

Review – Graphing Linear Equations, Arithmetic Sequences, Exponents

A) ARITHMETIC SEQUENCES

Explicit formula: $A_n = A_1 + (n-1)d$
 (A_n = nth term, A_1 = first term, n = term number, d = common difference)

Recursive formula: $A_n = A_{n-1} + d$

- 1.) Find the 19th term of the sequence: 7, 11, 15, ...
 $a_1 = 7$ $d = 4$ $a_n = 7 + (n-1)(4)$
 $a_{19} = 7 + (19-1)(4) = 7 + 18 \cdot 4 = 7 + 72 = 79$
- 2.) Write an the explicit formula for the nth term of the sequence: -8, 1, 10, 19, ...
 $a_n = -8 + (n-1)(9)$
- 3.) Which term is -34 in the sequence: 30, 22, 14, ...
 $-34 = 30 + (n-1)(-8)$ $-34 = 30 - 8n + 8$ $-34 = -8n + 38$
 $-72 = -8n$ $n = 9$ (9th term)
- 4.) Find the first term in a sequence whose 10th term is 120 with a common difference of 4.
 $a_{10} = 120$ $d = 4$ $120 = a_1 + (10-1)(4)$
 $120 = a_1 + 36$ $a_1 = 84$
- 5.) In the sequence 0.5, 1, 1.5, 2, ..., find the 250th term.
 $a_1 = 0.5$ $d = 0.5$ $n = 250$ $a_{250} = 0.5 + (250-1)(0.5)$
 $a_{250} = 0.5 + (249)(0.5) = 125$
- 6.) Taylor and Brooklyn are recording how far a ball rolls down a ramp during each second. Their chart looks like this:

Time (sec.)	1	2	3	4	5
Dist. (cm.)	9	13	17	21	25

- a.) Is it arithmetic? How do you know?
 Yes - constant + first difference
- b.) What is A_1 and d ?
 $a_1 = 9$ $d = 4$
- c.) Write an equation for the sequence (simplified ^{explicit} recursive formula).
 $a_n = 4n + 5$
- d.) How far will the ball travel during the 35th second?
 $a_{35} = 4(35) + 5 = 140 + 5 = 145$ feet

- 7.) In a sequence, if $A_1 = 2$, $A_4 = 11$, find A_{20} .
 2 11 $2 + 3d = 11$ $d = 3$ $a_{20} = 2 + (20-1)(3) = 2 + 57$
 $a_{20} = 59$

- 8.) Find the missing terms: 25, 19, 13, 7, 1, -5, -11
 $13 + 4d = -11$ $4d = -24$ $d = -6$

- 9.) Is 687 a term in the sequence: -9, 3, 15, ... ? If so, which term is it?
 $687 = -9 + (n-1)(12)$ $a_1 = -9$ $d = 12$
 $687 = -9 + 12n - 12$
 $699 = -9 + 12n$
 $\frac{708}{12} = \frac{12n}{12}$ $n = 59$
 Yes. 59th term

B) EXPONENTS

$$x^m x^n = x^{m+n}$$

$$x^2 x^3 = x^{2+3} = x^5$$

$$x^m / x^n = x^{m-n}$$

$$x^6 / x^2 = x^{6-2} = x^4$$

$$(x^m)^n = x^{mn}$$

$$(x^2)^3 = x^{2 \times 3} = x^6$$

$$(xy)^n = x^n y^n$$

$$(xy)^3 = x^3 y^3$$

$$(x/y)^n = x^n / y^n$$

$$(x/y)^2 = x^2 / y^2$$

$$x^{-n} = 1/x^n$$

$$x^{-3} = 1/x^3$$

Simplify:

1.) $n^2(2np^3)(-3n^3p^4)$

$$-6n^6 p^7$$

2.) $(-5m^2k^4)^2(-2m^3k)^3$

$$(25m^4k^8)(-8m^9k^3)$$

$$-200m^{13}k^{11}$$

3.) $\left(\frac{3m^7}{4x^5y^3}\right)^4 = \frac{81m^{28}}{256x^{20}y^{12}}$

4.) $\frac{18x^3y^4z^7}{-2x^2y^4z^5} = -9xz^2$

5.) $\left(\frac{4}{7}m\right)^2(49m)(17p)\left(\frac{1}{34}p^5\right)$

$$\left(\frac{16m^2}{49}\right)(49m)(17p)\left(\frac{1}{34}p^5\right)$$

$$\frac{16m^3 p^6}{2} = 8mp^6$$

6.) $\left(\frac{-4c^2k^3}{5ck^2}\right)^2 \left(\frac{10c^5k}{360^2}\right)^3 =$

$$\left(\frac{16c^4k^4}{25c^2k^4}\right)\left(\frac{125c^5k^3}{27}\right) = \frac{80c^7k^5}{27}$$

7.) $\frac{1}{3}(9f^4k^3)^0(6f^8k^3)^2$

$$\frac{1}{3}(36f^{16}k^6)$$

$$12f^{16}k^6$$

8.) $t^{6p} \cdot t^{p+7k} \cdot t^{2p-3k} \cdot t^k$

$$t^{9p+5k}$$

9. Find the volume of a rectangular prism with length = $2x^3y^4$, width = $3xy^5$, and height = $5x^5y^3$.

$$V = (2x^3y^4)(3xy^5)(5x^5y^3) = 30x^9y^{12}$$

10. Find the surface area of a cube with side length of $3m^2n$. What is its volume?

$$SA = 6s^2 = 6(3m^2n)^2 = 54m^4n^2$$

$$V = s^3 = (3m^2n)^3 = 27m^6n^3$$

12. If the area of a triangle is $24x^2y^7$ and the base is $12xy^2$, what is the height?

$$A = \frac{1}{2}bh$$

$$24x^2y^7 = \frac{1}{2}(12xy^2)h$$

$$\frac{42x^2y^7}{16xy^2} = \frac{6x^2y^2 \cdot h}{6xy^2}$$

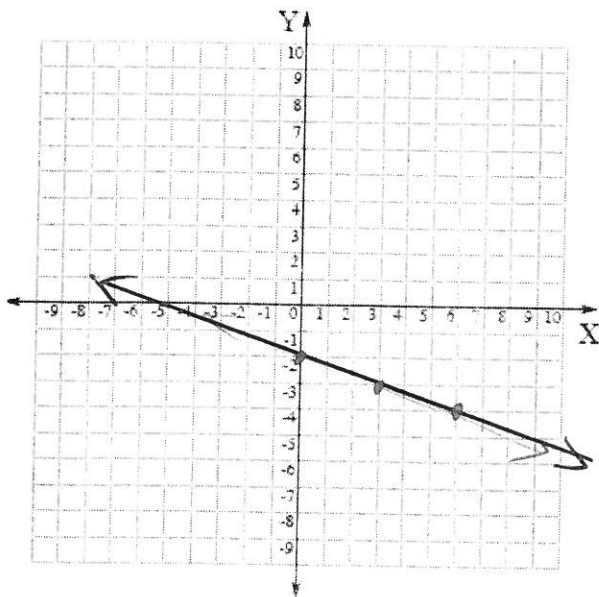
$$h = 4xy^5$$

13. Put the equation in slope-intercept form, graph the equation.

(a) $2x + 6y = -12$

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

$$m = -\frac{1}{3} \quad b = -2$$

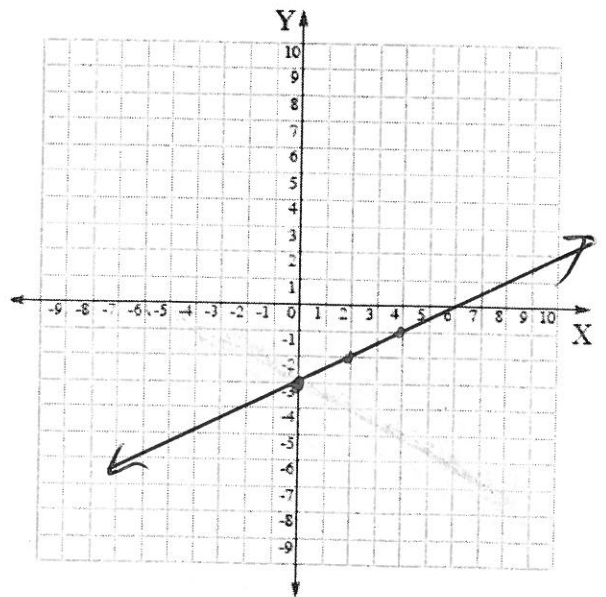


(b) $-10y - 5x = 30$

$$-10y = 5x + 30$$

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

$$m = \frac{1}{2} \quad b = -3$$

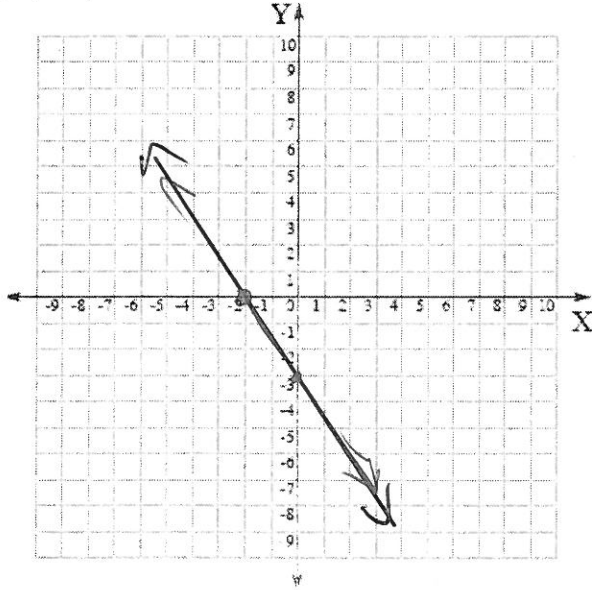


14. Put the equation in standard form. Graph the equation using x and y intercepts.

(a) $6y = -9x - 18$

$9x + 6y = -18$

$(-2, 0) (0, -3)$



(b) $-5y = 2x$

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

$(0, 0) \rightarrow$ x and y intercept
*Use slope

