

Student Workbook
for

COMPASS Algebra Prep Workshop

Includes Internet links (save this file to your computer to be able to click the links) to over 4 hours of instructional videos for an online workshop experience.

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Math COMPASS Test-Prep Workshop

Preparing for the Algebra Test: To Place Into College-Level Math

Workshop Format (face-to-face): 2 hours 25 minutes

- 10 minute overview of test
- About 15 minutes instruction for each of the 9 areas below
- Practice problem packet for HW with answer key and video solutions on the Web

Notes for Using the Online Workshop: <http://screencast.com/t/J3GJ0tn3>

It is important to know that the test will ask questions from all areas of algebra, so you need to have many specific skills, including:

1. Substituting Values & Expressions Into Formulas
2. Setting Up Equations for Word-Problem Situations
3. Add, Subtract, Multiply, & Divide Polynomials
4. Factor Trinomials & Solve Quadratic Equations
5. Solve 1-Variable Linear Equations & Formulas
6. Exponent Rules
7. Simplify & Add, Subtract, Multiply, & Divide Radicals
8. Simplify Rational Expressions, Including Complex Fractions
9. 2-Variable Linear Equations: Slope, Intercepts, and Graphing

“Multiple-choice items test the following:

- **basic skills**—performing a sequence of basic operations
- **application**—applying sequences of basic operations to novel settings or in complex ways
- **analysis**—demonstrating conceptual understanding of principles and relationships in mathematical operations”

(<http://www.act.org/compass/sample/math.html>)

NOTE: Though some questions are “basic skills” many questions require you to put several ideas together, or work multi-step problems to determine the answer. You have to be prepared to *think outside the normal math problem box*.

Preparing Yourself for Test Day

- You are strongly encouraged NOT to attempt all COMPASS tests (Reading, Writing, Math, Essay) during the same test session. If you do, math is last, and you'll be tired by the end of the session, and not perform your best. Take the English tests one day, and the Math test another day (like when you return for your Essay score) if you can work that into your schedule.
- Plan to take your test as early as possible during the registration and testing periods. As the start of the semester nears, you may spend hours waiting in line to take the test, which may add stress and frustration, negatively impacting your performance.
- Make sure you are well rested, and have eaten recently before the test, so you'll be at your best physically and mentally.
- Stop studying for the test at least 15 minutes before you take the test, to allow your brain time to recharge, so you can think clearly. Don't cram up until the last minute!
- Bring a scientific or graphing calculator that you are comfortable using: no cell phone calculators or CAS calculators (such as TI-89 or TI-92) are allowed. The calculator can be a huge asset, as long as you know how to use it well.
- The test is not timed, so if you feel stressed or frustrated at any point, take a short break to relax.
- The COMPASS test begins asking you Algebra questions, and is adaptive, meaning it will advance you into college algebra problems and place you higher if you are doing well, but it will also drop you down into pre-algebra and likely place you into pre-college developmental courses if you do poorly. *It is very important that you answer the first few test questions correctly in order to have a chance to place at the college level.*
- The questions are multiple choice, and a wrong answer is viewed the same as a skipped question, so make sure you don't skip any problems, but instead try to at least make a reasonable guess on any question you feel clueless about.
- Since the questions are multiple-choice, the wrong answer choices used are often based on common mistakes students make. Just because your answer matches one of the choices doesn't automatically mean that it is correct. Make sure to carefully re-read the problem, if necessary, before submitting your answer, to make sure you have completely worked the problem, especially since many of the questions require multiple steps.
- The number of questions COMPASS will ask you depends on your performance. It is possible to place at the college level in as few as a dozen questions or so if you do well, but the test will not stop, but rather ask you more difficult questions to attempt to place you even beyond the first-level college credit courses. Keep going even when the problems get beyond what you know. Once you miss a few of those, the test will end. **Good Luck, you can do this!**

Content Overview: 1. Substituting Values & Expressions Into Formulas

- Always, ALWAYS, put parentheses around anything you plug into a formula.
- Once you have something plugged in, if only numbers are involved you can use your calculator to do the evaluating for you.

EX 1-1: If $x = -\frac{1}{4}$ then $3x^2 - 4x + 7 = ?$

- (A) $7\frac{1}{4}$ (B) $7\frac{13}{16}$ (C) $5\frac{13}{16}$ (D) $8\frac{3}{16}$ (E) $9\frac{1}{2}$

<http://screencast.com/t/rLF4kdm1>

EX 1-2: The change in Gibbs free energy (ΔG) is calculated at constant temperature T (in Kelvin) from the change in enthalpy (ΔH) and the change in entropy (ΔS) by the formula $\Delta G = \Delta H - T\Delta S$. Determine the change in entropy when the change in Gibbs free energy is 100 joules and the change in enthalpy is 1300 joules at a temperature of 300 Kelvin.

- (A) -28,700 J (B) -389,900 J (C) 4 J
(D) 0.1 J (E) -900 J

<http://screencast.com/t/XsJ7o8WQk>

EX 1-3: Determine the value of $8a + \frac{a^2 - 3}{a + 2} + 5a\sqrt{-3a}$ when $a = -3$.

- (A) 33 (B) -75 (C) -57 (D) 33 (E) -81

<http://screencast.com/t/DzMBTTirxLL>

Content Overview: 2. Setting Up Equations for Word-Problem Situations

- (1) Define a variable, (2) use it to write expressions for calculations, and (3) form equation(s) by finding two different expressions that describe the same quantity.
- Many situations involve rates of something per base unit, and also amounts of the something. Distinguishing between the rate of something versus the amount of something is an important skill.

A useful general formula: $R \cdot B = A$ or (rate)(base) = amount

This shows up in situations like:

Application Situation	Number Example:	Algebra Example:
(tax rate)(base) = dollar amount of tax	9% sales tax on a \$20 purchase $(.09)(20) = 1.8$ Sales tax paid = \$1.80	8.5% sales tax on a \$x purchase $(.085)(x) = .085x$ Sales tax paid = .085x dollars
(price rate)(quantity) = dollar amount of total cost	\$3 price per item, buying 6 items $(3)(6) = 18$ Total purchase cost = \$18	\$y price per item, buying 6 items $(y)(6) = 6y$ Total purchase cost = \$6y
(discount rate)(list price) = dollar amount of discount	30% off of a \$150 item $(.3)(150) = 45$ you save = \$45	18% off of a \$x item $(.18)(x) = .18x$ \$ you save = .18x
(rate of speed)(time) = amount of distance travelled	going 50 mph for 4 hours $(50)(4) = 200$ you travelled = 200 miles	going 65 mph for t hours $(65)(t) = 65t$ you travelled = 65t miles
(concentration rate)(amount of mix) = amount of ingredient	5% alcohol in a 12 oz beer $(.05)(12) = .6$ you had .6 oz of pure alcohol	10% alcohol in a y oz beer $(.1)(y) = .1y$ had .1y oz of pure alcohol
(interest rate)(principal invested) = dollar amount of interest paid	2.5% periodic interest on credit card balance of \$3200 $(.025)(3200) = 80$ pay \$80 interest that period	x periodic interest on credit card balance of \$540 $(x)(540) = 540x$ pay \$540x interest that period

Content Overview: 2. Setting Up Equations for Word-Problem Situations (cont'd)

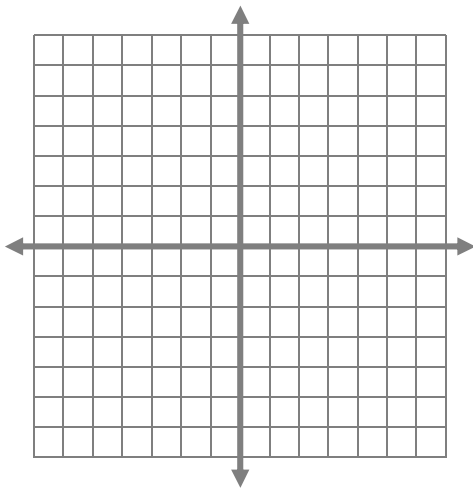
- When things “vary” or are “proportional” we model this with an equation involving multiplication by, or division of a constant k , as follows: “ z varies directly with x and inversely with y ” means $z = \frac{kx}{y}$. This is also described as “ z is directly proportional to x and inversely proportional to y ”.

EX 2-1: The reciprocal of ten times an unknown number gives a result of $6\frac{1}{2}$ when it is subtracted from 8. Which equation can be used to find the unknown number, x ?

- (A) $6\frac{1}{2} = \frac{1}{10x} - 8$ (B) $8 - (-10x) = 6\frac{1}{2}$ (C) $\frac{1}{10}x = 6\frac{1}{2} - 8$
(D) $6\frac{1}{2} = 8 - \frac{1}{10x}$ (E) $-10x = 6\frac{1}{2} - 8$

<http://screencast.com/t/w1kmlEwdffn>

EX 2-2: Determine the length of \overline{CD} through the points $C(-3,3)$ and $D(1,-1)$.



- (A) $4\sqrt{2}$ units (B) $2\sqrt{2}$ units
(C) 32 units (D) 8 units
(E) 4 units

<http://screencast.com/t/zwhGxSI9>

Content Overview: 2. Setting Up Equations for Word-Problem Situations (cont'd)

EX 2-3: Dave rides a bicycle at a speed of 7 mph faster than Jackie. He completes a road course in 2.5 hours. Jackie completes the same course in 3 hours and 40 minutes. How fast is Dave riding? Round to the nearest mph.

- (A) 15 mph (B) 22 mph (C) 19 mph (D) 26 mph (E) 33 mph

<http://screencast.com/t/gq8LEntYpahC>

EX 2-4: In a recent election, candidate Jackson earned 71.2% of the votes. He won 55,598 actual votes. Which equation can be used to determine the number of ballots, x , that were cast in the election?

- (A) $x = .712(55598)$ (B) $.712x = 55,598$ (C) $x = \frac{.712}{55,598}$
(D) $x + .712x = 55,598$ (E) $x - .712x = 55,598$

<http://screencast.com/t/b0B9dCOrX0o>

EX 2-5: The electrical resistance of a wire varies directly with the length of the wire, but inversely with its cross-sectional area. A length of 120 inches of #12 copper wire has a cross-sectional area of 0.0051 sq. in. and a resistance of 0.016 ohms. How many ohms of resistance would be in a 500 inch length of #28 copper wire, which has a cross-sectional area of 0.000125 sq. in.?

- (A) 0.07 ohms (B) 2.72 ohms (C) 0.27 ohms
(D) 9.4 ohms (E) 0.00009 ohms

<http://www.screencast.com/t/HRhhJX24>

Content Overview: 3. Add, Subtract, Multiply, & Divide Polynomials

- Only like terms (same variables with same exponents on them) can be added or subtracted.
- When multiplying or dividing, exponents on terms usually change.

EX 3-1: $3r^2 - 4r + 7 - (8r - 4r^2 + 2) = ?$

- (A) $3r^3 + 9$ (B) $-r^2 - 12r + 9$ (C) $7r^2 - 12r + 5$
(D) $40r^3 + 14$ (E) $-r^2 - 12r + 5$

<http://screencast.com/t/rB158HevrkE>

EX 3-2: For $x \neq 0$, determine the quotient of $12x^6 - 6x^4 + 4x^2$ and $4x^2$.

- (A) $3x^4 - \frac{3}{2}x^2 + 1$ (B) $12x^6 - 6x^4$ (C) $12x^6 - 6x^4 + 1$
(D) $3x^3 - \frac{3}{2}x^2 + 1$ (E) $3x^3 - \frac{3}{2}x^2 + x$

<http://screencast.com/t/0FZINkfpDw3F>

EX 3-3: If $(3x^2 + 4)(nx - 7) = 18x^3 - 21x^2 + 24x - 28$, the what is the value of n ?

- (A) 18 (B) 6 (C) $\frac{28}{3}$ (D) 7 (E) $6x - 7$

<http://screencast.com/t/8S7pkhyde1>

EX 3-4: Determine the sum of $-\frac{3}{5}c^2d^3 + 5c^2d$ and $4cd^2 + 6d^3c^2$.

- (A) $\frac{27}{5}c^2d^3 + 5c^2d + 4cd^2$ (B) $\frac{27}{5}c^2d^3 + 9c^2d$ (C) $\frac{27}{5}c^2d^3 + 9c^3d^3$
(D) $-\frac{3}{5}c^2d^3 + 5c^2d + 4cd^2 + 6d^3c^2$ (E) $-\frac{12}{5}c^3d^5 + 30c^4d^4$

<http://screencast.com/t/Xu9jWzYjs>

Content Overview: 4. Factor Trinomials & Solve Quadratic Equations

- Always start factoring by looking for a GCF for each term in the polynomial.
- To factor $ax^2 + bx + c$, find all factors of “ a times c ” using same-sign factors when ac is positive but opposite sign factors when ac is negative, finding the pair that adds up to be b . Use these to split the middle term and factor by grouping.
- The difference of squares $a^2 - b^2$ factors as $(a + b)(a - b)$
- If $a = 1$, the factor pair that adds to b is part of the factored answer.
- To solve $ax^2 + bx + c = 0$, factor the trinomial, then set each factor = 0 and solve.

EX 4-1: $14x^2y - 18xy^2$ is the same as which of the following?

- (A) $-4xy^{-1}$ (B) $2x^2y^2(7y - 9x)$ (C) $-4x^3y^3$
(D) $-252x^3y^3$ (E) $2xy(7x - 9y)$

<http://screencast.com/t/6XLUOrUO39>

EX 4-2: If $8x^2 - 4x + 6x - 3 = (mx - 1)(2mx + 3)$, what is the value of m ?

- (A) 2 (B) 4 (C) 6 (D) 8 (E) 3

<http://screencast.com/t/cUtdYj8W>

EX 4-3: Which of the following is a factor of $3y^4 - 33y^3 + 72y^2$?

- (A) $y + 3$ (B) $y - 12$ (C) $y - 8$ (D) $y^2 - 3$ (E) $y + 8$

<http://screencast.com/t/Dshu4xrvvP0>

Content Overview: 4. Factor Trinomials & Solve Quadratic Equations (cont'd)

EX 4-4: Which is the sum of the solutions to the equation $4x^2 + 13x = 12$?

- (A) $-4\frac{3}{4}$ (B) $-3\frac{1}{4}$ (C) $\frac{12}{17}$ (D) $\frac{3}{4}$ (E) -4

<http://screencast.com/t/wVWRJ4VHfM7>

EX 4-5: Which is a factor of $3z^4 - 27z^2$?

- (A) $z^2 - 3$ (B) $3z^2 - 9$ (C) $3z^2 + 9$ (D) $z + 3$ (E) $z + 9$

<http://www.screencast.com/t/2pLrFrCr>

Content Overview: 5. Solve 1-Variable Linear Equations & Formulas

- UNDO what is done to "x" in the reverse of the order of operations.
- Add or subtract the same thing to/from both sides of the equation; multiply or divide every term on both sides by anything but zero.

EX 5-1: Solve for x: $4\left(3x - \frac{5}{8}\right) + 7 = 5x - \frac{7}{3} + 4x$

- (A) $x = -\frac{41}{18}$ (B) $x = -\frac{209}{72}$ (C) $x = -\frac{713}{24}$
(D) $x = -\frac{41}{66}$ (E) no solution

<http://screencast.com/t/KUJMIDrt>

Content Overview: 5. Solve 1-Variable Linear Equations & Formulas (cont'd)

EX 5-2: Given $z = 3x - \frac{1}{4}$ and $4y = 3x - 7$, write z in terms of y .

- (A) $\frac{3x-7}{4}$ (B) $4y + \frac{27}{4}$ (C) $4y + \frac{15}{2}$ (D) $4y + 3$ (E) $\frac{z}{4} - \frac{27}{16}$

<http://screencast.com/t/x2fgoFQ1xF>

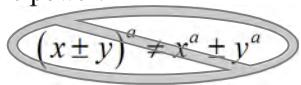
EX 5-3: A new operation \oplus is defined as $m \oplus n = m^2 - 4n + m$. Given that $2 \oplus x = 5$, determine the value of x .

- (A) $\frac{1}{4}$ (B) $4 - 4x + m$ (C) $11 - 4x$ (D) $\frac{11}{4}$ (E) $-\frac{1}{4}$

<http://screencast.com/t/ntFmHdEn>

Content Overview: 6. Exponent Rules

Working from basic algebra concepts we can show the following patterns with exponents: <http://screencast.com/t/WAy4DPfu> <http://screencast.com/t/OyR5PwCzS>

<p>Product Rule: To multiply like bases you add the exponents. $x^a x^b = x^{a+b}$</p>	<p>Quotient Rule: To divide like bases you subtract the exponents. $\frac{x^a}{x^b} = x^{a-b} \text{ or } \frac{x^a}{x^b} = \frac{1}{x^{b-a}}$</p>	<p>Power Rule: To take a base with an exponent and raise it to another power you multiply exponents. $(x^a)^b = x^{ab}$</p>
<p>1 Exponent Rule: Anything raised to an exponent of 1 is itself. $x^1 = x$</p>	<p>0 Exponent Rule: Anything (except 0) raised to an exponent of 0 is the number 1. $x^0 = 1 \text{ for } x \neq 0$ 0^0 is undefined</p>	<p>Negative Exponent Rule: A negative exponent means reciprocal of the base. $x^{-a} = \frac{1}{x^a} \text{ or } \frac{1}{x^{-a}} = x^a \text{ or}$ $\left(\frac{x}{y}\right)^{-a} = \left(\frac{y}{x}\right)^a$</p>
<p>Distribute Exponent over Multiplication: A product to a power is the same as each factor raised to that power. $(xy)^a = x^a y^a$</p>	<p>Distribute Exponent over Division: A fraction to a power is the same as both the top & bottom raised to that power. $\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$</p>	<p>DON'T Distribute Exponent over Addition/Subtraction: A sum/difference to a power is NOT the same as each term raised to the power! </p>
<p>Fractional Exponent = Root (Radical): The bottom of the fractional exponent is the index of the root (kind of root). The top of the fractional exponent is the exponent on the base (or on the radical itself). $x^{\frac{a}{b}} = \sqrt[b]{x^a} \text{ or } x^{\frac{a}{b}} = \left(\sqrt[b]{x}\right)^a \text{ where } b \geq 2 \text{ and } x \geq 0 \text{ when } b \text{ is even.}$</p>		

EX 6-1: For all non-zero values of the variables, $\frac{-8n^{-2}m^3}{24(n^3m^6)^2} = ?$

- (A) $\frac{-1}{3n^{12}m^4}$ (B) $\frac{-1}{3n^8m^9}$ (C) $\frac{3}{n^8m^9}$ (D) $\frac{-1}{3n^3m^{12}}$ (E) $\frac{1}{32n^{12}m^6}$

<http://screencast.com/t/U8AnNPUpelwW>

Content Overview: 6. Exponent Rules (cont'd)

EX 6-2: For all non-zero values of x , which is equivalent to $(125x^3)^{-\frac{4}{3}}$?

- (A) $\frac{1}{5x^4}$ (B) $\sqrt[4]{125x^9}$ (C) $\frac{1}{625x^4}$ (D) $-625x^4$ (E) $-5x^4$

<http://screencast.com/t/v7m5nVx2ihU>

EX 6-3: For all non-negative values of y , $\sqrt[4]{162y^8} =$

- (A) $3y^2\sqrt[4]{2}$ (B) $40.5y^2$ (C) $40.5y^4$ (D) $2\sqrt[4]{3y^2}$ (E) $162y^{32}$

<http://screencast.com/t/CjEISAvI7bJ>

EX 6-4: Simplify: $\left(4x^{\frac{3}{5}}\right)\left(-6x^{\frac{2}{3}}\right)$

- (A) $-2x^{\frac{5}{8}}$ (B) $-24x^{\frac{5}{8}}$ (C) $-24x^{\frac{2}{5}}$ (D) $-24x^{\frac{19}{15}}$ (E) $\frac{1}{2x^{\frac{1}{15}}}$

<http://screencast.com/t/TmtZ8oCIK29d>

EX 6-5: Given that $5^{12x} = 8$, then $5^{4x} = ?$

- (A) 24 (B) $\frac{8}{3}$ (C) 2 (D) 512 (E) 2.36

<http://www.screencast.com/t/6B1CWQm7nz>

EX 6-6: Solve for x : $8^{x+3} = 4$

- (A) $-\frac{5}{2}$ (B) $-\frac{7}{3}$ (C) -1 (D) $-\frac{1}{3}$ (E) $\frac{5}{2}$

<http://www.screencast.com/t/gLy7rmbS1uP2>

Content Overview: 7. Simplify & Add, Subtract, Multiply, & Divide Radicals

- Only like radicals (same index, same radicand) can be added/subtracted.
- Use exponent rules to multiply/divide radicals (ex: $\sqrt[n]{x}\sqrt[n]{y} = \sqrt[n]{xy}$)
- To eliminate radicals from $\frac{x}{\sqrt{y} \pm \sqrt{z}}$ multiply by $\frac{\sqrt{y} \mp \sqrt{z}}{\sqrt{y} \mp \sqrt{z}}$.
- To solve $\sqrt[n]{x} = a$ raise both sides to the n th power, but check all solutions.
- To solve $x^{\frac{m}{n}} = a$ raise both sides to the exponent $\frac{n}{m}$, but check all solutions.

EX 7-1: $(4 - \sqrt{2})(3 + \sqrt{5}) =$

- (A) $12 - \sqrt{10}$ (B) $12 + 4\sqrt{5} - 3\sqrt{2} - \sqrt{10}$ (C) $7 + \sqrt{3}$
(D) $12 + \sqrt{3} - \sqrt{10}$ (E) $12 - \sqrt{7}$

<http://screencast.com/t/3HwgzcEU>

EX 7-2: Which is the simplified form of $\sqrt{8x} + 4\sqrt{2x} - 2\sqrt{18x}$, for $x \geq 0$?

- (A) $2\sqrt{-8x}$ (B) $\sqrt{8x} + 2\sqrt{16x}$ (C) 0 (D) $6\sqrt{4x} - 6\sqrt{2x}$
(E) $3\sqrt{2x}$

<http://screencast.com/t/ZDrjklOBvv>

Content Overview: 7. Simplify & Add, Subtract, Multiply, & Divide Radicals (cont'd)

EX 7-3: Solve for x : $\frac{2}{3} = \frac{4}{\sqrt{2x+1}}$

- (A) $\frac{\sqrt{6}-1}{2}$ (B) $\sqrt{3}-1$ (C) $\frac{35}{2}$ (D) $\frac{5}{2}$ (E) $\frac{11}{4}$

<http://screencast.com/t/FoDuBQRaO>

EX 7-4: For all $x > 0$: $\frac{7}{\sqrt{2x+3}} = ?$

- (A) $\frac{7(\sqrt{2x}-3)}{2x-9}$ (B) $\frac{49}{2x+9}$ (C) $\frac{7(\sqrt{2x}-3)}{4x-9}$ (D) $7(\sqrt{2x}-3)$
(E) $\frac{7(\sqrt{2x}-3)}{2x-3}$

<http://screencast.com/t/J7IL07p1u>

EX 7-5: $\frac{\sqrt{90}}{2} + \frac{5}{\sqrt{3}} = ?$

(A) $\frac{9\sqrt{10} + 10\sqrt{3}}{6}$

(B) $\frac{5 + 3\sqrt{10}}{2 + \sqrt{3}}$

(C) $10 - 5\sqrt{3} + 6\sqrt{10} - 3\sqrt{30}$

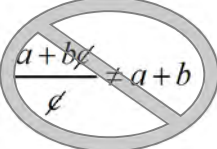
(D) $\frac{19\sqrt{13}}{6}$

(E) $\frac{15}{2}$

<http://www.screencast.com/t/MLVXr50yyH>

Content Overview: 8. Simplify Rational Expressions, Including Complex Fractions

- When reducing fractions, cancel factors, but never terms that are being added/subtracted

$$\frac{ab\cancel{c}}{\cancel{c}} = ab \quad \text{and} \quad \frac{a\cancel{(b+c)}}{\cancel{b+c}} = a \quad \text{BUT} \quad \frac{a+b\cancel{c}}{\cancel{c}} \neq a+b$$


- $\frac{x}{y} = x \cdot \frac{1}{y}$
- A rational expression is defined (has domain) for all numbers except those that make the bottom equal to zero.

EX 8-1: For $x \neq 0$, which is equivalent to $\frac{18x^3 - 6x^2}{3x^2}$?

- (A) $18x^3 - 2$ (B) $6x - 2$ (C) $6x - 6x^2$ (D) $4x$ (E) $15x - 3$

<http://screencast.com/t/q3NXdCxu>

EX 8-2: For what values of x is the rational expression $\frac{(x-5)(x+3)}{2x-4x^2}$ defined?

- (A) $x \neq 5, -3$ (B) $x \neq -5, 3$ (C) $x \neq -\frac{1}{2}, 0$
(D) $x \neq 0, \frac{1}{2}$ (E) $x \neq 5, -3, \frac{1}{2}$

<http://screencast.com/t/tI0vP4hQsP2L>

Content Overview: 8. Simplify Rational Expressions, Including Complex Fractions (cont'd)

EX 8-3: For $x \neq 2$, $\frac{\frac{3x}{5x-10}}{\frac{3}{x-2}} = ?$

(A) $\frac{x}{5}$

(B) $\frac{9x}{(5x-10)(x-2)}$

(C) $\frac{1}{5x-5}$

(D) $\frac{x}{10}$

(E) $\frac{5}{x}$

<http://screencast.com/t/awbu4hxx>

Content Overview: 9. 2-Variable Linear Equations: Slope, Intercepts, and Graphing

- In a 2-variable linear equation $y = mx + b$, the graph is a straight line where m is the slope and $(0, b)$ is the y -intercept.
- If a line has slope $m = \frac{p}{q}$ then a parallel line has the same slope, $m_{//} = \frac{p}{q}$, and a perpendicular line has slope $m_{\perp} = -\frac{q}{p}$.

EX 9-1: Determine the slope of the line $3x - 2y = 8$.

- (A) $m = 3$ (B) $m = -\frac{3}{2}$ (C) $m = \frac{2}{3}$ (D) $m = -4$ (E) $m = \frac{3}{2}$

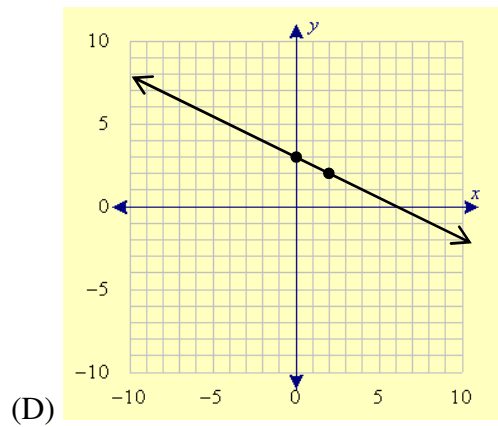
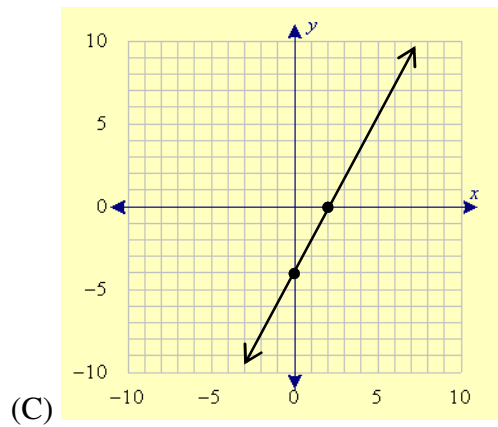
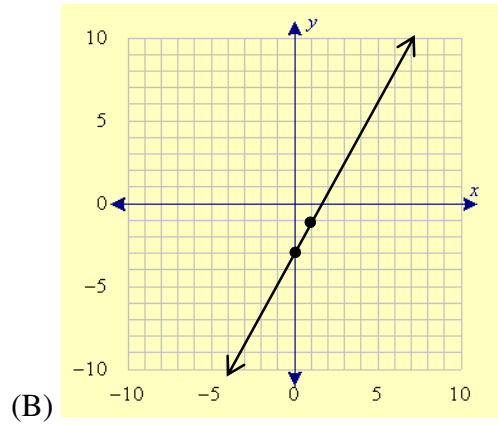
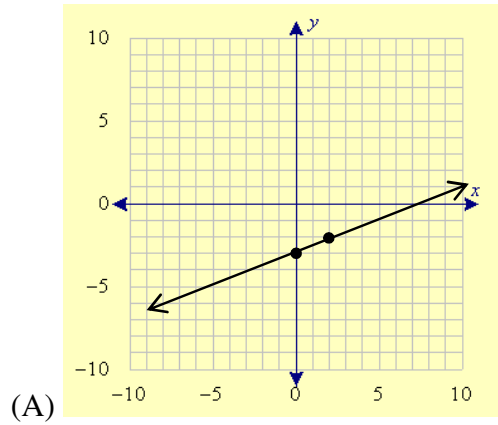
<http://www.screencast.com/t/LO5yvW9LhEjW>

EX 9-2: Which line below is perpendicular to $y = 2x + 7$

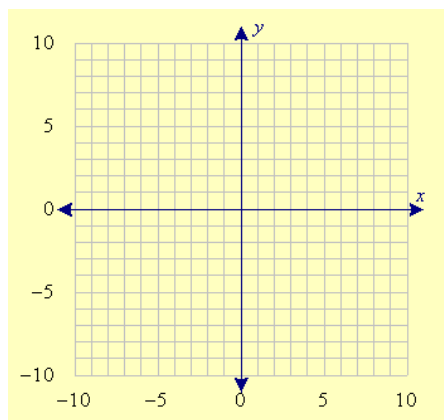
- (A) $3y = 6x + 9$ (B) $-4y = 8x - 4$ (C) $-\frac{1}{2}x + 3y = 6$
- (D) $6y = 8 - 3x$ (E) $y = 4x - \frac{1}{7}$

<http://screencast.com/t/1vpaXeMHtqX>

EX 9-3: Which could be the graph of the $2x - 4y = 12$



<http://www.screencast.com/t/S0TiDCWHJ5a>



Additional Practice Problems for Homework

<p>1. Evaluate $5x^2 - 4x + 2$ when $x = -3a$.</p>	<p>2. When $x = -4$, what is the value of $\frac{3x - \sqrt{-x}}{x^2}$?</p>
<p>3. When on sale for 15% off, a book costs \$100.30. What was the original price of the book?</p>	<p>4. A house has two leaky faucets. One is leaking 0.5 gallons per hour faster than the other. If the first faucet can fill a pail in 12 hours, and the faster leaking faucet can fill the same pail in 4 hours, how fast is each faucet leaking?</p>
<p>5. Multiply: $(x+2)(x^2 - 2x + 4)$</p>	<p>6. If we know that $(3x^2 + nx - 4) + (nx^2 - 2x) = 9x^2 + 4x - 4$ what is the value of n?</p>
<p>7. Factor: $3x^2 - 19x - 14$</p>	<p>8. Solve for x: $x^2 + 8 = 9x$. What is the value of the positive difference of the solutions?</p>
<p>9. If $3x^2 + 4x - 7 = 5x + 8 - x$, then $x^2 = ?$</p>	<p>10. $a \Xi b = b^2 - ab$. If $x \Xi 3 = 5$, then $x = ?$</p>
<p>11. $36^{-\frac{5}{2}} = ?$</p>	<p>12. $\frac{(3x^3)^3 5x^2}{6x^2} = ?$</p>
<p>13. $\frac{\sqrt{24}}{3} + \frac{\sqrt{54}}{2} = ?$</p>	<p>14. $\sqrt[3]{24x^{10}} = ?$</p>
<p>15. $\frac{3x^5}{8y^2} \div \frac{15x}{2y^8} = ?$</p>	<p>16. Reduce: $\frac{x^2 + 3x + 2}{2x^2 + 3x + 1}$ for $x > 0$.</p>
<p>17. What is the slope of a line that is parallel to $6y - 4x = 10$?</p>	<p>18. Write the equation of a line with slope -3 that contains the point $(-3, 5)$.</p>

ANSWERS to Additional Practice Problems for Homework

<p>1. $45a^2 + 12a + 2$ http://screencast.com/t/5MVWVL4MRE</p>	<p>2. $-\frac{7}{8}$ http://screencast.com/t/qTGKbZKco4</p>
<p>3. Original price is \$118. http://www.screencast.com/t/83WD3F97r</p>	<p>4. Slower faucet leaks at $\frac{1}{4}$ gallons/hour. Faster faucet leaks at $\frac{3}{4}$ gallons/hour. http://screencast.com/t/GUHKfmMUJ</p>
<p>5. $x^3 + 8$ http://screencast.com/t/e4bXlqsO</p>	<p>6. $n = 6$ http://screencast.com/t/1b7Btxkr</p>
<p>7. $(x-7)(3x+2)$ http://screencast.com/t/7MNBCRG6GNtb</p>	<p>8. Positive difference of the solutions = 7. http://screencast.com/t/pe6xrrEx8u</p>
<p>9. $x^2 = 5$ http://www.screencast.com/t/5aW3M4fl</p>	<p>10. $x = \frac{4}{3}$ http://screencast.com/t/EbzNfj7Fq</p>
<p>11. $\frac{1}{7776}$ http://screencast.com/t/tX7QtdTom9</p>	<p>12. $\frac{45x^9}{2}$ http://screencast.com/t/lrpotA41E24</p>
<p>13. $\frac{13\sqrt{6}}{6}$ http://screencast.com/t/TGCA5CYAU2</p>	<p>14. $2x^3\sqrt[3]{3x}$ http://screencast.com/t/QirFLYAee</p>
<p>15. $\frac{x^4y^6}{20}$ http://screencast.com/t/FVysfmM6Fcc</p>	<p>16. $\frac{x+2}{2x+1}$ http://screencast.com/t/nyNofnbOxR</p>
<p>17. $m_{ll} = \frac{2}{3}$ http://screencast.com/t/KjGw21komi</p>	<p>18. $y = -3x - 4$ http://screencast.com/t/cscpshITYNT</p>