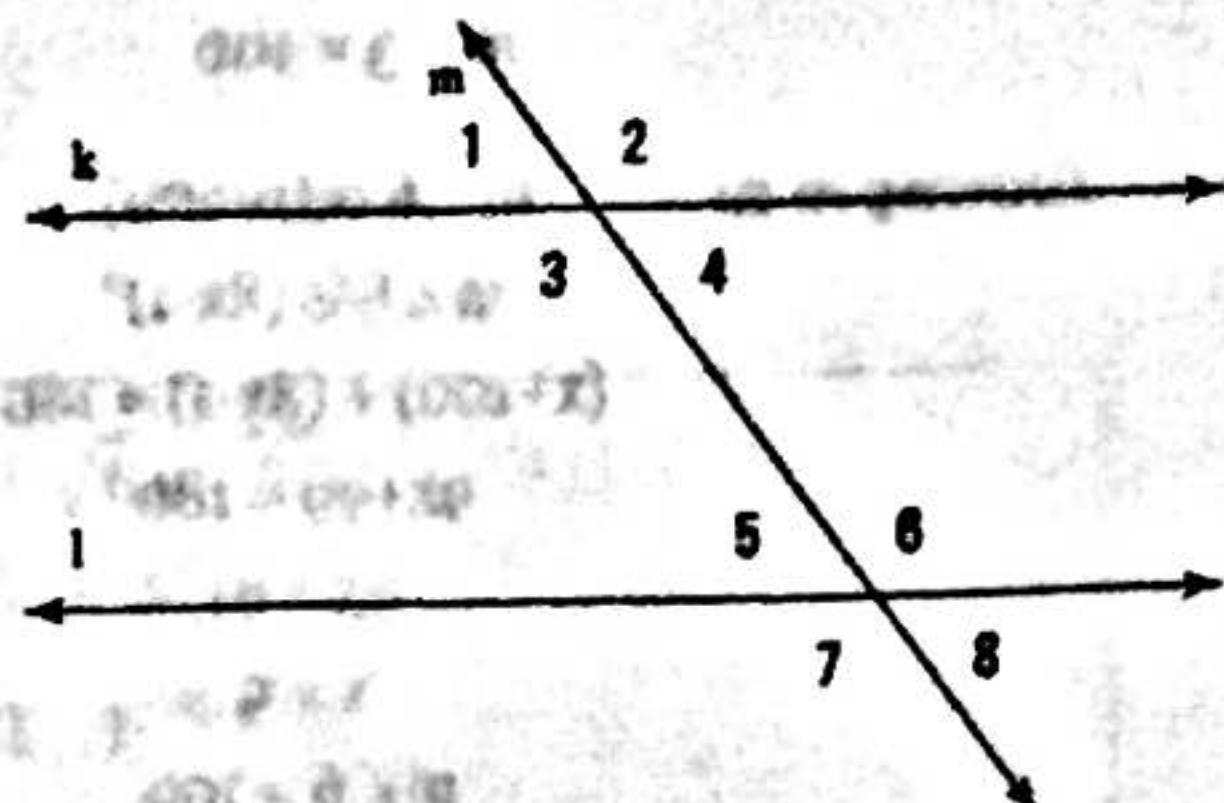
Entering Geometry Additional Practice

The following are topics learned in algebra that will be helpful to review and practice prior to starting your year in Geometry.

Part 1: Angle Relationships

Lines k and l , shown at the right, are parallel. Use this to identify the angle relationships of the angles given below. Then, find the angle measure. The types of angle relationships are given.

Note: the measure of an angle might not be the same across all problems.



Example: Given that $m\angle 1$ is 63° , find $m\angle 2$.

Angle relationship: supplementary angles

$$m\angle 2 = 117^\circ$$

Angle Relationships. Choose one for each problem below.

vertical angles	supplementary angles	complementary angles
corresponding angles	alternate interior angles	alternate exterior angles

1. $m\angle 2$ is 117° $m\angle 6 = \underline{117^\circ}$ Relationship: <u>corresponding angles</u>	2. $m\angle 5$ is 48° $m\angle 7 = \underline{132^\circ}$ Relationship: <u>supplementary angles</u>
3. $m\angle 5$ is 55° $m\angle 4 = \underline{55^\circ}$ Relationship: <u>alternate interior angles</u>	4. $m\angle 7$ is 130° $m\angle 6 = \underline{130^\circ}$ Relationship: <u>vertical angles</u>

Solve for x, then find the angle measures.

Example 1:

$$m\angle 2 \text{ is } (2x+16)^\circ$$

$$m\angle 3 \text{ is } (3x-26)^\circ$$

$$2x+16 = 3x-26$$

$$x = 42$$

$$m\angle 2 = 100$$

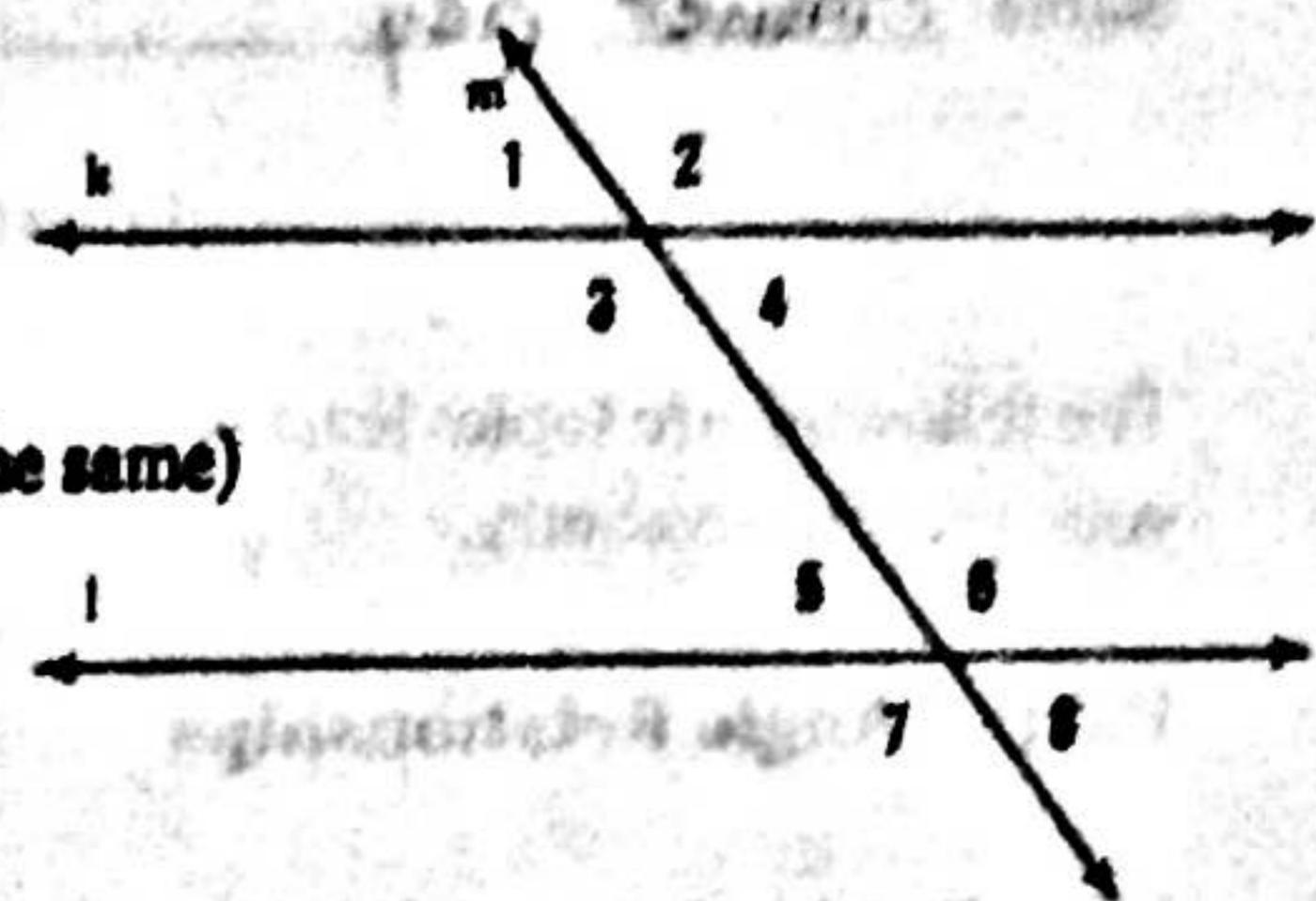
$$m\angle 3 = 100$$

$\angle 2$ and $\angle 3$ are vertical angles

Vertical angles are congruent (the same)

Solve for x

Plug in 42 for x



Example 2:

$$m\angle 6 \text{ is } (x+100)^\circ$$

$$m\angle 8 \text{ is } (8x-1)^\circ$$

$$(x+100) + (8x-1) = 180$$

$$9x+99 = 180$$

$$9x = 81$$

$$x = 9$$

$$m\angle 6 = 109$$

$$m\angle 8 = 71$$

$\angle 6$ and $\angle 8$ are supplementary angles

Supplementary angles add up to 180°

Add angles together

Subtract 99

Divide by 9

Plug in 9 for x

5. $m\angle 4$ is $(x+23)^\circ$ and $m\angle 5$ is $(2x-14)^\circ$

$$x+23 = 2x-14$$

$$23 = x - 14$$

$$\boxed{x = 37}$$

$$m\angle 4 = 37 + 23$$

$$\boxed{m\angle 4 = 60}$$

$$m\angle 5 = 2(37) - 14$$

$$m\angle 5 = 74 - 14$$

$$\boxed{m\angle 5 = 60^\circ}$$

OR
 $m\angle 4 = m\angle 5$
 so $\boxed{m\angle 5 = 60^\circ}$

$$x = \boxed{37}$$

$$m\angle 4 = \boxed{60^\circ}$$

$$m\angle 5 = \boxed{60^\circ}$$

6. $m\angle 5$ is $(x+6)^\circ$ and $m\angle 7$ is $(2x-48)^\circ$

$$x+6 + 2x-48 = 180$$

$$m\angle 5 = 74 + 6$$

$$\boxed{m\angle 5 = 80}$$

$$3x - 42 = 180$$

$$3x = 222$$

$$\boxed{x = 74}$$

$$m\angle 7 = 2(74) - 48$$

$$m\angle 7 = 148 - 48$$

$$\boxed{m\angle 7 = 100^\circ}$$

OR

$$m\angle 5 + m\angle 7 = 180^\circ$$

$$80^\circ + m\angle 7 = 180^\circ$$

$$\boxed{m\angle 7 = 100^\circ}$$

$$x = \boxed{74}$$

$$m\angle 5 = \boxed{80^\circ} \quad m\angle 7 = \boxed{100^\circ}$$

7. $m\angle 1$ is $(2x-96)^\circ$ and $m\angle 2$ is $(x+72)^\circ$

$$2x - 96 + x + 72 = 180$$

$$3x - 24 = 180$$

$$3x = 204$$

$$\boxed{x = 68}$$

$$m\angle 1 = 2(68) - 96$$

$$m\angle 1 = 136 - 96$$

$$\boxed{m\angle 1 = 40^\circ}$$

$$m\angle 2 = 68 + 72$$

$$\boxed{m\angle 2 = 140^\circ}$$

OR

$$m\angle 1 + m\angle 2 = 180^\circ$$

$$40^\circ + m\angle 2 = 180^\circ$$

$$\boxed{m\angle 2 = 140^\circ}$$

$$x = \boxed{68}$$

$$m\angle 1 = \boxed{40^\circ}$$

$$m\angle 2 = \boxed{140^\circ}$$

8. $m\angle 2$ is $(7x-18)^\circ$ and $m\angle 7$ is $(5x+16)^\circ$

$$7x - 18 = 5x + 16$$

$$7(17) - 18 = m\angle 2$$

$$2x = 16$$

$$m\angle 2 = 119 - 18$$

$$\boxed{x = 17}$$

$$\boxed{m\angle 2 = 101^\circ}$$

$$m\angle 7 = 5x + 16$$

$$m\angle 7 = 5(17) + 16$$

$$m\angle 7 = 85 + 16$$

$$\boxed{m\angle 7 = 101^\circ}$$

OR $m\angle 2 = m\angle 7$

$$so \boxed{m\angle 7 = 101^\circ}$$

$$x = \boxed{17}$$

$$m\angle 2 = \boxed{101^\circ}$$

$$m\angle 7 = \boxed{101^\circ}$$

Part 2: Radical Operations

Use radical operations rules to simplify the following.

Example:

$$\begin{aligned} &\sqrt{75} + \sqrt{27} - \sqrt{3} \times \sqrt{5} \\ &\sqrt{75} + \sqrt{27} - \sqrt{15} \\ &5\sqrt{3} + \sqrt{27} - \sqrt{15} \\ &5\sqrt{3} + 3\sqrt{3} - \sqrt{15} \\ &8\sqrt{3} - \sqrt{15} \end{aligned}$$

Order of operations: multiply
Simplify $\sqrt{75}$ to $5\sqrt{3}$
Simplify $\sqrt{27}$ to $3\sqrt{3}$
Add like terms

Note: You cannot add $\sqrt{15}$ because there is a different number inside the radical

$$\begin{aligned} 9. \quad &\sqrt{15} \times \sqrt{12} - \sqrt{8} \times \sqrt{10} \\ &\sqrt{180} - \sqrt{8} \times \sqrt{10} \\ &\sqrt{180} - \sqrt{80} \\ &6\sqrt{5} - 4\sqrt{5} \\ &2\sqrt{5} \end{aligned}$$

$$\begin{aligned} 10. \quad &\sqrt{98} + \sqrt{6} \times \sqrt{27} \\ &\sqrt{98} + \sqrt{162} \\ &7\sqrt{2} + 9\sqrt{2} \\ &16\sqrt{2} \end{aligned}$$

$$\begin{aligned} 11. \quad &\sqrt{8} \times \sqrt{12} - \sqrt{300} \\ &\sqrt{96} - \sqrt{300} \\ &4\sqrt{6} - 10\sqrt{3} \end{aligned}$$

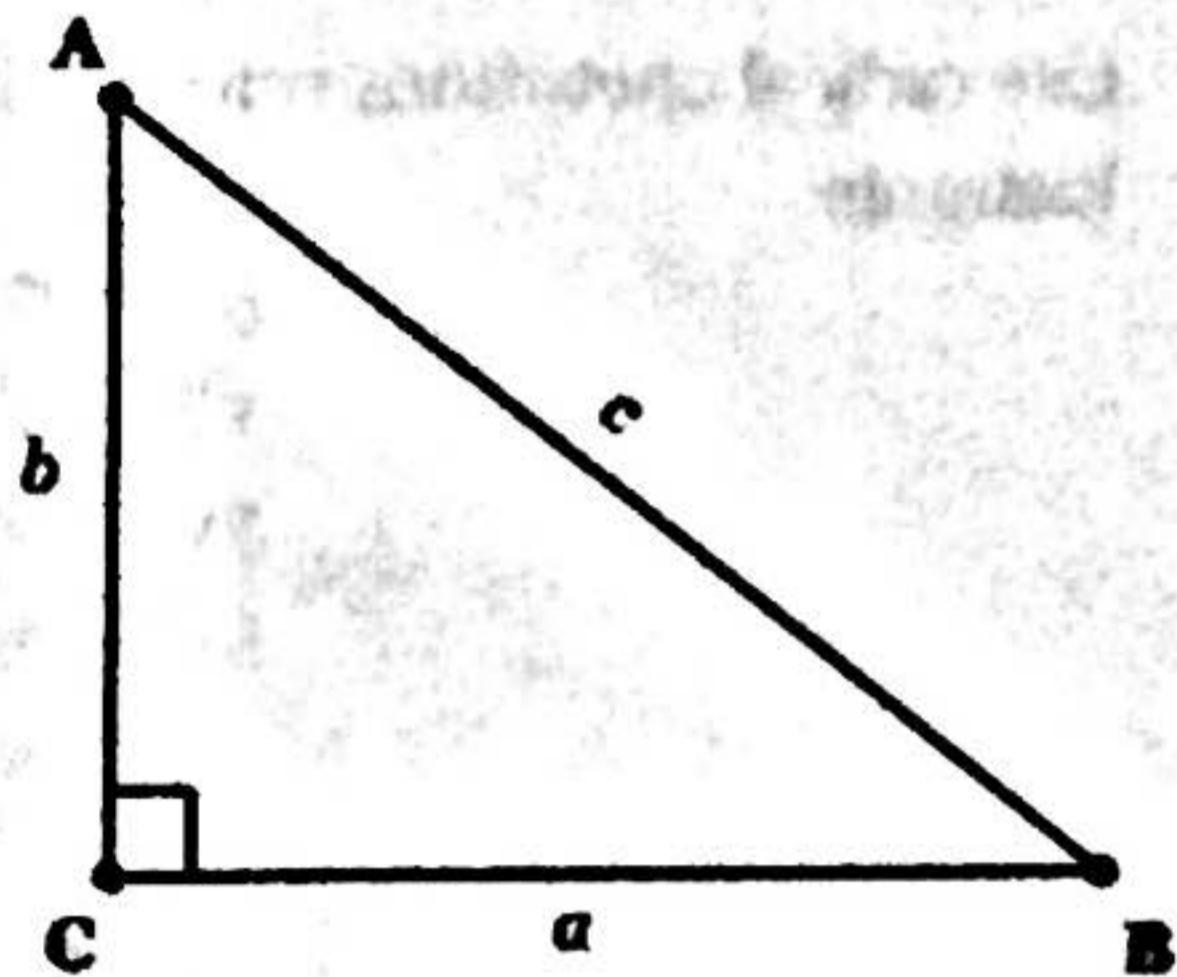
$$\begin{aligned} 12. \quad &\sqrt{6} \times \sqrt{24} + \sqrt{54} \times \sqrt{3} \\ &\sqrt{144} + \sqrt{54} \times \sqrt{3} \\ &\sqrt{144} + \sqrt{162} \\ &12 + 9\sqrt{2} \end{aligned}$$

Use the Pythagorean Theorem and the given triangle to solve for the missing side. Leave your answer as a simplified radical.

Example:

$$\begin{aligned} \text{Side } c &\text{ is 6 units long} \\ \text{Side } b &\text{ is 3 units long} \\ a^2 + b^2 &= c^2 \\ a^2 + 3^2 &= 6^2 \\ a^2 + 9 &= 36 \\ a^2 &= 27 \\ a &= 3\sqrt{3} \end{aligned}$$

Side c is the hypotenuse
Side b is an adjacent side
Pythagorean theorem
Plug in 6 for c and 3 for b
Simplify exponents
Subtract 9 from both sides
Take square root of both sides



13. $a = 10$ and $b = 2\sqrt{29}$

$$\begin{aligned} 10^2 + (2\sqrt{29})^2 &= c^2 \\ 100 + 4(29) &= c^2 \\ 100 + 116 &= c^2 \\ 216 &= c^2 \\ c &= 6\sqrt{6} \end{aligned}$$

$c = 6\sqrt{6}$

14. $b = 2\sqrt{7}$ and $c = 14$

$$\begin{aligned} a^2 + (2\sqrt{7})^2 &= 14^2 \\ a^2 + 4(7) &= 196 \\ a^2 + 28 &= 196 \\ a^2 &= 168 \\ a &= 2\sqrt{42} \end{aligned}$$

$a = 2\sqrt{42}$

15. $a = 5$ and $c = 5\sqrt{5}$

$$\begin{aligned} 5^2 + b^2 &= (5\sqrt{5})^2 \\ 25 + b^2 &= 25(5) \\ 25 + b^2 &= 125 \\ b^2 &= 100 \\ b &= 10 \end{aligned}$$

$b = 10$

16. $a = x+2$, $b = x-3$, and $c = 25$

$$\begin{aligned} (x+2)^2 + (x-3)^2 &= 25^2 \\ x^2 + 4x + 4 + x^2 - 6x + 9 &= 625 \\ 2x^2 - 2x + 13 &= 625 \\ 2x^2 - 2x - 612 &= 0 \\ 2(x^2 - x - 306) &= 0 \\ 2(x-18)(x+17) &= 0 \\ x = 18 \text{ or } x = -17 & \text{ will make side lengths negative} \end{aligned}$$

$x = 18$

$a = 20$

$b = 15$

$c = 25$

Part 3: Point-Slope Form (the 3rd way to write a linear equation)

Find an equation for each relation in point-slope form.

Example:

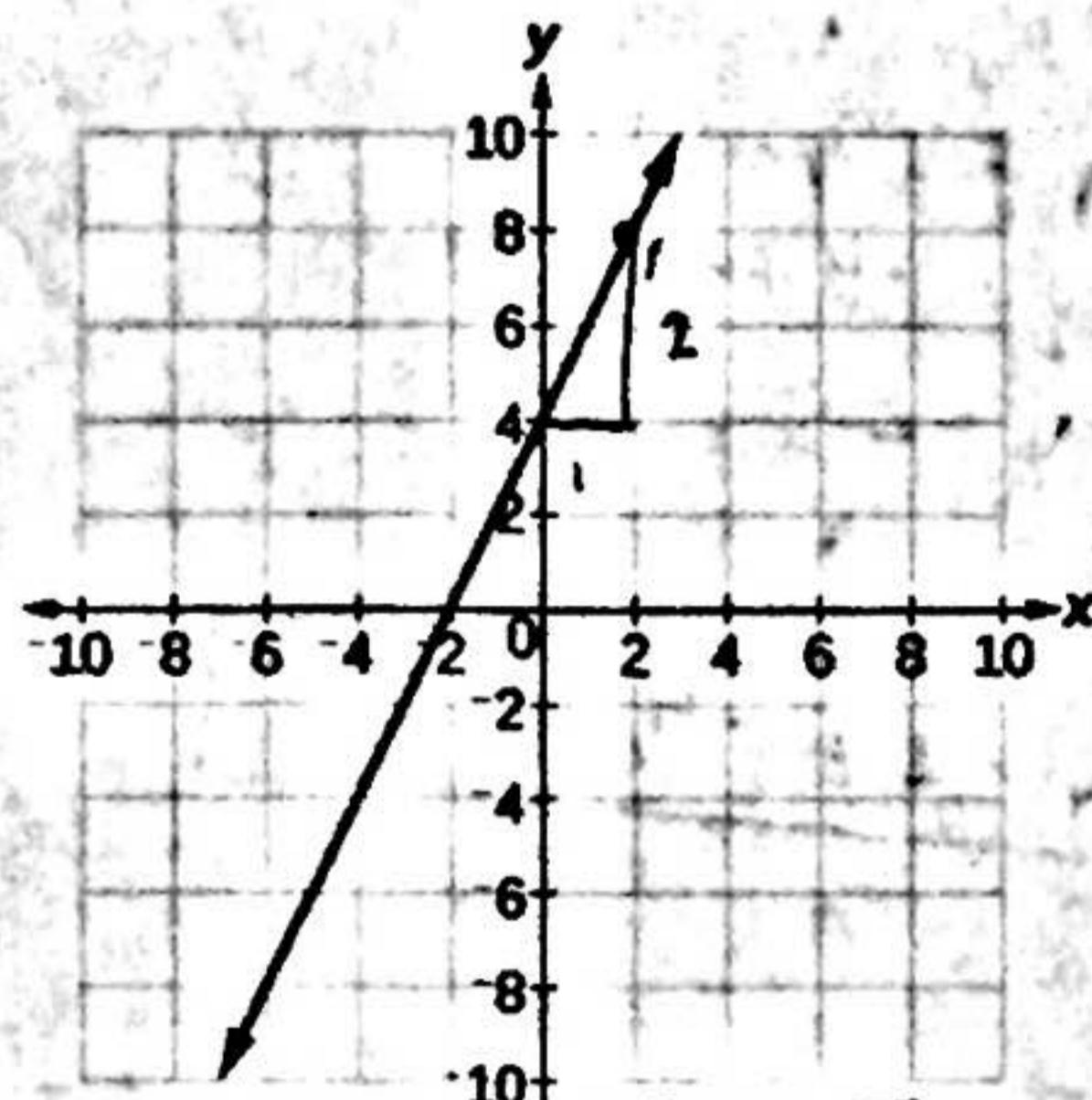
x	y
3	11
5	16
7	21
9	26
11	31

+2
+2
+2
+2

+5
+5
+5
+5

$y - y_1 = m(x - x_1)$
 $m = \text{change in } y / \text{change in } x$
 $m = 5/2$
 Point: $(x_1, y_1) \rightarrow (3, 11)$
 *can choose any point to use
 $y - 11 = 5/2(x - 3)$

17.



$$m = \frac{2}{1}$$

$$(2, 8)$$

19. (1, -26) and (-6, -40)

$$m = \frac{-40 - (-26)}{-6 - 1} = \frac{-14}{-7} = 2$$

$$y + 40 = 2(x + 6)$$

OR

$$y + 26 = 2(x - 1)$$

18. (3, 27) and (-2, 2)

$$m = \frac{2 - 27}{-2 - 3} = \frac{-25}{-5} = 5$$

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

OR

$$y - 27 = 5(x - 3)$$

20.

x	y
-4	-2
-2	-10
-1	-14
1	-22
2	-26

+2
+1
+2
+1

-8
-4
-8
-4

$$m = -4$$

$$(-4, -2)$$

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

Use the given information to write an equation in point-slope form.

21. $y = \frac{1}{3}x - 83$
 $m = \frac{1}{3}$

$$\begin{aligned}y &= \frac{1}{3}(3) - 83 \\y &= 1 - 83 \\y &= -82 \\(3, -82)\end{aligned}$$

$$y + 82 = \frac{1}{3}(x - 3)$$

22. $m = -3$ and $(8, 7)$ is on the line

$$y - 7 = -3(x - 8)$$

23. $4x - 3y = 21$

$$\begin{aligned}-3y &= -4x + 21 \\y &= \frac{4}{3}x - 7 \\y &= \frac{4}{3}(3) - 7 \\y &= 4 - 7 \\y &= -3 \\m &= \frac{4}{3} \\(3, -3)\end{aligned}$$

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

24. $y = -\frac{4}{7}x + 6$

$$\begin{aligned}m &= -\frac{4}{7} \\y &= -\frac{4}{7}(7) + 6 \\y &= -4 + 6 \\y &= 2 \\(-7, 2)\end{aligned}$$

$$y - 2 = -\frac{4}{7}(x + 7)$$