

| | |
|---|---|
| <p>1.</p> $5x(3x) = 5x(x \cdot 3)$ <p>is an example of which property?</p> <p>(a) Associative property of addition</p> <p>(b) Commutative property of addition</p> <p>(c) Associative property of multiplication</p> <p>(d) Commutative property of multiplication</p> | <p>2. Evaluate</p> $-15 - (-10)$ |
| <p>3. Evaluate</p> $\left(-\frac{2}{7}\right)\left(-\frac{21}{4}\right)$ | <p>4. Evaluate</p> $\frac{3}{7} - \frac{12}{21}$ |

5. For $a = -4$ and $b = -7$, find
 $a^2 - 4b$

6. For $a = -5$ and $b = 6$, find
 $|3a - b|$

7. Simplify

$$7(x + 2) + 3(x - 2)$$

8. Simplify

$$5m + 8 - (2m - 4)$$

9. Solve

$$5x = \frac{1}{4}$$

10. Solve

$$3x + 2 = 20$$

11. Solve

$$6(2x - 5) = 3x + 6$$

12. Solve

$$5x - \frac{1}{3} = \frac{5}{6}$$

13. Five less than twice a number is equal to the number. What is the number?

14. Find three consecutive numbers whose sum is 105.

15. Solve

$$3x + 2 < 23$$

16. Solve

$$7 - 7x > 21$$

17. Determine the slope of the line that passes through the points

$$(-3, 2) \text{ and } (-5, 8)$$

18. Determine the slope of the line with the equation

$$x + 2y = 4$$

19. Determine the slope of a line perpendicular to

$$y = -\frac{2}{5}x + 3$$

20. Find the x -intercept and y -intercept of the line with the equation

$$5x + 4y = 40.$$

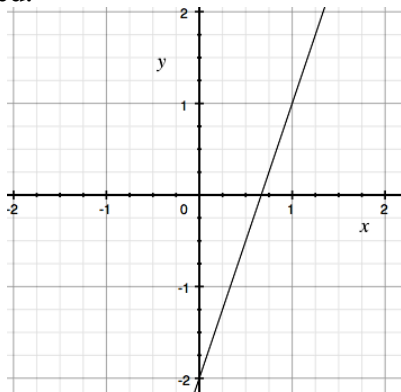
21. Write an equation in slope-intercept form of the line that has slope 6 and passes through the point

$$(5, -3)$$

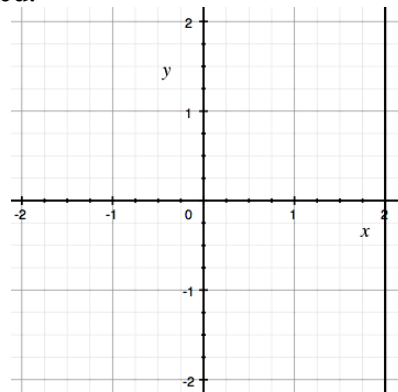
22. Write an equation in slope-intercept form of the line that passes through the points

$$(6, -1) \text{ and } (5, 2)$$

23. Determine the equation of the line graphed.



24. Determine the equation of the line graphed.



25. Simplify

$$(2x^5y^3)^5$$

26. Simplify.

$$\frac{x^3}{x^{-8}}$$

27. Simplify.

$$\left(\frac{a^4}{5b^2}\right)^{-2}$$

28. Simplify.

$$(2x^2y^{-2})(7x^{-5}y^5)$$

| | |
|--|--|
| <p>29. Write 8.371×10^5 in standard notation.</p> | <p>30. Write each number in scientific notation, then multiply and simplify, leaving your answer in scientific notation.</p> $0.0001 \times 25,000$ |
| <p>31. Multiply and simplify.</p> $(5a - b)(4a + 2b)$ | <p>32. Multiply and simplify.</p> $(x + 5)(x^2 + x - 5)$ |

| | |
|---|--|
| <p>33. Write the prime factorization of</p> <p style="text-align: center;">90</p> | <p>34. Find the GCF of</p> <p style="text-align: center;">$10y^5$ and $25y$</p> |
| <p>35. Factor completely.</p> <p style="text-align: center;">$12x^3 - 3x^4$</p> | <p>36. Factor.</p> <p style="text-align: center;">$x^2 - x - 20$</p> |

37. Factor.

$$2x - 2y + ax - ay$$

38. Factor.

$$10x^2 - 13x - 3$$

39. Solve

$$(x + 4)(x - 10) = 0$$

40. Solve

$$x^2 + 7x - 8 = 0$$

Math 101, Final Exam Resource Page

Addition Table

| + | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

Multiplication Table

| × | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 3 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 5 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 6 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| 7 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 9 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 10 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Rules for Signed Numbers

| Addition | | | | Subtraction | | | |
|--|---|-----------------|------------|--------------------|---|----------|------------|
| Positive | + | Positive | = Positive | $A - B = A + (-B)$ | | | |
| POSITIVE | + | Negative | = Positive | | | | |
| Positive | + | NEGATIVE | = Negative | | | | |
| Negative | + | Negative | = Negative | | | | |
| Numbers in bold, capital letters have a greater magnitude than nonbold, lower case partner number. | | | | | | | |
| Multiplication | | | | Division | | | |
| Positive | × | Positive | = Positive | Positive | ÷ | Positive | = Positive |
| Positive | × | Negative | = Negative | Positive | ÷ | Negative | = Negative |
| Negative | × | Positive | = Negative | Negative | ÷ | Positive | = Negative |
| Negative | × | Negative | = Positive | Negative | ÷ | Negative | = Positive |

Rules for Fractions

For any real numbers, $a, b, c,$ and $d, b \neq 0, c \neq 0,$ and $d \neq 0$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c} \qquad \frac{a}{c} - \frac{b}{c} = \frac{a-b}{c} \qquad \frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd} \qquad \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$$

Distributive Property

For any real numbers, $a, b, c,$ and d

$$a(b + c) = ab + ac$$

| Properties of Equality | Properties of Inequality | | | |
|---|---|---|---|---|
| For any real numbers, $a, b, c,$ If $a = b,$ then $a + c = b + c$ and $ac = bc$ | For any real numbers, $a, b,$ and $c > 0$ | | For any real numbers, $a, b,$ and $c < 0$ | |
| | If $a < b,$ then $a + c < b + c$ and $ac < bc$ | If $a < b,$ then $a + c < b + c$ and $ac < bc$ | If $a > b,$ then $a + c > b + c$ and $ac < bc$ | If $a < b,$ then $a + c < b + c$ and $ac > bc$ |

| Formulas for Linear Equations | | |
|-------------------------------|-----------------------------------|------------------------|
| Slope-Intercept Form | Slope | Point-slope Form |
| $y = mx + b$ | $m = \frac{y_2 - y_1}{x_2 - x_1}$ | $y - y_1 = m(x - x_1)$ |

| Rules for Exponents | | | | |
|---------------------------|---|---|---------------------------|--|
| Product Rule | Quotient Rule | Power Rules | Zero Exponent | Negative Exponent |
| $a^m \cdot a^n = a^{m+n}$ | $\frac{a^m}{a^n} = a^{m-n}$ $(a \neq 0)$ | $(a^m)^n = a^{mn}$ $(ab)^m = a^m b^m$ $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad (b \neq 0)$ | $a^0 = 1$ $(a \neq 0)$ | $a^{-n} = \frac{1}{a^n}$ $(a \neq 0)$ |

| Factoring Methods for Polynomials of 2-4 Terms | | | | | | | | | |
|--|---|--|--|-------------|-------|---------|--|---------|--|
| Number of terms | Step 1 | Identify the polynomial or polynomial factor | Step 2 | | | | | | |
| 2 | Factor out any GCF | Difference of squares \Rightarrow | $a^2 - b^2 = (a + b)(a - b)$ | | | | | | |
| | | Sum of cubes \Rightarrow | $a^3 + b^3 = (a + b)(a^2 - ab + b)$ | | | | | | |
| | | Difference of cubes \Rightarrow | $a^3 - b^3 = (a - b)(a^2 + ab + b)$ | | | | | | |
| | | None of the above \Rightarrow | Prime – or cannot be factored by methods shown in this course. | | | | | | |
| 3 | Factor out any GCF | $x^2 + bx + c \Rightarrow$ | $= (x \quad)(x \quad)$ <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td colspan="2">Product c</td></tr> <tr><td> </td><td> </td></tr> <tr><td colspan="2">Sum b</td></tr> </table> | Product c | | | | Sum b | |
| | | Product c | | | | | | | |
| | | | | | | | | | |
| Sum b | | | | | | | | | |
| $ax^2 + bx + c \Rightarrow$ | $ax^2 + bx + c = ax^2 + b_1x + b_2x + c$ Then factor by grouping or box method. <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td colspan="2">Product ac</td></tr> <tr><td>b_1</td><td>b_2</td></tr> <tr><td colspan="2">Sum b</td></tr> </table> | Product ac | | b_1 | b_2 | Sum b | | | |
| Product ac | | | | | | | | | |
| b_1 | b_2 | | | | | | | | |
| Sum b | | | | | | | | | |
| None of the above \Rightarrow | Prime – or cannot be factored by methods shown in this course. | | | | | | | | |
| 4 | Factor out any GCF | | Try to factor by grouping or box method. | | | | | | |