

Example Items

Pre-Calculus Pre-AP

Pre-Calculus Pre-AP Example Items are a **representative set** of items for the ACP. Teachers may use this set of items along with the test blueprint as guides to prepare students for the ACP. On the last page, the correct answer, content SE and SE justification are listed for each item.

*The specific part of an SE that an Example Item measures is **NOT** necessarily the only part of the SE that is assessed on the ACP.* None of these Example Items will appear on the ACP.

Teachers may provide feedback regarding Example Items.

(1) Download the [Example Feedback Form](#) and email it. The form is located on the homepage of Assessment.dallasisd.org.

OR

(2) To submit directly, click “Example Feedback” **after** you login to the [Assessment website](#).

First Semester

2018–2019

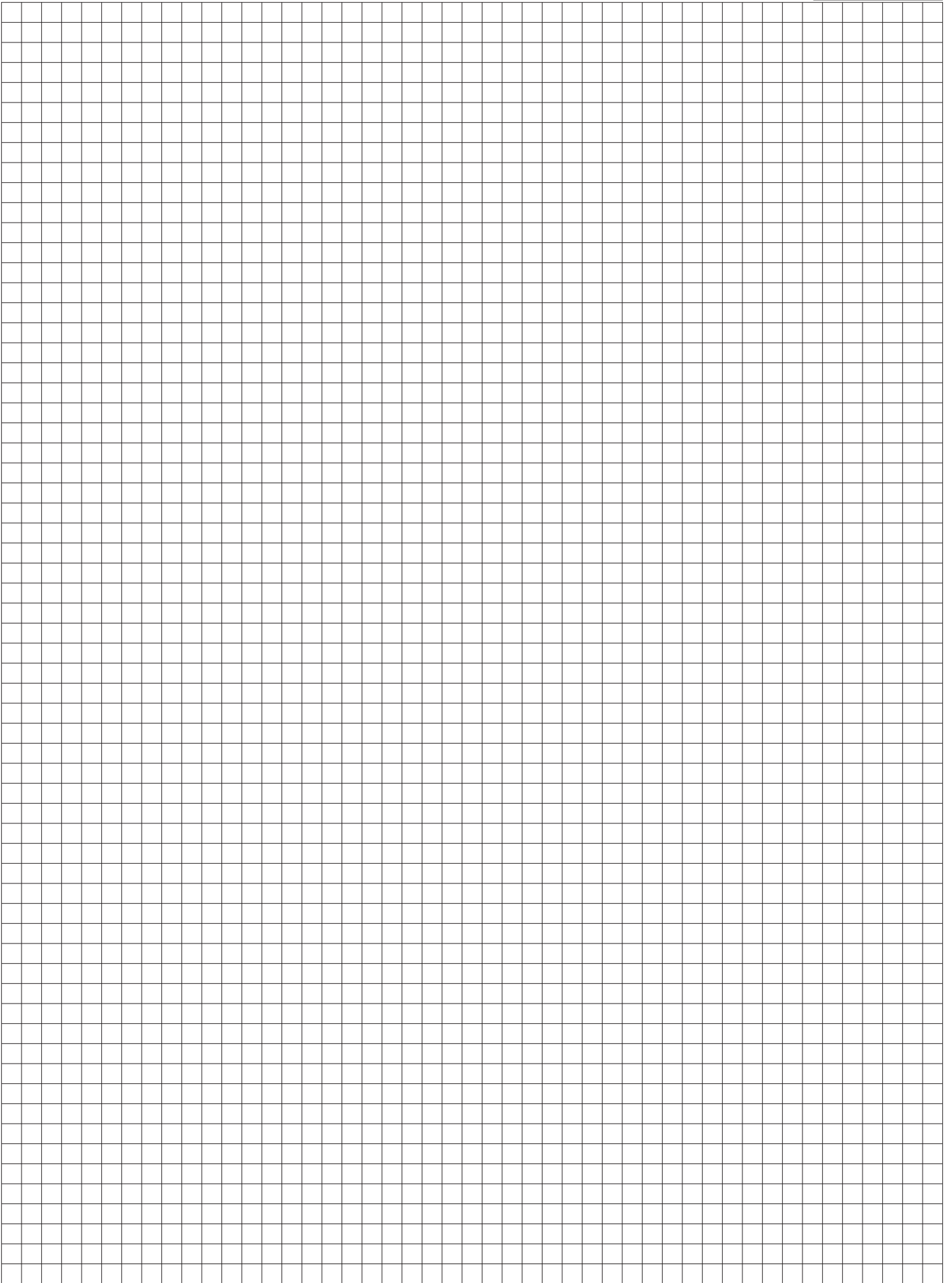
Code #: 1221

ACD Formulas
Pre-Calculus/Pre-Calculus PAP
2018-2019

Trigonometric Functions and Identities			
Pythagorean Theorem:	$a^2 + b^2 = c^2$		
Special Right Triangles:	30° - 60° - 90°	$x, x\sqrt{3}, 2x$	
	45° - 45° - 90°	$x, x, x\sqrt{2}$	
Law of Sines:	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$	Heron's Formula:	$A = \sqrt{s(s-a)(s-b)(s-c)}$
Law of Cosines:	$a^2 = b^2 + c^2 - 2bc \cos A$	$b^2 = a^2 + c^2 - 2ac \cos B$	$c^2 = a^2 + b^2 - 2ab \cos C$
Linear Speed:	$v = \frac{s}{t}$	Angular Speed:	$\omega = \frac{\theta}{t}$
Reciprocal Identities:	$\sin \theta = \frac{1}{\csc \theta}$	$\cos \theta = \frac{1}{\sec \theta}$	$\tan \theta = \frac{1}{\cot \theta}$
	$\csc \theta = \frac{1}{\sin \theta}$	$\sec \theta = \frac{1}{\cos \theta}$	$\cot \theta = \frac{1}{\tan \theta}$
Pythagorean Identities:	$\sin^2 \theta + \cos^2 \theta = 1$	$1 + \tan^2 \theta = \sec^2 \theta$	$1 + \cot^2 \theta = \csc^2 \theta$
Sum & Difference Identities:	$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$	$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$	
	$\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$	$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$	
Double-Angle Identities:	$\sin 2\theta = 2 \sin \theta \cos \theta$	$\cos 2\theta = \cos^2 \theta - \sin^2 \theta$	
	$\cos 2\theta = 2 \cos^2 \theta - 1$	$\cos 2\theta = 1 - 2 \sin^2 \theta$	
Sequences and Series			
The n^{th} Term of an Arithmetic Sequence:	$a_n = a_1 + (n-1)d$	The n^{th} Term of a Geometric Sequence:	$a_n = a_1 r^{n-1}$
Sum of a Finite Arithmetic Series:	$\sum_{k=1}^n a_k = \frac{n}{2}(a_1 + a_n)$	$S_n = \frac{n}{2}[2a_1 + (n-1)d]$	
Sum of a Finite Geometric Series:	$\sum_{k=1}^n a_k = \frac{a_1(1-r^n)}{1-r}, r \neq 1$	$S_n = \frac{a_1 - a_n r}{1-r}, r \neq 1$	
Sum of an Infinite Geometric Series:	$\sum_{n=1}^{\infty} a_n = \frac{a_1}{1-r}, r < 1$		
Binomial Theorem:	$(a+b)^n = {}_n C_0 a^n b^0 + {}_n C_1 a^{n-1} b^1 + {}_n C_2 a^{n-2} b^2 + \dots + {}_n C_r a^{n-r} b^r + \dots + {}_n C_n a^0 b^n$		
Permutations:	${}_n P_r = \frac{n!}{(n-r)!}$	Combinations:	${}_n C_r = \frac{n!}{(n-r)! r!}$
Projectile Motion			
Vertical Position:	$y = tv_0 \sin \theta - \frac{1}{2}gt^2 + h_0$	Horizontal Distance:	$x = tv_0 \cos \theta$
Vertical Free-Fall Motion:	$s(t) = -\frac{1}{2}gt^2 + v_0 t + s_0$	$v(t) = -gt + v_0$	$g \approx 32 \frac{\text{ft}}{\text{sec}^2} \approx 9.8 \frac{\text{m}}{\text{sec}^2}$

ACD Formulas
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Conic Sections	
Circle:	Standard Form: $(x - h)^2 + (y - k)^2 = r^2$
Parabola:	Standard Form: $(x - h)^2 = 4p(y - k)$ $(y - k)^2 = 4p(x - h)$
	Focus: $(h, k + p)$ $(h + p, k)$
	Directrix: $y = k - p$ $x = h - p$
Ellipse:	Standard Form: $\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$ $\frac{(x - h)^2}{b^2} + \frac{(y - k)^2}{a^2} = 1$
	Foci: $(h \pm c, k)$ $(h, k \pm c)$
	a, b, c Relationship: $c^2 = a^2 - b^2$ $c^2 = a^2 - b^2$
Hyperbola:	Standard Form: $\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$ $\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$
	Foci: $(h \pm c, k)$ $(h, k \pm c)$
	Asymptotes: $(y - k) = \pm \frac{b}{a}(x - h)$ $(y - k) = \pm \frac{a}{b}(x - h)$
	a, b, c Relationship: $c^2 = a^2 + b^2$ $c^2 = a^2 + b^2$
	Eccentricity: $e = \frac{c}{a}$ $e = \frac{c}{a}$
Exponential Functions	
Simple Interest:	$I = prt$
Compound Interest:	$A = P\left(1 + \frac{r}{n}\right)^{nt}$
Continuous Compound Interest:	$A = Pe^{rt}$
Exponential Growth or Decay:	$N = N_0(1 + r)^t$
Continuous Exponential Growth or Decay:	$N = N_0e^{kt}$
Coordinate Geometry	
Distance Formula:	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Slope of a Line:	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Midpoint Formula:	$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
Quadratic Equation: $ax^2 + bx + c = 0$	Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Slope-Intercept Form of a Line:	$y = mx + b$
Point-Slope Form of a Line:	$y - y_1 = m(x - x_1)$
Standard Form of a Line:	$Ax + By = C$



EXAMPLE ITEMS Pre-Calculus Pre-AP Key, Sem 1

Item#	Key	SE	SE Justification
1	A	P.2G	Graph functions, including exponential, and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a , b , c , d in mathematical problems.
2	B	P.2F	Graph piecewise defined functions.
3	C	P.2N	Analyze situations modeled by functions, including exponential functions, to solve real-world problems.
4	867	P.5C	Calculate the n th partial sum of an arithmetic series in mathematical problems.
5	A	P.2L	Determine various types of discontinuities in the interval $(-\infty, \infty)$ as they relate to functions.
6	B	P.5F	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.
7	A	P.2F	Graph rational functions.
8	D	P.5J	Solve polynomial equations with real coefficients by applying a variety of techniques in mathematical problems.
9	C	P.2N	Analyze situations modeled by functions, including logarithmic to solve real-world problems.
10	B	P.2I	Determine the key features of rational functions such as asymptotes.
11	C	P.5I	Solve exponential equations in real-world problems.
12	A	P.2I	Analyze the key features of polynomial functions such as relative maximum, relative minimum, zeros.
13	40.4	P.5E	Calculate the n th partial sum of a geometric series.
14	D	P.5I	Generate exponential equations in real-world problems.
15	B	P.2N	Analyze situations modeled by functions including rational to solve real-world problems.
16	D	P.2C	Represent a given function as a composite function of two functions.
17	A	P.2E	Determine an inverse function for a given function over its domain and represent the inverse using multiple representations.
18	D	P.2I	Analyze the key features of rational functions such as domain.
19	C	P.5H	Solve logarithmic equations in real-world problems.
20	D	P.2L	Determine various types of discontinuities in the interval $(-\infty, \infty)$ as they relate to functions.
21	B	P.5A	Evaluate finite sums written in sigma notation.
22	C	P.2G	Graph transformations, including $f(x) + d$, $f(x - c)$, for specific values of c , and d , in mathematical problems.