What are MAT 100P and MAT 100?

MAT 100P and MAT 100 are developmental mathematics courses that count as 3 elective credits towards graduation. They cover the same content, but differ in method and pace of delivery: MAT 100P is an emporium style course where you learn at your own pace, while MAT 100 is a standard lecture course requiring a higher standardized test score for placement. Your standardized test scores reveal that you may have not mastered some of the topics listed below. We strongly advise that you review this material before the math placement. The topics that are covered in MAT 100P and MAT 100 include, but are not limited to, the following:

- Adding, subtracting, multiplying, and dividing real numbers.
  Example 1: $-\frac{5}{6} + \frac{7}{8} =$

- Simplifying exponents (positive or negative) without a calculator.
  Example 2: $(-4)^3 =$
  Example 3: $3^{-3} =$

- Simplifying expressions using rules of exponents.
  Example 4: $\dfrac{(8x^2y)(-3x^3y^2)}{-6x^4y^3} =$

- Working with scientific notation and percentages.
  Example 5: write $2,803,000,000$ in scientific notation.
  Example 6: what is the sales tax on a \$999 smartphone if the sales tax is 6.25%?

- Using order of operations to simplify expressions.
  Example 7: $20 - 12 \div 3 - 8(-1) =$

- Using the distributive property to simplify expressions.
  Example 8: $-2x(3x + y - 4) =$
  Example 9: $-3\{7x - 2[x - (2x - 1)]\} =$

- Combining like terms to simplify expressions.
  Example 10: $2ab + 5c - 6ac - 2ab =$

- Using substitution to evaluate algebraic expressions and formulas.
  Example 11: if $a = 1$ and $b = -4$, then $a^3 + 2b - 4 =$

- Solving various kinds of equations.
  Example 12: solve $-19 + x - 7 = 20 - 42 + 10$
  Example 13: solve $-3(x + 5) + 2 = 4(x + 6) - 9$
  Example 14: solve $\frac{1}{3}(x - 2) = \frac{1}{5}(x + 4) + 2$

- Solving and graphing simple and compound inequalities, and writing a solution in interval notation.
  Example 15: solve $5(x - 3) \leq 2(x - 2)$

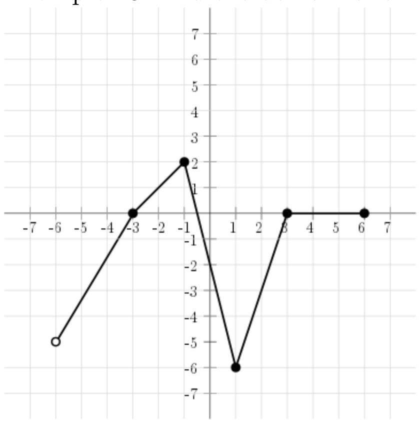
- Graphing both linear equations and quadratic functions.
  Example 16: graph $y = -x + 2$.
  Example 17: graph $f(x) = x^2 - 4$.

- Identifying the slope of a line given two points on the line, an equation, or graph.
  Example 18: what is the slope of the line through $(-1, -2)$ and $(3, 4)$?
  Example 19: find the slope of the line corresponding to the equation $5x - 2y = 4$.

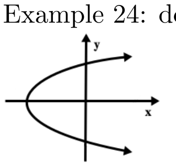
- Writing an equation of a line given a point and slope, a graph, or two points on the line.
  Example 20: what is the equation of the line through $(-1, -2)$ and $(3, 4)$?

- Identifying the slopes of parallel and perpendicular lines.
  Example 21: if L is the line corresponding to $y = -\frac{2}{3}x + 4$, find the slope of a line perpendicular to L.
  Example 22: if L is the line corresponding to $y = -\frac{2}{3}x + 4$, what is the slope of a line parallel to L?

- Identifying the domain and range of a relation.
  Example 23: find the domain and range of the following relation:



- Evaluating functions and determining whether a graph is a function by utilizing the vertical line test.
  Example 24: does the curve below represent the graph of a function of x?



- Solving a system of linear equations.
  Example 25: solve for x and y if $2x - y = 3$ and $-x + 3y = 1$.

- Performing polynomial operations such as:
  Example 26: $(5x^2 - 6x - 12) + (-2x^2 + 8x + 2) =$
  Example 27: $(4x + 9)(5x - 6) =$
  Example 28: $(15x^3 - 24x^2 + 9x) \div (-3x) =$

- Factoring polynomials (GCF, difference of two squares, quadratic trinomials).
  Example 29: factor $6a^4b^2 - 12a^2b^3 + 2a^3b^4$.
  Example 30: factor $9x^2 - 144$.
  Example 31: factor $y^2 + 5y + 6$.

- Simplifying radicals, performing operations with radicals, and solving radical equations.
  Example 32: $\sqrt{12} + 3\sqrt{27} =$
  Example 33: solve $\sqrt{x + 12} = x$

- Solving quadratic equations using the square root property, the Quadratic Formula, or factoring.
  Example 34: solve $x^2 = 2x + 8$.

- Simplifying rational expressions.
  Example 35: $\dfrac{x^3 - 4x}{x^2 + 6x + 8} \div \dfrac{x^2 + 5x}{x + 4} =$
  Example 36: $\dfrac{x}{x^2 + 3x} + \dfrac{3}{x^2 + 3x} =$

Answers

[1.] $-\dfrac{5}{6}+\dfrac{7}{8}=\dfrac{1}{24}$

[2.] $(-4)^3=-64$

[3.] $3^{-3}=\dfrac{1}{27}$

[4.] $\dfrac{(8x^2y)(-3x^3y^2)}{-6x^4y^3}=4x$

[5.] $2,803,000,000=2.803\times 10^9$

[6.] Sales tax is $.0625\times \$999=\$62.4375\approx \$62.44$.

[7.] $20-12\div 3-8(-1)=24$

[8.] $-2x(3x+y-4)=-6x^2-2xy+8x$

[9.] $-3\{7x-2[x-(2x-1)]\}=6-27x$

[10.] $2ab+5c-6ac-2ab=5c-6ac=(5-6a)c$

[11.] If $a=1$ and $b=-4$, then $a^3+2b-4=-11$

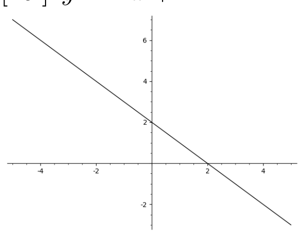
[12.] $-19+x-7=20-42+10 \implies x=14$

[13.] $-3(x+5)+2=4(x+6)-9 \implies x=-4$

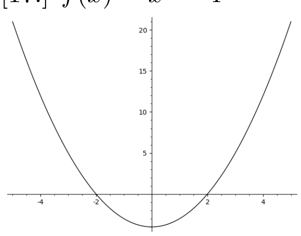
[14.] $\frac{1}{3}(x-2)=\frac{1}{5}(x+4)+2 \implies x=26$

[15.] $5(x-3)\le 2(x-2) \implies x\le \frac{11}{3} \implies x\in(-\infty,11/3]$

[16.] $y=-x+2$



[17.] $f(x)=x^2-4$



[18.] Between $(-1,-2)$ and $(3,4)$ the slope is $\frac{3}{2}$.

[19.] $5x-2y=4 \implies y=\frac{5}{2}x-2$, so the slope is $m=\frac{5}{2}$.

[20.] Line through $(-1,-2)$ and $(3,4)$ is $y-4=\frac{3}{2}(x-3)$, or $y=\frac{3}{2}x-\frac{1}{2}$.

[21.] The slope of L is $m = -\frac{2}{3}$, so a line perpendicular to L has slope $\frac{-1}{m} = \frac{3}{2}$.

[22.] The slope of L is $m = -\frac{2}{3}$, so a line parallel to L has the same slope $m = -\frac{2}{3}$.

[23.] The domain is the interval $(-6, 6]$. The range is $[-6, 2]$.

[24.] The curve pictured does not represent the graph of a function of x since it fails the vertical line test.

[25.] If $2x - y = 3$ and $-x + 3y = 1$, then $x = 2$ and $y = 1$.

[26.] $(5x^2 - 6x - 12) + (-2x^2 + 8x + 2) = 3x^2 + 2x - 10$

[27.] $(4x + 9)(5x - 6) = 20x^2 + 21x - 54$

[28.] $(15x^3 - 24x^2 + 9x) \div (-3x) = -5x^2 + 8x - 3$

[29.] $6a^4b^2 - 12a^2b^3 + 2a^3b^4 = 2a^2b^2(3a^2 - 6b + ab^2)$.

[30.] $9x^2 - 144 = (3x + 12)(3x - 12) = 9(x + 4)(x - 4)$.

[31.] $y^2 + 5y + 6 = (y + 2)(y + 3)$.

[32.] $\sqrt{12} + 3\sqrt{27} = 11\sqrt{3}$

[33.] $\sqrt{x + 12} = x \implies x = 4$ using principal root

[34.] $x^2 = 2x + 8 \implies x^2 - 2x - 8 = 0 \implies (x + 2)(x - 4) = 0 \implies x = -2$ or $x = 4$.

[35.] $\dfrac{x^3 - 4x}{x^2 + 6x + 8} \div \dfrac{x^2 + 5x}{x + 4} = \dfrac{x - 2}{x + 5}$

[36.] $\dfrac{x}{x^2 + 3x} + \dfrac{3}{x^2 + 3x} = \dfrac{1}{x}$