

Practice Handouts: Answer Key

1. Linear Equations and Graphs (Part 1): Intercepts and Slope

Section 1: Solutions to 2-variable equations

1. c 2. a

Section 2: Intercepts from a graph

1. x-intercept: (4, 0) y-intercept: (0, -11)

Section 3

1. x-intercept: $(-7/3, 0)$ y-intercept: (0, 2)
 2. [Challenge] x-intercept: $(-14/a, 0)$ y-intercept: $(0, 14/b)$

Section 4: Slope from graph

1. $m = -1/2$ 2. [Challenge] $m = (b - a)/(x_2 - x_1)$ or $m = (a - b)/(x_1 - x_2)$

Section 5: Slope from two points

1. $m = 16/9$ 2. [Challenge] $m = (2 - \pi)/(\pi + 2)$

Section 6: Horizontal and vertical lines

1. $y = -3$ 2. $m = 0$ 3. [Challenge] $m = \text{undefined}$

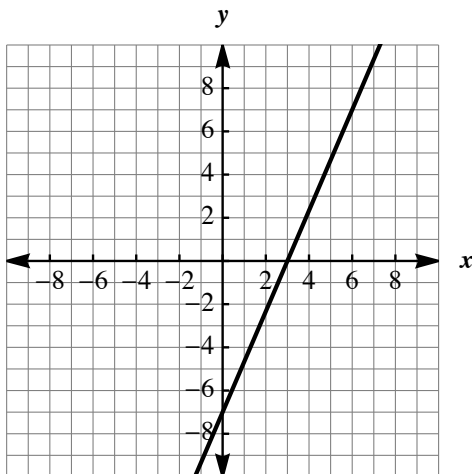
2. Linear Equations and Graphs (Part 1): Intercepts and Slope

Section 1: Slope-intercept intro

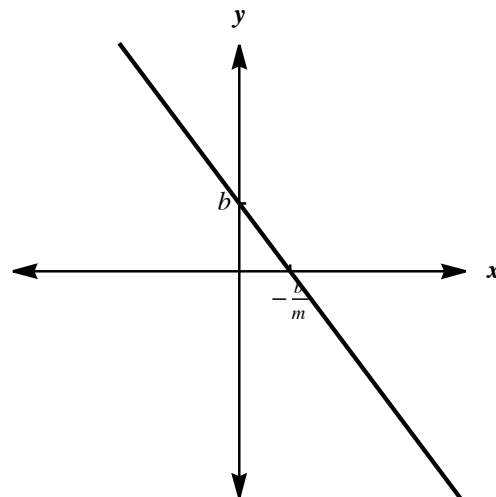
1. y-intercept: (0, 4) 2. $y = -4x - 5$

Section 2: Graph from slope-intercept form

1.



2.



Section 3: Slope-intercept equation from graph

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

Section 4: Slope-intercept from from two points

1. $y = -\frac{1}{3}x + 5$ 2. [Challenge] $y = mx - (mx_1 - y_1)$

Section 5: Slope-intercept from from two points

1. $y = \frac{9}{7}x + \frac{62}{7}$ 2. [Challenge] $y = \frac{54}{13}x + \frac{23}{26}$

Section 6: Point-slope form

1. $y + 5 = \frac{1}{13}(x + 3)$ 2. [Challenge] $y + \frac{1}{2} = -\frac{22}{13}\left(x - \frac{1}{3}\right)$

3. Functions (Part 1): Function Notation and Evaluate Functions

Section 1: Evaluate functions

1. a. -3 b. -14 c. 19 d. 52
2. [Challenge] a. 22 b. 8

Section 2: Evaluate functions from their graph

1. a. -1 b. -2 c. 7 d. -4

Section 3: Evaluate function expressions

1. a. 4 b. -24

Section 4: Function inputs & outputs: equation

1. $g(-3)$ 2. $f(-3)$ 3. [Challenge] $h(-2)$

Section 5: Function inputs & outputs: graph

1. 4 or 7.2 2. -8 , -3 or 1.8

Section 6: Function rules from equations

1. $h(r) = 3r + 2$ 2. $f(x) = 5x - 47$ 3. [Challenge] $g(x) = 5x - 6$

Section 7: Function notation word problems

1. c 2. a

4. Functions (Part 2): Domain and Range

Section 1: Domain and range from a graph

1. a. $[-8, 7]$ b. $[-4, 8]$
2. [Challenge] a. $(2, \infty)$ b. $[0, \infty)$

Section 2: Determine the domain of functions

1. a. $(-\infty, \infty)$ b. $x \leq 15/4$ c. $r \neq -3$
2. [Challenge] a. $-\infty < x < \infty$ b. $x \leq -2$ and $x \geq 2$

Section 3: Recognize functions from graphs

1. a, b, d, and e
2. [Challenge] $x < -2$ and $x > 2$

Section 4: Recognize functions from tables

1. Either of the weights for a height of 72 inches must not be 180 lbs.

5. Functions (Part 3): Interpreting Functions

Section 1: Relative maxima and minima

1. a. $(-5, -4)$, $(1, -4)$, and $(6, 2)$ b. $(-8, -2)$, $(-3, -2)$, and $(4, 4)$

Section 2: Absolute maxima and minima

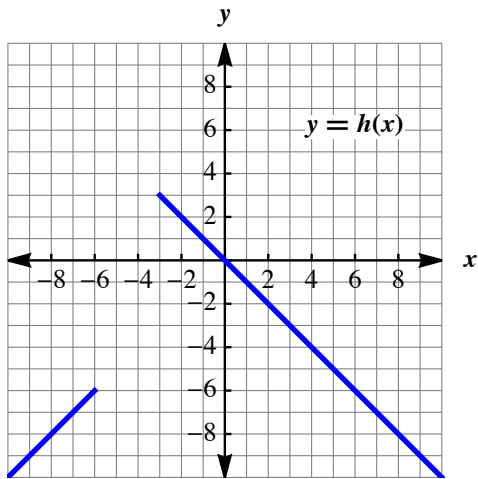
1. a. $(9, -7)$ b. $(5, 9)$

Section 3: Positive and negative intervals

1. a. $x < -6$, $-4 < x < 2$, $x > 5$ b. $-6 < x < -4$, $2 < x < 5$

Section 4: Increasing and decreasing intervals

1. a. $-\infty < x < -4$, $-1 < x < 4$ b. $-4 < x < -2$, $4 < x < \infty$
 2. [Challenge]



6. Piecewise Functions

Section 1: Evaluate piecewise functions

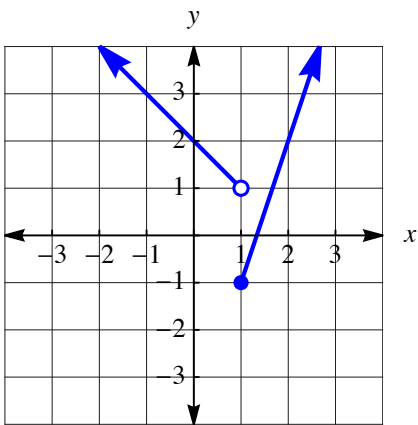
1. 60 2. 80 3. [Challenge] Undefined

Section 2: Evaluate step functions

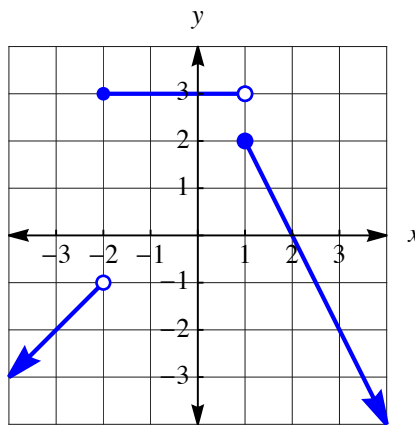
1. a. 8 b. Undefined c. -6 d. 5

Section 3: Piecewise functions graphs

1.



2.



3.
$$f(x) = \begin{cases} -2x - 3 & x < -2 \\ -x & -2 \leq x \leq 1 \\ -2x + 4 & 1 < x \end{cases}$$

7. Exponents and Radicals

Section 1: Multiply and divide powers (integer exponents)

1. a. y^{-3} b. 7^{-18} c. x^{-4} d. 7^{12} e. z^{-30} f. y^{-1}

Section 2: Powers of products and quotients (integer exponents)

1. a. $x^{30}y^{24}$ b. $x^{-9}y^{-18}$
 2. c

Section 3: Properties of exponents challenge (integer exponents)

1. $(5^{-7})^3 = 5^{-21}$

Section 4: Square roots

1. a. 13 b. 15 c. π d. 2

Section 5: Cube roots

1. a. 6 b. 4 c. 12 d. y

Section 6: Roots of decimals and fractions

1. a. $\frac{13}{5}$ b. .02 c. 1.1 d. $\frac{14}{9}$

Section 7: 4th and 5th roots

1. a. 6 b. .3 c. 4 d. $\frac{2}{3}$

Section 8: Unit-fraction exponents

1. a. $t^{1/2}$ b. $x^{1/4}$ c. $\frac{1}{y^{1/5}} = y^{-1/5}$ d. $\frac{x^{1/6}}{y^{1/6}} = x^{1/6} y^{-1/6}$

Section 9: Fractional exponents

1. a. $t^{3/2}$ b. $x^{5/4}$ c. $\frac{1}{y^{2/5}} = y^{-2/5}$ d. $\frac{x^{4/6}}{y^{4/6}} = \frac{x^{2/3}}{y^{2/3}} = x^{2/3} y^{-2/3}$

Section 10: Rational exponents challenge

1. a, b, and c 2. a and c

Section 11: Properties of exponents (rational exponents)

1. a. $z^{1/3}$ b. $z^{-15/7}$ c. $z^{14/15}$ d. $z^{8/7}$

Section 12: Properties of exponents challenge (rational exponents)

1. a. $15r^{-3}$ b. $\frac{8}{3}w^{-11/4}$ c. $y^{1/6}$
2. a. $2x^{10/3} - 4x^{-2/3}$ b. $5x^{17/3} - 3x^{5/3} + x^{2/3}$ c. $x^{1/6} - \frac{x^{-5/6}}{2}$

Section 13: Evaluate radical expressions challenge

1. a. 2 b. 5 c. -7 d. $\frac{1}{16}$

Section 14: Simplify square roots

1. a. $4\sqrt{5}$ b. $11\sqrt{3}$ c. 42 d. $14\sqrt{3}$

Section 15: Simplify square roots (variables)

1. a. $7x^2\sqrt{2x}$ b. $z^4\sqrt{30z}$ c. $4y^5\sqrt{2y}$

Section 16: Simplify square-root expressions

1. a. $6x^2y^3\sqrt{2xy}$ b. $4y^6z^4\sqrt{2yz}$ c. $3xy^2\sqrt{35x}$

8. Polynomials (Part 1): Adding and Subtracting

Section 1: Polynomials intro

1. d 2. a and c 3. a. 1 b. 5 c. 12 d. 0

Section 2: Add polynomials (intro)

1. a. $-2h^4 + 5h^3 + 3h^2 - 12$ b. $3f^5 + 4f^3 - 15f - 2$

Section 3: Subtract polynomials (intro)

1. a. $-2h^4 + h^3 - 5h^2$ b. $3f^5 - 14f^3 - 7f + 2$
a. $(-2h^4 + 3h^3 - h^2 - 6) - (2h^3 + 4h^2 - 6)$
b. $(3f^5 - 5f^3 - 11f) - (9f^3 - 4f - 2)$

Section 4: Add and subtract polynomials

1. $11b^2 - 8b - 4$
2. a. $-10g^2 + 8g + 14$ b. $-2g^2 + 3g + 11$ c. $2g^2 - 3g - 11$ d. [Challenge] $4g^2 - 6g - 22$

Section 5: Add and subtract polynomials: two variables (intro)

1. a. $9p^2q - 3pq^2 - pq - 5q^2$ b. $-5df^3 + 4df - 9f^2$

Section 6: Add and subtract polynomials: two variables

1. a. $-6f^4 + 14f^2g^2 - 8g^4$ b. $-f^4 - 6f^2g^2 - g^4$ c. $-5f^4 + 20f^2g^2 - 7g^4$
d. $5f^4 - 20f^2g^2 + 7g^4$

9. Polynomials (Part 2): Multiplying

Section 1: Multiply monomials intro

1. a. $16h^9$ b. $-3q^9$ c. $-12x^7$

Section 2: Multiply monomials

1. $c = 3, d = 4$ 2. $15p^3q^4$ 3. $-4a^7b^6$ 4. [Challenge] $abp^{w+y}q^{x+z}$

Section 3: Multiply monomials by polynomials: area model

1. $5x^2 + 15x + 10$ 2. $12x^4 + 54x^3 + 30x^2$ 3. $21w^4 + 7w^3 + 35w$ 4. $-25k^4 + 10k^3 - 15k^2$

Section 4: Multiply monomials by polynomials

1. a. $-q^5 + 2q^4 - q^2$ b. $-m^5 + 5m^4 - 7m^3$ c. $-3h^6 + 21h^3$

Section 5: Multiply monomials by polynomials challenge

1. a. $5p^2 + 15pq + 5q^2$ b. $-20g^5h - 12g^6h + 28g^7$
2. a. $a = -9, b = 15$ b. $a = 4, b = -1/2$

10. Polynomials (Part 3): Multiplying, continued

Section 1: Multiply binomials: area model

1. $x^2 + 12x + 27$ 2. $x^2 + 9x + 20$ 3. [Challenge] $-6x^3 + 16x^2 + 12x - 32$

Section 2: Warmup: multiplying binomials intro

1. a. $x^2 + 10x + 21$ b. $x^2 - x - 20$ c. $x^2 + x - 30$ d. $x^2 - 4x + 3$

Section 3: Multiply binomials intro

1. a. $x^2 + 7x + 6$ b. $x^2 - 4x - 21$ c. $x^2 + 5x - 36$ d. $x^2 - 10x - 11$

Section 4: Multiply binomials

1. a. $15h^2 - 27h - 6$ b. $-63x^2 + 93x - 24$ c. $-27y^2 - 75y - 42$
d. [Challenge] $\frac{2}{15}r^2 - \frac{7}{60}r - \frac{1}{8}$

Section 5: Multiply binomials by polynomials

1. a. $15h^3 - 7h^2 + 28h + 6$ b. $-15b^4 + 14b^2 - 3$ c. $\frac{-1}{2}y^4 - 2y^3 + 33y^2 - \frac{55}{3}y + 2$
d. [Challenge] $\frac{r^4}{21} - \frac{13r^3}{168} + \frac{3r^2}{1120} + \frac{r}{840} + \frac{1}{48}$

11. Factors and Divisibility (Part 1 — Required for Honors)

Section 1: Factors and divisibility

1. a and b 2. b 3. d

Section 2: Factor monomials

1. $-4b$ 2. $4p^4$ 3. c

Section 3: Greatest common factor of monomials

1. $4x$ 2. $4pq^3$ 3. a

Section 4: Factor polynomials: common factor

1. $(x-6)(x-4)$ 2. $11r^3(3r^3-2r^2+8)$ 3. $w = 5k^3$ $l = 5k + 1$

Section 5: Evaluate expressions using structure

1. -36 2. -58

Section 6: Warmup: factoring quadratics intro

1. $(x+3)(x+5)$ 2. $(p-8)(p-4)$ 3. $(r-6)(r+3)$

Section 7: Factoring quadratics intro

1. $(x-7)(x-3)$ 2. $x+4$

12. Factors and Divisibility (Part 2—Required for Honors)**Section 1: Factor quadratics by grouping**

1. $(3x+1)(x-1)$ 2. $-(3x-7)(x-4)$

Section 2: Factor polynomials: quadratic methods

1. $(p+7q)(p-2q)$ 2. $-5r^2(r+4)(r-3)$ 3. $(q^8-5)(q^8-3)$

Section 3: Factor polynomials: quadratic methods (challenge)

1. $(a+3)(a-2b)$ 2. $y+6x$

Section 4: Difference of squares intro

1. $(x+6)(x-6)$ 2. $(2+x)(2-x)$

Section 5: Difference of squares

1. $(5+8y)(5-8y)$ 2. $3(x+6)(x-6)$ 3. $(4t+1)(4t-1)$

Section 6: Perfect squares intro

1. $(4-x)^2$ 2. $3+x$

Section 7: Perfect squares

1. $(1+7x)^2$ 2. $2(w-11)^2$ 3. $(8x-10)^2$

Section 8: Factor polynomials: special product forms

1. $(6a-5b)^2$ 2. $(11q^4+10)(11q^4-10)$

13. Logarithms**Section 1: Introduction to Logarithms**

1. 2 2. 6 3. -1 4. -2 5. 3

Section 2: Properties of Logarithms

1. a. $\log(2) + \log(x)$ b. $1 - \log(x)$ c. $10 \log_5(x)$ d. $\log_2 10 + \log_2 x - 2 \log_2 y$
2. a. $\log(x^{10})$ b. $\log_2(x^2 y^4)$ c. $\log_8\left(\frac{a^{1/2}}{b^{1/4}}\right)$ d. $\log_6\left(\frac{a^{1/3} c^5}{32 b^3}\right)$