

# Precalculus (IMRA)

Subject: Mathematics

Grade: 11

Expectations: 57

Breakouts: 269

(a) Introduction.

1. The desire to achieve educational excellence is the driving force behind the Texas essential knowledge and skills for mathematics, guided by the college and career readiness standards. By embedding statistics, probability, and finance, which focusing on fluency and solid understanding, Texas will lead the way in mathematics education and prepare all Texas students for the challenges they will face in the 21st century.
2. The process standards describe ways in which students are expected to engage in the content. The placement of the process standards at the beginning of the knowledge and skills listed for each grade and course is intentional. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use

(B) use a problem

- (xiv) communicate [mathematical reasoning's] implications using multiple representations, including diagrams as appropriate
  - (xv) communicate [mathematical reasoning's] implications using multiple representations, including graphs as appropriate
  - (xvi) communicate [mathematical reasoning's] implications using multiple representations, including language as appropriate
- (E) create and use representations to organize, record, and communicating pr,u .7 (a)2 (t)1.7 (he)3 (m) -1.317 Td [(as









- (ii) determine the key features of logarithmic functions
  - (iii) determine the key features of rational functions
  - (iv) determine the key features of polynomial functions
  - (v) determine the key features of power functions
  - (vi) determine the key features of trigonometric functions
  - (vii) determine the key features of inverse trigonometric functions
  - (viii) determine the key features of piecewise defined functions, including step functions
  - (ix) analyze the key features of exponential functions
  - (x) analyze the key features of logarithmic functions
  - (xi) analyze the key features of rational functions
  - (xii) analyze the key features of polynomial functions
  - (xiii) analyze the key features of power functions
  - (xiv) analyze the key features of trigonometric functions
  - (xv) analyze the key features of inverse trigonometric functions
  - (xvi) analyze the key features of piecewise defined functions, including step functions
- (J) analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, 3.8 ( )0.5 (o)2 (f)7.6 ( )0.5 (pie\*gu6 (cl)3.4 (udi)39 (d f)1.7 di)3oia conac funieipowg2S0/TT1 iaeco



- (x) analyze end behavior of functions, including power functions, using infinity notation to communicate this characteristic in realworld problems
  - (xi) describe end behavior of functions, including exponential functions, using infinity notation to communicate this characteristic in mathematical problems
  - (xii) describe end behavior of functions, including exponential functions, using infinity notation to communicate this characteristic in realworld problems
  - (xiii) describe end behavior of functions, including logarithmic functions, using infinity notation to communicate this characteristic in mathematical problems
  - (xiv) describe end behavior of functions, including logarithmic functions, using infinity notation to communicate this characteristic in realworld problems
  - (xv) describe end behavior of functions, including rational functions, using infinity notation to communicate this characteristic in mathematical problems
  - (xvi) describe end behavior of functions, including rational functions, using infinity notation to communicate this characteristic in realworld problems
- (xvii)(c)-4.1 ( )0.5 (i)-0.6 (n)-3.Bcint.004(ct)1f 03 ( [(i)3.5 n])TJ 0 Tc.4 (xv)0.9 (i)-0.pesy 0 Td ( )Tj EMC /LBody <</M
- (i)-093 -BDu.3 (sy ((-5.4 (x)-1.1 9 ( p)-a6 (3.9 (l)-0.h6 (e)9 ( p)-a69.293 -2.066 Td [(1 Tf 0 -5.4 x)-1.1 p[(co)2 o)8.4 (b( )Tj



- (F) determine the conic section formed when a plane intersects a double cone;
- determine the conic section formed when a plane intersects a double cone
- (G) make connections between the locus definition of conic sections and their equations in rectangular coordinates;
- make connections between the locus definition of conic sections and their equations in rectangular coordinates
- (H) use the characteristics of an ellipse to write the equation of an ellipse with center (h, k) and
- use the characteristics of an ellipse to write the equation of an ellipse with center (h, k) and
- (I) use the characteristics of a hyperbola to write the equation of a hyperbola with center (h, k) and
- use the characteristics of a hyperbola to write the equation of a hyperbola with center (h, k) and
- (4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:
- (A) determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in mathematical and real-world problems;
- determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in mathematical problems
  - determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in real-world problems
- (B) describe the relationship between degree and radian measure on the unit circle;
- describe the relationship between degree and radian measure on the unit circle
- (C) represent angles in radians or degrees based on the concept of rotation and find the measure of reference angles and angles in standard position;
- represent angles in radians or degrees based on the concept of rotation
  - find the measure of reference angles
  - find the measure of angles in standard position
- (D) represent angles in radians or degrees based on the concept of rotation in mathematical and real-world problems, including linear and angular velocity;
- represent angles in radians or degrees based on the concept of rotation in mathematical problems, including linear velocity
  - represent angles in radians or degrees based on the concept of rotation in real-world problems, including linear velocity
  - represent angles in radians or degrees based on the concept of rotation in mathematical problems, including angular velocity
  - represent angles in radians or degrees based on the concept of rotation in real-world problems, including angular velocity
- (E) determine the value of trigonometric ratios of angles and solve problems involving trigonometric ratios in mathematical and real-world problems;
- determine the value of trigonometric ratios of angles

- (ii) solve problems involving trigonometric ratios in mathematical problems
  - (iii) solve problems involving trigonometric ratios in realworld problems
- (F) use trigonometry in mathematical and realworld problems, including directional bearing;
- (i) use trigonometry in mathematical, including directional bearing
  - (ii) use trigonometry in realworld problems, including directional bearing
- (G) use the Law of Sines in mathematical and realworld problems;
- (i) use the Law of Sines in mathematical problems
  - (ii) use the Law of Sines in realworld problems
- (H) use the Law of Cosines in mathematical and realworld problems;
- (i) use the Law of Cosines in mathematical problems
  - (ii) use the Law of Cosines in realworld problems
- (I) use vectors to model situations involving magnitude and direction;
- (i) use vectors to model situations involving magnitude
  - (ii) use vectors to model situations involving direction
- (J) represent the addition of vectors and the multiplication of a vector by a scalar geometrically and symbolically; and
- (i) represent the addition of vectors geometrically
  - (ii) represent the addition of vectors symbolically
  - (iii) represent the multiplication of a vector by a scalar geometrically
  - (iv) represent the multiplication of a vector by a scalar symbolically
- (K) apply vector addition and multiplication of a vector by a scalar in mathematical and realworld problems.
- (i)

- (i) calculate the  $n$ th term of an arithmetic series in mathematical problems
  - (ii) calculate the  $n$ th term of an arithmetic series in real-world problems
  - (iii) calculate the partial sum of an arithmetic series in mathematical problems
  - (iv) calculate the partial sum of an arithmetic series in real-world problems
- (D) represent arithmetic series and geometric series using sigma notation;
- (i) represent arithmetic series using sigma notation
  - (ii) represent geometric series using sigma notation
- (E) calculate the  $n$ th term of a geometric series, the partial sum of a geometric series, and sum of an infinite geometric series when it exists;
- (i) calculate the  $n$ th term of a geometric series
  - (ii) calculate the partial sum of a geometric series
  - (iii) calculate the sum of an infinite geometric series when it exists
- (F) apply the Binomial Theorem for the expansion of  $(a + b)^n$  in powers of  $a$  and  $b$  for a positive integer  $n$  where  $a$  and  $b$  are any numbers;
- (i) apply the Binomial Theorem for the expansion of  $(a + b)^n$  in powers of  $a$  and  $b$  for a positive integer  $n$ , where  $a$  and  $b$  are any numbers
- (G) use the properties of logarithms to evaluate or transform logarithmic expressions;
- (i) use the

- (i) solve polynomial inequalities with real coefficients by ~~app~~ using a variety of techniques in mathematical problems
- (ii) solve polynomial inequalities with real coefficients by applying a variety of techniques-~~in real~~ problems
- (iii)