Name_____ **aafm13140185107590B5B55555555t3**

website   **www.alvarezmathhelp.com**

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the radical equation, and check all proposed solutions.

1) $\sqrt{30x + 15} = x + 8$

    A) {–7}   B) {8}   C) {–6}   D) {7}

1) _____

Objective: (1.6) Solve Radical Equations

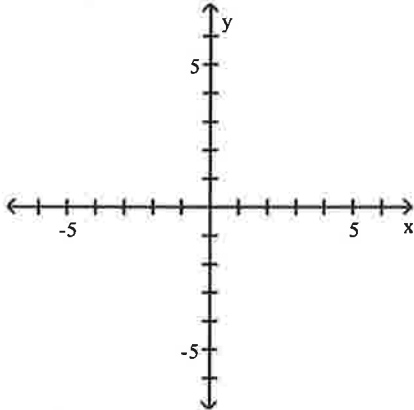ALVAREZ **VIDEO 9 S55–55**   **S29–29   S79–21   S67–21**
SULLIVAN147–49,76   M90–20   M75–20   M99–13   M57–11
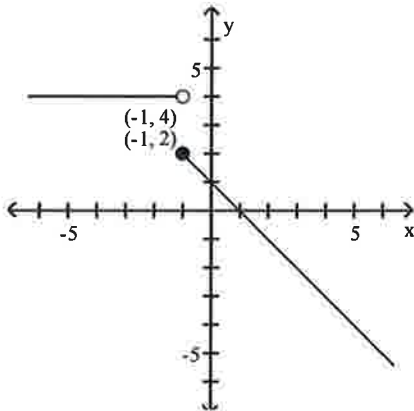**m49–3   m50–9   m102 #16   m44 #4 m37–5 m51–5**

Graph the function.

2) $f(x) = \begin{cases} x + 1 & \text{if } x < 1 \\ 4 & \text{if } x \geq 1 \end{cases}$
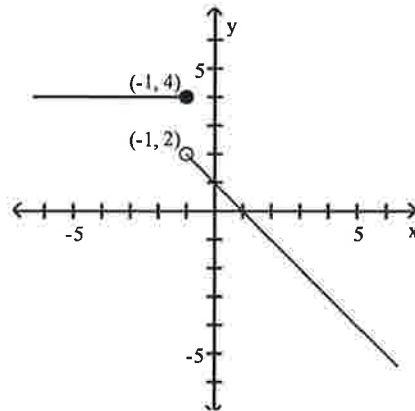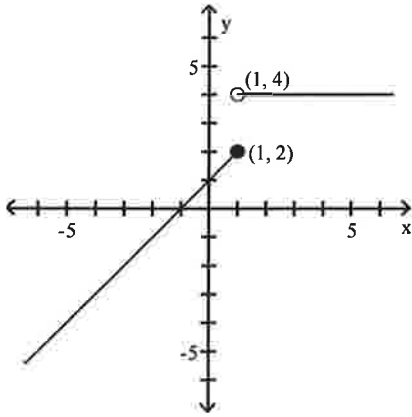
2) _____

A)

B)

C)

D)

ALVAREZ **VIDEO 17 S55–16,17** S54–16,17 S79–14 S67–14
**SULLIVAN147– 63,64 M90–27 M75–25 M57–12 m49–6
m50–10
m102 #24 m44 #5 m37–6 m51–8**

Find and simplify the difference quotient $\frac{f(x+h)-f(x)}{h}$, $h \neq 0$ for the given function.

3) $f(x) = x^2 + 5x + 6$

3) _____

A) $2x + h + 6$

B) $\dfrac{2x^2 + 2x + 2xh + h^2 + h + 12}{h}$

C) $2x + h + 5$

D) 1

ALVAREZ **VIDEO 18 S55–9** S54–9 S79–9 S67– 9
**SULLIVAN147–55 M90–28 M75–26 M99–23 M57–13 m49–7
m50–11 m102 #25
m44 #6 m37–7 m51–9**

Begin by graphing the standard absolute value function $f(x) = |x|$. Then use transformations of this graph to graph the given function.

4) $h(x) = |x - 3| - 3$

4) _____

2

A)

B)

C)

D)

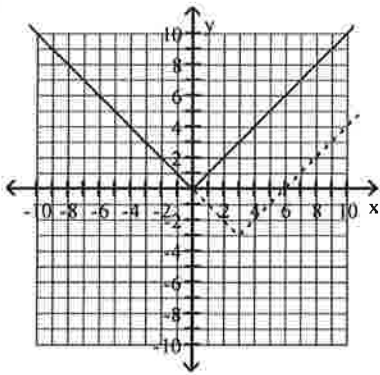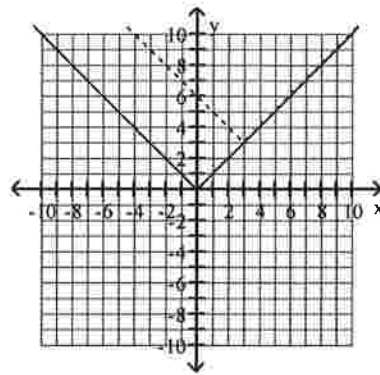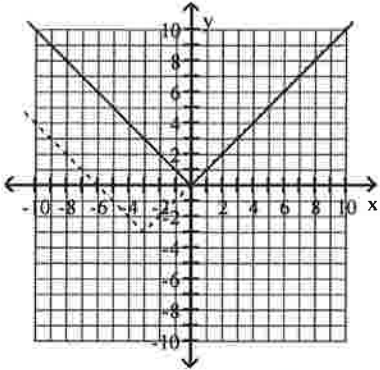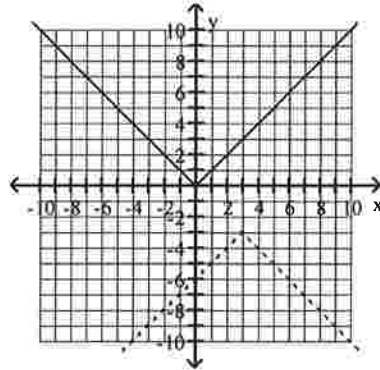Objective: (2.5) Use Horizontal Shifts to Graph Functions

ALVAREZ **VIDEO 21** <mark>**S55–19**</mark> **S54–19 S79–16   S67–16**
SULLIVAN147– 66   M90–36 M75–38   M99–15 M57–20 m49–8
m37–14 m51–19,20

Find the domain of the function.

5) $f(x) = \sqrt{18 - x}$ 　　　　　　　　　　　　　　　　　　　　　　5) _____

    A) $(-\infty, 18) \cup (18, \infty)$ 　　　　　　　　B) $(-\infty, 3\sqrt{2}]$
    C) $(-\infty, 18]$ 　　　　　　　　　　　　　D) $(-\infty, 3\sqrt{2}) \cup (3\sqrt{2}, \infty)$

Objective: (2.6) Find the Domain of a Function

ALVAREZ VIDEO 23 <mark>**S55–6**</mark> **S54–6 S79–6   S67–6 SULLIVAN147–52**
M90–38   M75–28   M99–31,32 M57–14 m49–9 m50–12 m102 #30 m44 #7
m37–8 m51–11

For the given functions f and g , find the indicated composition.

6) $f(x) = 4x^2 + 3x + 6,$ 　$g(x) = 3x - 4$ 　　　　　　　　　　6) _____
    $(g \circ f)(x)$
    A) $12x^2 + 9x + 22$ 　　　B) $12x^2 + 9x + 14$ 　　　C) $4x^2 + 9x + 14$ 　　　D) $4x^2 + 3x + 2$

Objective: (2.6) Form Composite Functions

ALVAREZ VIDEO 31 S55–7,8   S54–7–8 S79–37 S67–32 SULLIVAN147–108
M90–41   M75–31   M99–35,36,37 M57–16 m49–14 m50–14   m102 #35
m44 #9 m37–10 m51–13

Find the distance between the pair of points.

7) (–1, –3) and (–7, 5)

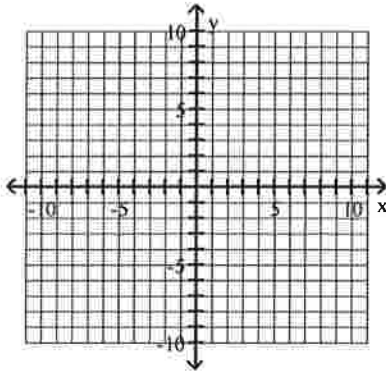   A) 10   B) 20   C) 11   D) 100

7) _____

ALVAREZ VIDEO 33 S55–3 S54–3 S79–1 S67–1 SULLIVAN147–43 M90–43 M75–33 M99–38 M57–17 m49–15 m50–15 m102 #38 m44 #10 m37–11 m51–14

Graph the equation.
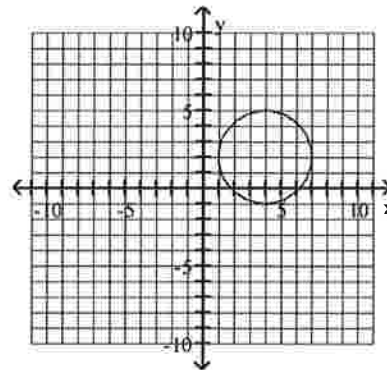
8) $x^2 + y^2 - 8x - 4y + 11 = 0$

8) _____

A)   B)

ALVAREZ VIDEO 36 S55–5 S54–5 S79–3 S67–3 SULLIVAN147–48 M90–45 M75–35 M99–40,41 M57–19 m49–17 m50–17 m102 #41 m44 #12 m37–13 m51–16

Solve the problem.

9) An arrow is fired into the air with an initial velocity of 160 feet per second. The height in feet of the arrow t seconds after it was shot into the air is given by the function $h(x) = -16t^2 + 160t$. Find the maximum height of the arrow.

    A) 1200 ft   B) 80 ft   C) 400 ft   D) 720 ft

9) _____

ALVAREZ VIDEO 39 S55–26 S54–26 S79–28 S67–27 SULLIVAN147–94 M90–51 M75–41 M99–43 M57–23 m49–20 m102 #44,45,46 m37–16 m51–17,18

Graph the polynomial function.

10) $f(x) = x^3 + 4x^2 + x - 6$ 10) _____

A)

B)

C)

D)

Objective: (3.2) Graph Polynomial Functions

ALVAREZ VIDEO 43 S55–27   S54–27 S79–29,30,31,32   S67–24,25
SULLIVAN147–62   M90–26   M75–24   M99–19 M57–28 m49–22 m50–23
m102 #50   m44 #18 m37–20 m51–7,25

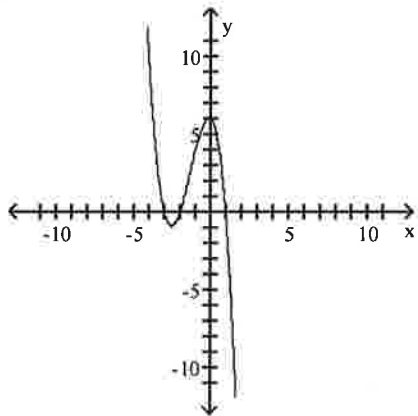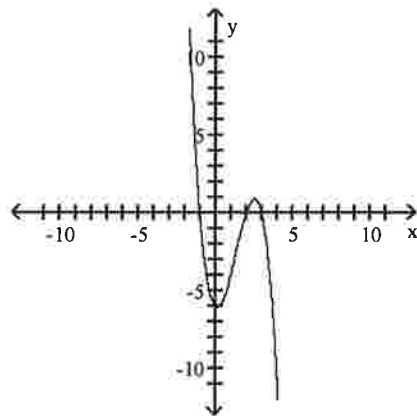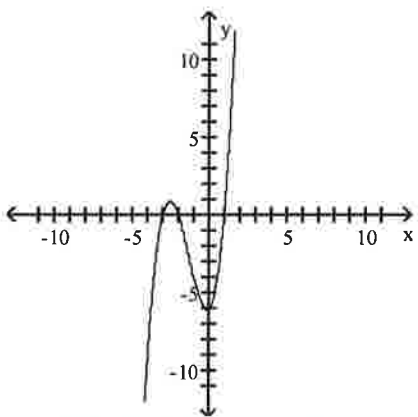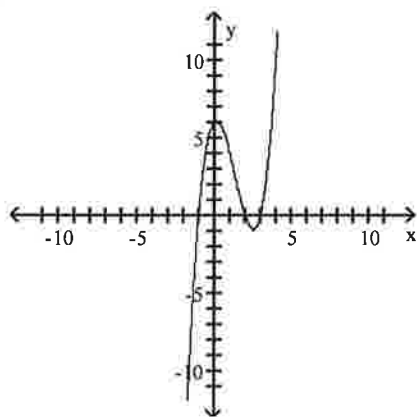**Solve the polynomial equation. In order to obtain the first root, use synthetic division to test the possible rational roots.**

11) $x^3 + 8x^2 - 18x + 20 = 0$

    A) {-10, 10}   B) {1 + i, 1 - i, 10i}   C) {1 + i, 1 - i, 10}   D) {1 + i, 1 - i, -10}

11) _____

Objective: (3.4) Solve Polynomial Equations

ALVAREZ VIDEO 49 S55–29 S54–29 S79–35 S67–30
SULLIVAN147–99,100,101 M90–55 M75–45 M99–48,49,50,51,53 M57–26
m49–24 m50–22 m102–50 m44–17 m37–17 m51–23,24,25

Find the vertical asymptotes, if any, of the graph of the rational function.

12) $\dfrac{x - 49}{x^2 - 7x + 10}$

    A) $x = 2, x = 5$ B) $x = -2, x = -5$
    C) $x = -49$ D) $x = 2, x = 5, x = -49$

12) _____

Objective: (3.5) Identify Vertical Asymptotes

ALVAREZ VIDEO 54 S55–30 S54–30 S79–36 S67–31
SULLIVAN147–103,104 M90–57 M75–47 M99–58,59,60,61 m49–27 m50–26
m102 #56 m44 #21 m37–22 m51–27,28

Find the slant asymptote, if any, of the graph of the rational function.

13) $f(x) = \dfrac{x^2 + 6x - 5}{x - 4}$

    A) $y = x + 6$ B) $y = x$
    C) $y = x + 10$ D) no slant asymptote

13) _____

Objective: (3.5) Identify Slant Asymptotes

ALVAREZ VIDEO 57 M90–61 A ONLY M75–51 A ONLY M99–57 M57–30
m49–30 m50–25 m102 #58 m44 #20 m37–21 m51–26

Find the domain of the logarithmic function.

14) $f(x) = \ln(8 - x)$

    A) $(-\infty, 8)$ B) $(-8, \infty)$ C) $(-\infty, 0)$ D) $(-\infty, 8)$ or $(8, \infty)$

14) _____

Objective: (4.2) Find the Domain of a Logarithmic Function

ALVAREZ VIDEO 63 S55–36 S54–36 S79–44,46,47,53 S67–39,41,47a
SULLIVAN147–118 M90–64 M75–54 M99–66 M57–35 m49–31 m50–30
m102 #61 m44 #24 m37–25 m51–31

Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

15) $\log\left[\dfrac{4x^4\sqrt[3]{5-x}}{6(x+5)^2}\right]$

15) _____

   A) $\log 4 + 4\log x + \dfrac{1}{3}\log(5-x) - \log 6 + 2\log(x+5)$

   B) $\log 4 + \log x^4 + \log(5-x)^{1/3} - \log 6 - \log(x+5)^2$

   C) $\log(4x^4\sqrt[3]{5-x}) - \log(6(x+5)^2)$

   D) $\log 4 + 4\log x + \dfrac{1}{3}\log(5-x) - \log 6 - 2\log(x+5)$

Objective: (4.3) Expand Logarithmic Expressions

ALVAREZ VIDEO 67 S55–40 S54–40 S79–59,60 S67–50,51
SULLIVAN147–123,124 M90–66 M75–56 M99–67,68,69,70 M57–36–37
m49–32 m50–31,32 m102–62,63,64 m44–25,26 #62,63,64 m44 25,26 m37–26,27
m51–32,33

Solve the equation by expressing each side as a power of the same base and then equating exponents.

16) $16^{x+7} = 64^{x-10}$

16) _____

   A) {24}   B) {44}   C) {37}   D) {17}

Objective: (4.4) Use Like Bases to Solve Exponential Equations

ALVAREZ VIDEO 70 S55–33 S54–33 S79–39 S67–34 SULLIVAN147–113
M90–67 M75–57 M99–73 M57–38 m49–33 m50–33 m102 #65 m44 #27
m37–28 m51–34

Solve the exponential equation. Use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

17) $3^{x+6} = 8$

17) _____

   A) –4.11   B) 6.53   C) 1.31   D) –0.35

Objective: (4.4) Use Logarithms to Solve Exponential Equations

ALVAREZ VIDEO 73 S55–44 S54–44 S79–52,66 S67–46,56
SULLIVAN147–130,131,132 M90–69 M75–59 M99–77 M57–39 M50–34
m37–29 m51–36

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

18) $\log_4(x-1) + \log_4(x-7) = 2$

18) _____

   A) {9, –1}   B) {9}   C) {10}   D) {–1}

Objective: (4.4) Use the Definition of a Logarithm to Solve Logarithmic Equations

ALVAREZ VIDEO 76 S55–42 S54–42 S79–62 S67–53
SULLIVAN147–127,129 M90–72 M75–62 M99–78 M57–40 M49–37
M50–35 M102 #75 M44 #30 m37–30 m51–38

19) $\log (4 + x) - \log (x - 4) = \log 3$ 19) _____

    A) {8}   B) $\left\{\dfrac{3}{2}\right\}$ C) {-8}   D) ∅

20) $\ln x + \ln (x - 1) = \ln 72$ 20) _____

    A) {9, -8}   B) {-8}   C) $\left\{\dfrac{73}{2}\right\}$ D) {9}

Solve the problem.

21) Find out how long it takes a $3100 investment to double if it is invested at 8% compounded   21) _____

    semiannually. Round to the nearest tenth of a year. Use the formula $A = P\left(1 + \dfrac{r}{n}\right)^{nt}$.

    A) 8.8 years   B) 9 years   C) 8.6 years   D) 9.2 years

22) The population of a certain country is growing at a rate of 2.1% per year. How long will it take for   22) _____

    this country's population to double? Use the formula $t = \dfrac{\ln 2}{k}$, which gives the time, t, for a

    population with growth rate k, to double. (Round to the nearest whole year.)

    A) 33 years   B) 32 years   C) 34 years   D) 35 years

Solve the system of equations.

23) $x + y + z = 2$ 23) _____
    $x - y + 2z = -1$
    $2x + y + z = 1$
    A) {(2, -1, 1)}   B) {(-1, 2, 1)}   C) {(1, 2, -1)}   D) {(1, -1, 2)}

Find the indicated sum.

24) $\displaystyle\sum_{i=3}^{5} (i^2 + 6)$

24) _____

    A) 42   B) 68   C) 85   D) 30

Objective: (8.1) Use Summation Notation

ALVAREZ VIDEO 98 S55–53 S54–53 S79–78 S67–66 SULLIVAN35–34 M90–88 M75–73 M99–94,95 M57–52 m49–47 m50–45 m102 #96 m44 #39 m37–36 m51–49

Write the first three terms in the binomial expansion, expressing the result in simplified form.

25) $(x + 2)^{16}$

25) _____

    A) $x^{16} + 30x^{15} + 960x^{14}$ B) $x^{16} + 32x^{15} + 480x^{14}$

    C) $x^{16} + 30x^{15} + 480x^{14}$ D) $x^{16} + 32x^{15} + 960x^{14}$

Objective: (8.5) Find a Particular Term in a Binomial Expansion

ALVAREZ VIDEO 100 S55–54 S54–54 S79–79 S67–67 SULLIVAN147–147 M90–90 M75–75 M99–96,97,98,99 M57–56 M49–49 M50–49 M102 #100,101 M44 #40 m37–37 m51–50,51

1) D
2) D
3) C
4) A
5) C
6) B
7) A
8) B
9) C
10) C
11) D
12) A
13) C
14) A
15) D
16) B
17) A
18) B
19) A
20) D
21) A
22) A
23) B
24) B
25) B