AP CALCULUS AB
Summer Assignment

The following questions are intended to review some of the necessary skills you will need to enter AP Calculus AB. Solve each of them in a separate piece of paper showing ALL WORK. We will go over all of them at the beginning of the course, but a grade will be given to those who has completed them in advance. Answers Key is attached along with this assignment to verify your solutions. Good Luck!!!

1. Let L represent the line $y = \frac{2}{3}x + 5$. **(a)** Graph L. Write the equation of the line through (1,0) that is **(b)** parallel to L, **(c)** perpendicular to L.

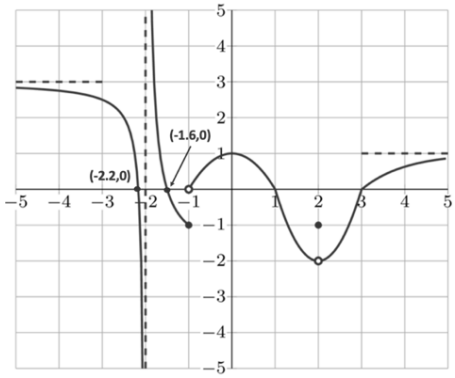
2. Find the slope and y-inetercept for the linear function described by the table.

x	-3	6	15
$f(x)$	6	9	12

3. Find the solutions of the following quadratic equations using **factoring**.

(a) $4x^2 + 6x = 0$ **(b)** $x^2 - 16x = 0$
(c) $9x^2 - 4x = 0$ **(d)** $x^2 - 1 = 0$
(d) $25x^2 - 16 = 0$ **(e)** $x^2 - 2x - 24 = 0$
(f) $x^2 - x - 6 = 0$ **(g)** $9x^2 - 6x + 1 = 0$
(h) $6x^2 + x - 2 = 0$ **(i)** $3x^2 = x + 4$
(j) $3x^2 + 45 = 24x$ **(k)** $2x^2 - 14x = 16$

4. Determine the following information from the given graph of the function f. **(a)** Domain and range **(c)** Intervals of increasing and decreasing **(d)** Intervals where $f(x) \geq 0$ **(e)** Intervals where f is discontinuous **(f)** x and y intercepts **(g)** Relative and absolute extrema **(h)** Intervals where f is concave up (down) **(i)** Points of inflection **(j)** Vertical and horizontal asymptotes of f **(k)** $f(2) =?$ **(l)** In how many point is $f(x) = 1$?



5. Graph the polynomial functions by using their end behavior, roots and multiplicity, and y-intercept.

(a) $f(x) = x^4 - 2x^2 + 1$
(b) $f(x) = x^3 + 2x^2 - 9x - 18$
(c) $f(x) = x^3 + x^2 - 4x - 4$
(d) $f(x) = x^4 - 9x^2$
(e) $f(x) = -x^4 + 16x^2$

6. Solve the following inequalities. Graph their solutions on the number line.

(a) $4x^2 - 4x + 1 \geq 0$ **(b)** $x^6 - 16x^4 \leq 0$
(c) $x^3 + 2x^2 - x - 2 \geq 0$

7. **Solve** the following absolute value and radical equations.

(a) $4|1 - 2x| - 20 = 0$ **(b)** $2\left|4 - \frac{5}{2}x\right| + 6 = 18$
(c) $\sqrt{3x + 18} = x$ **(d)** $\sqrt{x + 3} = x - 3$

8. Solve the following exponential equations.

(a) $8^{x+3} = 16^{x-1}$ **(b)** $8^{1-x} = 4^{x+2}$
(c) $e^{3x} + 5 = 6$ **(d)** $7e^{2x} - 5 = 5$

9. **Expand** or **condense** the following logarithmic expressions.

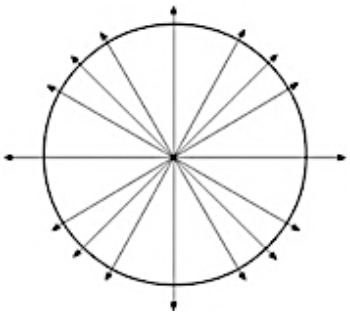
(a) $\boldsymbol{ln\left[\frac{x^4\sqrt[3]{x+5}}{(x-2)^2}\right]}$

(b) $\boldsymbol{\frac{1}{5}[5ln(x+9) - lnx - ln(x^2 - 9)]}$

10. Solve the following logarithmic equation.

(a) $\boldsymbol{\ln(3x) = 4}$ **(b)** $\boldsymbol{ln(4x - 1) = 3}$
(c) $\boldsymbol{ln\sqrt{2 - 7x} = 1}$. **(d)** $\boldsymbol{ln4 + \ln(1 - 2x) = 0}$

11. Fill the **Unit Circle** in radians and evaluate the following expressions.



(a) $\boldsymbol{\tan\left(\frac{2\pi}{3}\right)\tan\left(\frac{5\pi}{6}\right) + 2\sin\left(\frac{11\pi}{6}\right)}$
(b) $\boldsymbol{4\cos\left(\frac{\pi}{6}\right)\sin\left(\frac{4\pi}{3}\right) - 9tan\left(\frac{7\pi}{6}\right)tan\left(\frac{5\pi}{3}\right)}$

12. Solve the equations in the interval $0 \leq x < 2\pi$.

(a) $\boldsymbol{5sinx = 3sinx + \sqrt{3}}$
(b) $\boldsymbol{cos\,x + 2cosxsinx = 0}$

13. Sketch the graph of each of the parent functions. For trigonometric functions, graph two periods.

(a) $y = \sqrt{x} + 1$ **(b)** $y = e^{x-1}$ **(c)** $y = -lnx$
(d) $y = 2sinx$ **(e)** $y = -cosx$ **(f)** $y = \frac{1}{x+2} + 2$

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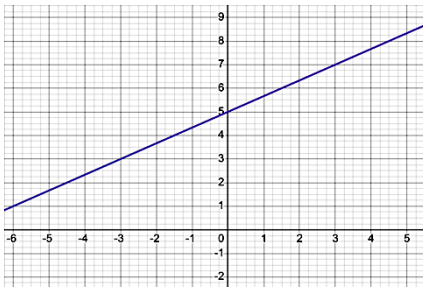
ANSWER KEY

1.(a)



(b) $y = \frac{2}{3}x - \frac{2}{3}$ **(c)** $y = -\frac{3}{2}x + \frac{3}{2}$

2. $y = \frac{1}{3}x + 7$

3. (a) $x = \left\{0, -\frac{3}{2}\right\}$ **(b)** $x = \{0, 16\}$

(c) $x = \left\{0, \frac{4}{9}\right\}$ **(e)** $x = \left\{-\frac{4}{5}, \frac{4}{5}\right\}$

(e) $x = \{6, -4\}$ **(f)** $x = \{3, -2\}$

(g) $x = \left\{\frac{1}{3}\right\}$ **(h)** $x = \left\{\frac{1}{2}, -\frac{2}{3}\right\}$

(i) $x = \left\{\frac{4}{3}, -1\right\}$ **(j)** $x = \{5,3\}$

(k) $x = \{8, -1\}$

4. $Domain = (-\infty, -2) \cup (-2, \infty)$

$Range = (-\infty, \infty)$

$f(x) \geq 0\ on\ (-\infty, -2.2] \cup (-2, -1.6] \cup [-1, 1] \cup [3, \infty)$

$f\ is\ discontinuous\ on\ x = -2, x = -1, x = 2$

$x - int = (-2.2, 0), (-1.6, 0), (1, 0), (3, 0)$

$y - int = (0, 1)$

$R.Max = (0, 1)$ $R.Min = none$

$A.Max = none$ $A.Min = none$

$C.Up = (-2, -1) \cup (-1, 3)$

$C.Down = (-\infty, -2) \cup (-1, 1) \cup (3, \infty)$

$P.Inf = (1, 0), (3, 0)$

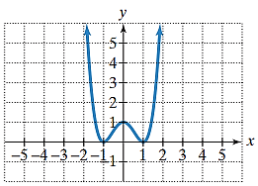
$V.Asymp: x = -2$

$H.Asymp: y = 3, y = 1$

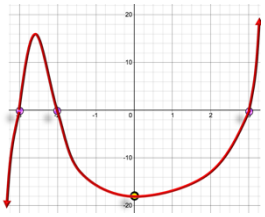
$f(2) = -1$

$f(x) = 1$ for 3 different x values.

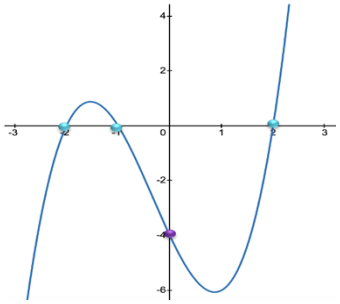
5. (a)



(b)



(c)



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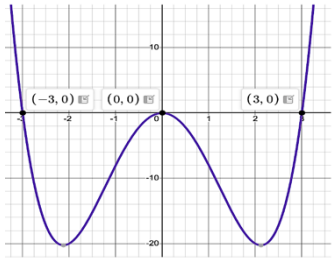

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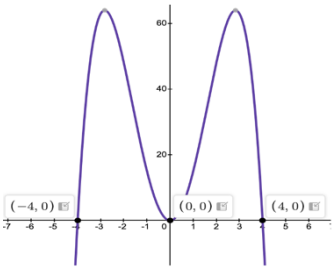


6. (a) $Solution = \left(-1, -\frac{3}{4}\right)$

(b) $Solution = [-4, 4]$ **(c)** $[-2, -1] \cup [1, \infty)$

7.(a) $x = \{-2,3\}$ **(b)** $x = \left\{-\frac{4}{5}, 4\right\}$

(c) $x = \{6\}$ **(d)** $x = \{6\}$

8. (a) $x = \{-5\}$ **(b)** $x = \left\{-\frac{1}{5}\right\}$

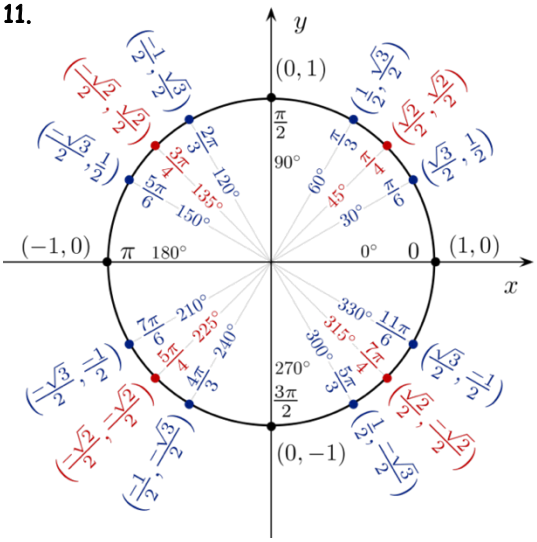
(c) $x = \{0\}$ **(d)** $\frac{1}{2} ln\left(\frac{10}{7}\right)$

9. (a) $4lnx + \frac{1}{3}\ln(x + 5) - 2\ln(x - 2)$

(b) $ln\left(\frac{(x+3)^4}{x^2 - 3x}\right)^{1/5}$

10. (a) $\frac{e^4}{3}$ **(b)** $\frac{e^3+1}{4}$ **(c)** $\frac{2-e^2}{7}$ **(d)** $\frac{3}{8}$

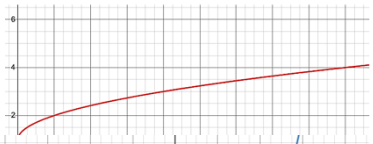
11.



(a) 0 (b) 6

12. (a) $x = \left\{\frac{\pi}{3}, \frac{2\pi}{3}\right\}$ (b) $x = \left\{\frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}$

13. (a)



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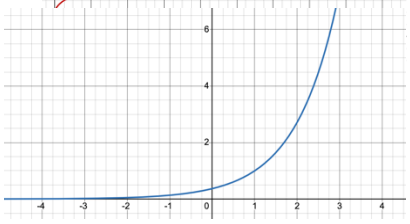
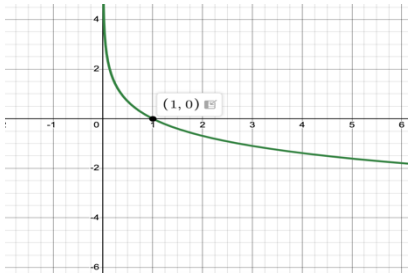


(c)



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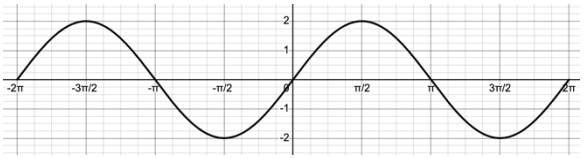

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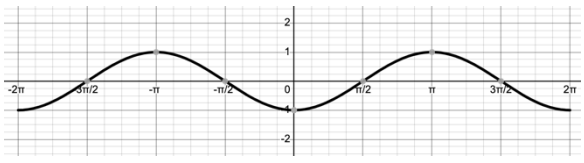

(f)