

Day 1: Review

Exponent laws:

<p>➤ Product law: $a^x \times a^y = a^{x+y}$</p>	<p>➤ Quotient law: $\frac{a^x}{a^y} = a^{x-y}$</p>	<p>➤ Negative exponent: $a^{-x} = \frac{1}{a^x}$</p> <p>➤ Negative exponent: $\left(\frac{a}{b}\right)^{-x} = \left(\frac{b}{a}\right)^x$</p>
<p>➤ Power of a quotient: $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$</p>	<p>➤ Power of a power: $(a^x)^y = a^{xy}$</p>	<p>➤ Power of a product: $(ab)^n = a^n b^n$</p>

Reminder: Zero exponent: $a^0 = 1$ $-a^0 = -1$ $(-a)^0 = 1$

Function Notation:

Relation: A set of ordered pairs; values of the independent variable are paired with values of dependent variable.

Function: A relation where each value of independent variable corresponds with only one value of the dependent variable.

Note: Every function is a relation. However, every relation is not a function.

How can we tell from a graph if it is a function or not?

VLT (vertical line test)

Example: Determine each value for the function $f(x) = 3x - 2$.

<p>a. $f(0)$ $= 3(0) - 2$ $= -2$</p>	<p>b. $-3f(2)$ $= -3 [3(2) - 2]$ $= -3 [4]$ $= -12$</p>	<p>c. $f(-3x)$ $= 3(-3x) - 2$ $= -9x - 2$</p>	<p>d. Solve for x if $f(x) = 10$. $10 = 3x - 2$ $3x = 12$ $x = 4$</p>
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Expand and Simplify:

<p>a. $3(5x + 6) - 5(2x - 1)$ $= 15x + 18 - 10x + 5$ $= 5x + 23$</p>	<p>b. $(2x + 3)^2$ $= (2x + 3)(2x + 3)$ $= 4x^2 + 6x + 6x + 9$ $= 4x^2 + 12x + 9$</p>	<p>c. $(5x - 7)(5x + 7) - (x + 1)^2$ $= 25x^2 - 49 - (x^2 + 2x + 1)$ $= 25x^2 - 49 - x^2 - 2x - 1$ $= 24x^2 - 2x - 50$</p>
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Solve by factoring: Types of factoring: GCF, ST, DOS, CT

<p>a. $3x^2 + 6x = 0$</p> <p>$3x(x+2) = 0$</p> <p>$x = \{0, -2\}$</p>	<p>b. $x^2 - 6x + 8 = 0$</p> <p>$(x-4)(x-2) = 0$</p> <p>$x = \{2, 4\}$</p>	<p>c. $4x^2 - 9 = 0$</p> <p>$(2x-3)(2x+3) = 0$</p> <p>$x = \left\{ \pm \frac{3}{2} \right\}$</p>	<p>d. $3x^2 - 5x - 2 = 0$</p> <p>$3x^2 - 6x + x - 2 = 0$</p> <p>$3x(x-2) + 1(x-2) = 0$</p> <p>$(3x+1)(x-2) = 0$</p> <p>$x = \left\{ -\frac{1}{3}, 2 \right\}$</p>
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Linear Functions:

- Degree of 1. Graph is a linear. First differences are constant
line
- Forms:
 - Standard Form $Ax + By + C = 0$
 - Slope y-intercept Form $y = mx + b$
 - Slope/Point Form $y = m(x - x_1) + y_1$

Example: State the slope and y-intercept of each line.

a. $3y = 9 - 6x$ *divide by 3*

$y = -2x + 3$

b. $2x + 8y - 3 = 0$

$8y = -2x + 3$

$y = \frac{-2x + 3}{8} = -\frac{1}{4}x + \frac{3}{8}$

Example: Determine the equation of the line:

<p>a. With slope $-2/3$ that passes through $(5, -2)$.</p> <p>$y = -\frac{2}{3}(x-5) - 2$</p> <p>$= -\frac{2}{3}x + \frac{10}{3} - 2$</p> <p>$= -\frac{2}{3}x + \frac{4}{3}$</p>	<p>b. passing through $(3, -2)$ and $(6, 7)$</p> <p>$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 + 2}{6 - 3} = \frac{9}{3} = 3$</p> <p>$\therefore y = 3(x-3) - 2$</p> <p>$= 3x - 9 - 2$</p> <p>$y = 3x - 11$</p>	<p>c. With x-intercept 5 and y-intercept -8.</p> <p>$(5, 0)$ $(0, -8)$</p> <p>$m = \frac{-8 - 0}{0 - 5} = \frac{8}{5}$</p> <p>$\therefore y = \frac{8}{5}x - 8$</p> <p style="text-align: right;">↓ b (y-int)</p>
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Day 1 - Prerequisite Skills Worksheet

1. Simplify.

a. $3(2x + 5y - 2)$

b. $-5(x - y - 2z)$

c. $-2m(m - n)$

d. $6 - 5x + 3y - 8x + 2 - 7y$

e. $(4x - 5y) - (6x + 3y) - (7x + 2y)$

f. $3x(x + 2) + 5x(x - 2)$

g. $-7h(2h + 5) - 4h(5h - 3)$

h. $(3x - 2)(4x + 5)$

i. $(7 - 3y)(2 + 4y)$

j. $(5x - 7y)(4x + y)$

2. Factor.

a. $4 - 8x$

b. $9mn - 12n$

c. $6x^2 - 5x$

d. $3m^2n^3 - 9m^3n^4$

e. $x^2 - x - 6$

f. $x^2 + 7x + 10$

g. $x^2 - 9x + 20$

h. $x^2 - 3x - 28$

i. $3y^2 + 18y + 24$

j. $2t^2 - 16t + 30$

k. $m^2 - 9$

l. $25n^2 - 64p^2$

m. $6y^2 - y - 2$

n. $12x^2 + x - 1$

o. $5a^2 + 7a - 6$

3. Evaluate.

a. 4^2

b. 5^0

c. 3^{-2}

d. -3^2

e. $(-3)^2$

f. 2^{-3}

g. $\left(\frac{1}{2}\right)^3$

h. $\left(\frac{2}{3}\right)^{-2}$

i. $3^0 + 5^0$

j. $2^{-1} + 3^{-1}$

k. $5 - 4^{-1}$

l. $\left(\frac{1}{2}\right)^{-1} \left(\frac{2}{3}\right)^{-1}$

4. Simplify.

a. $(x^2y^4)(x^{-3}y^2)$

b. $(-2m^3)^2(3m^2)^3$

5. Solve.

a. $6y - 8 = 4y + 10$

b. $4 = \frac{3}{2}m + 3$

c. $4 - \frac{m}{3} = 5 + \frac{m}{2}$

d. $(x - 3)(x + 2) = 0$

e. $(2x + 5)(3x - 1) = 0$

f. $x^2 - x - 2 = 0$

g. $x^2 + x - 20 = 0$

h. $m^2 + 2m - 15 = 0$

i. $6x^2 - x - 2 = 0$

Answers:

1.

a. $6x + 15y - 6$

b. $-5x + 5y + 10z$

c. $-2m^2 + 2mn$

d. $8 - 13x - 4y$

e. $-9x - 10y$

f. $8x^2 - 4x$

g. $-34h^2 - 23h$

h. $12x^2 + 7x - 10$

i. $14 + 22y - 12y^2$

j. $20x^2 - 23xy - 7y^2$

2.

a. $4(1 - 2x)$

b. $3n(3m - 4)$

c. $x(6x - 5)$

d. $3m^2n^3(1 - 3mn)$

e. $(x - 3)(x + 2)$

f. $(x + 5)(x + 2)$

g. $(x - 4)(x - 5)$

h. $(x - 7)(x + 4)$

i. $3(y + 4)(y + 2)$

j. $2(t - 5)(t - 3)$

k. $(m - 3)(m + 3)$

l. $(5n - 8p)(5n + 8p)$

m. $(3y - 2)(2y + 1)$

n. $(4x - 1)(3x + 1)$

o. $(5a - 3)(a + 2)$

3.

a. 16

b. 1

c. $\frac{1}{9}$

d. -9

e. 9

f. $\frac{1}{8}$

g. $\frac{1}{8}$

h. $\frac{9}{4}$

i. 2

j. $\frac{5}{6}$

k. $\frac{19}{4}$

l. 3

4.

a. $\frac{y^6}{x}$

b. $108m^{12}$

5.

a. $y = 9$

b. $m = \frac{2}{3}$

c. $m = -\frac{6}{5}$

d. $x = 3$ or $x = -2$

e. $x = -\frac{5}{2}$ or $x = \frac{1}{3}$

f. $x = 2$ or $x = -1$

g. $x = -5$ or $x = 4$

h. $x = -5$ or $m = 3$

i. $x = \frac{2}{3}$ or $x = -\frac{1}{2}$