

Math1_Algebra_Geometry_Calculus.pdf

Page 1 – Algebra

1. Solve for x : $2x + 3 = 17$
2. Expand: $(x + 5)(x - 2)$
3. Factor: $x^2 - 9x + 14$
4. If $5x - 2 = 18$, find x .
5. Simplify: $(3x^2 + 7x) - (x^2 - 4x)$
6. Roots of $x^2 - 4 = 0$
7. If $f(x) = 2x + 1$, find $f(4)$
8. Solve for y : $y/3 + 2 = 8$
9. What is the vertex of $y = x^2 + 4x + 3$?
10. Graph $y = -x + 5$.

Page 2 – Algebra (II)

1. Quadratic formula for $x^2 + 6x + 5 = 0$
2. Difference of squares: $x^2 - 25$
3. If $x/5 = 9$, $x = ?$
4. Solve for z : $7z + 8 = 36$
5. Simplify: $4(x + 2) - 3(x - 1)$
6. Factor completely: $x^3 - x^2$
7. What are the zeros of $f(x) = x^2 - x - 20$?
8. Expand: $(x - 3)^2$

9. If $f(x) = x^2$, find $f(-3)$
10. Evaluate: $|x - 4|$ when $x = 9$

Page 3 – Geometry

1. Find the area of a triangle with base 10, height 8.
2. Volume of a sphere with radius 5.
3. What is a parallelogram?
4. Pythagorean theorem explanation
5. Perimeter of rectangle: $l = 12$, $w = 3$
6. Define a trapezoid
7. Area of a circle, $r = 7$
8. If a triangle has sides 5, 12, 13, is it right?
9. What is the sum of interior angles of a hexagon?
10. Find the volume of a cylinder: $r = 3$, $h = 9$

Page 4 – Geometry (II)

1. Area of a parallelogram: base = 11, height = 6
2. Circumference of circle, $r = 10$
3. Distance formula between points (1,2) and (4,6)
4. Define a tangent
5. What is a chord in a circle?
6. Surface area of cube, side = 8
7. Diagonal length of square, side = 12

8. Angle sum in a pentagon
9. Find the centroid of triangle with vertices (0,0), (6,0), (0,6)
10. Area of ellipse: $a = 4$, $b = 7$

Page 5 – Calculus (I)

1. Differentiate $f(x) = 3x^3 + 2x^2 + 7$
2. Find the integral of $f(x) = 5x$
3. $\lim_{x \rightarrow 0} (\sin x)/x$
4. Second derivative of $y = x^2 + 2x + 4$
5. Find the critical points of $f(x) = x^3 - 6x^2 + 12x - 7$
6. Integrate $\int (2x^2 + 3x + 5) dx$
7. What is the definition of a derivative?
8. Area under $y = x$ from $x = 0$ to $x = 4$
9. Maximum value of $f(x) = -x^2 + 8x - 9$
10. What is the Fundamental Theorem of Calculus?

Page 6 – Calculus (II)

1. Find dy/dx for $y = e^x$
2. Integrate $\int \cos(x) dx$
3. What is the Taylor series of e^x at $x = 0$?
4. Chain rule: Differentiate $y = (3x^2 + 2x)^4$
5. Product rule example: Differentiate $y = x^2 \sin(x)$
6. What is a limit?

7. $\lim_{x \rightarrow \infty} (1 + 1/x)^x$
8. Integrate $\int 1/x \, dx$
9. Differentiate $y = \ln(x)$
10. Find inflection points of $f(x) = x^3 - 3x + 2$

Page 7 – Trigonometry (I)

1. What is $\sin(0^\circ)$?
2. $\cos(\pi/3) = ?$
3. $\tan(45^\circ) = ?$
4. Find the amplitude of $y = 3\sin(x)$
5. What is the period of $y = \cos(x)$?
6. Solve for θ : $\sin(\theta) = 0.5$
7. Graph $y = \tan(x)$
8. Prove $\sin^2(x) + \cos^2(x) = 1$
9. What is a unit circle?
10. Inverse sine of $1/2$

Page 8 – Trigonometry (II) / Statistics (I)

1. Law of sines: state and use
2. Law of cosines: formula
3. Angle sum identities
4. Standard deviation of $[2, 4, 6, 8, 10]$
5. Mean of $[10, 20, 30, 40, 50]$

6. What is a median?
7. Probability: Tossing 2 coins, chance both heads?
8. If $P(A) = 0.6$, $P(B) = 0.2$, $P(A \cap B) = 0.1$, $P(A \cup B) = ?$
9. Normal distribution: definition
10. What is a histogram?

Page 9 – Statistics (II) / Linear Algebra (I)

1. Variance formula
2. Mode of $[2, 2, 4, 6, 6, 6, 7]$
3. Quartiles explanation
4. Define a matrix
5. Multiply: $\begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix} \times \begin{bmatrix} 0 & 2 \\ 1 & 5 \end{bmatrix}$
6. What is a vector?
7. Find the determinant: $\begin{bmatrix} 4 & 5 \\ 2 & 1 \end{bmatrix}$
8. Eigenvalues of $\begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}$
9. If $v = [1, 2]$, $w = [3, 4]$, find $v + w$
10. What is a diagonal matrix?

Page 10 – Linear Algebra (II) / Word Problems

1. Solve the system: $2x + y = 10$, $x - y = 2$
2. Find the inverse of $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
3. Tickets cost \$15 for adults, \$10 for kids. 7 tickets, \$85. How many adults?
4. Train travels at 60 mph for 3 hours. How far?

5. Rectangle area is 48, width 6. Find length.
6. If $f(x) = 2x + 3$, what is $f(f(2))$?
7. A jar contains 8 red and 4 blue balls. Probability of picking a blue?
8. The sum of three consecutive integers is 39. What are they?
9. Solve: $3x - 2y = 7$, $x + y = 5$
10. If $x^2 + y^2 = 25$, and $y = 4$, find x .