

Name \_\_\_\_\_ **aafm1314018507590BBt2**

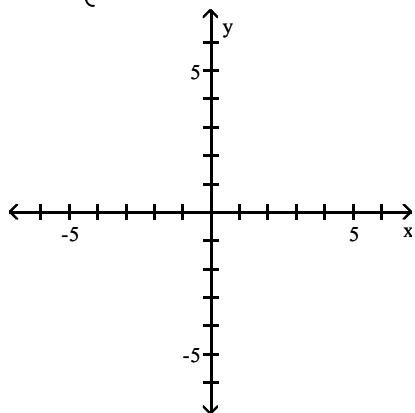
website **www.alvarezmathhelp.com**

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

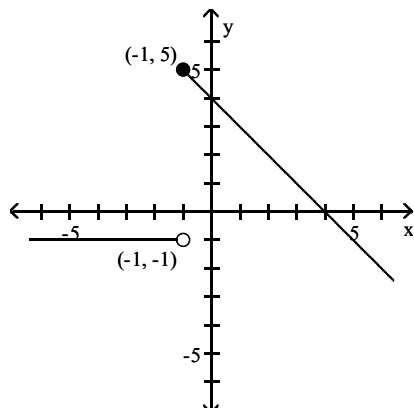
**Graph the function.**

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

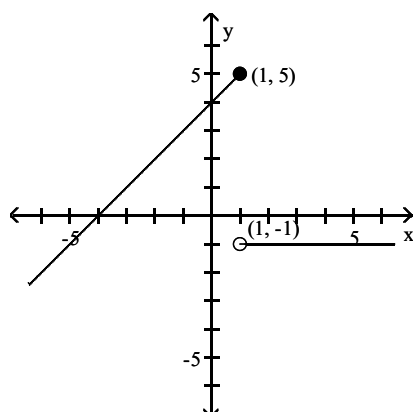
1) \_\_\_\_\_



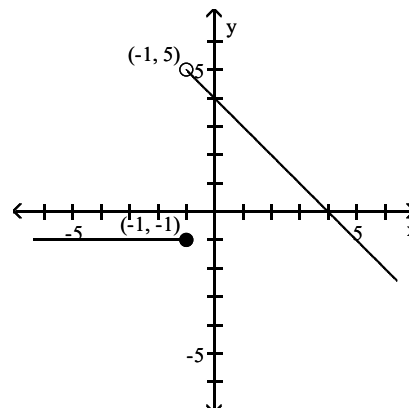
A)



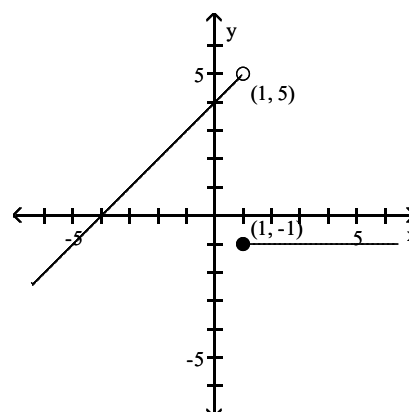
C)



B)



D)



Objective: (2.2) Understand and Use Piecewise Functions

ALVAREZ--VIDEO 17 S79-14 S67-14 SULLIVAN147- 63,64  
M90-27 M75-25 M99-20,21,22 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.

2)  $f(x) = x^2 + 6x + 4$

2) \_\_\_\_\_

A)  $2x + h + 4$

B)  $\frac{2x^2 + 2x + 2xh + h^2 + h + 8}{h}$

C)  $2x + h + 6$

D) 1

Objective: (2.2) Find and Simplify a Function's Difference Quotient

ALVAREZ--VIDEO 18 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

Find the domain of the function.

3)  $f(x) = \sqrt{19 - x}$

3) \_\_\_\_\_

A)  $(-\infty, 19) \cup (19, \infty)$

B)  $(-\infty, \sqrt{19}]$

C)  $(-\infty, 19]$

D)  $(-\infty, \sqrt{19}) \cup (\sqrt{19}, \infty)$

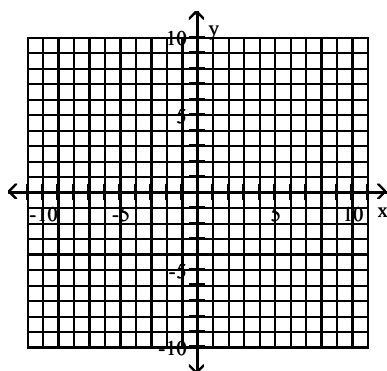
Objective: (2.6) Find the Domain of a Function

ALVAREZ--VIDEO 23 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

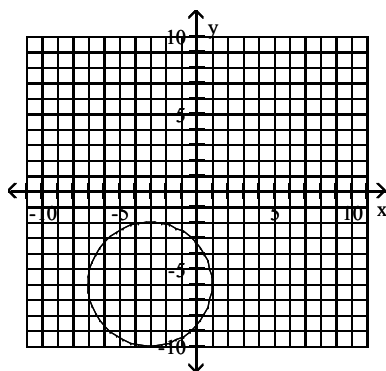
Graph the equation.

4)  $x^2 + y^2 - 6x - 12y + 29 = 0$

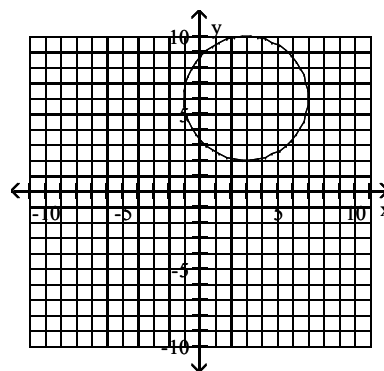
4) \_\_\_\_\_



A)



B)



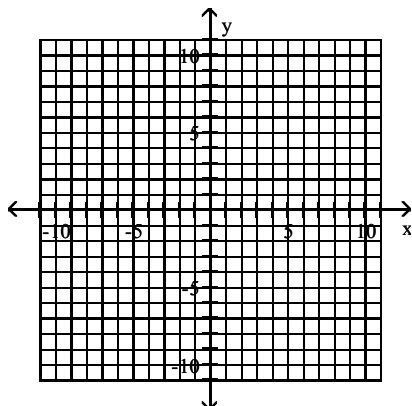
Objective: (2.8) Convert the General Form of a Circle's Equation to Standard Form

ALVAREZ--VIDEO 36 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

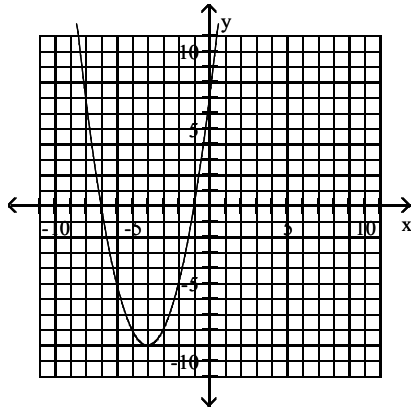
Use the vertex and intercepts to sketch the graph of the quadratic function.

5)  $f(x) = -x^2 - 8x - 7$

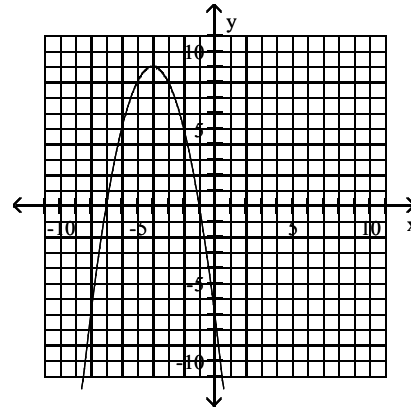
5) \_\_\_\_\_



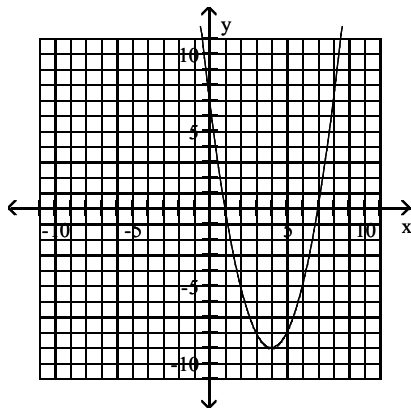
A)



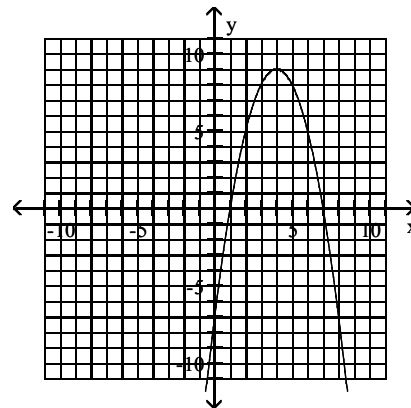
B)



C)



D)



Objective: (3.1) Graph Parabolas

ALVAREZ--VIDEO 38 S79-24,25,26 S67-24,25 SULLIVAN147-  
 81,82,83,85,86,87,88,89,90,91 M90-50 M75-40  
 M99-30,42,43,44,45,46,47,54,55 M57-22-23 m49-19 m50-20,21 m102  
 #43 m44 #13,14,15,16 m37-16 m51-21,22

Solve the problem.

- 6) An arrow is fired into the air with an initial velocity of 64 feet per second. The height in feet of the arrow  $t$  seconds after it was shot into the air is given by the function  $h(x) = -16t^2 + 64t$ . Find the maximum height of the arrow. 6) \_\_\_\_\_
- A) 192 ft      B) 32 ft      C) 64 ft      D) 96 ft

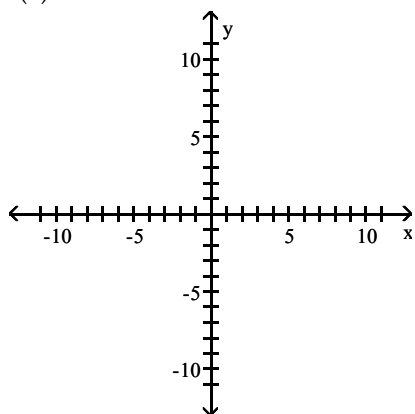
Objective: (3.1) Solve Problems Involving a Quadratic Function's Minimum or Maximum Value

ALVAREZ--VIDEO 39 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

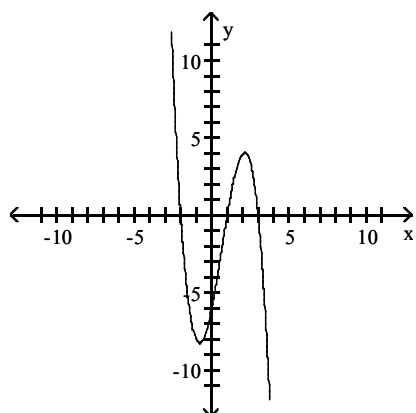
Graph the polynomial function.

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

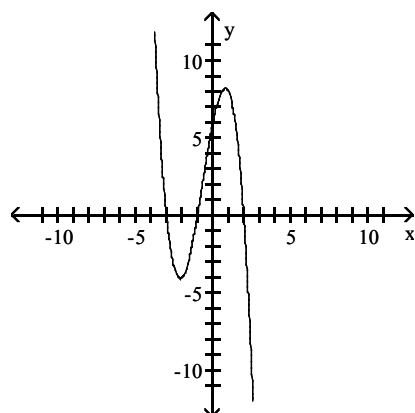
7) \_\_\_\_\_



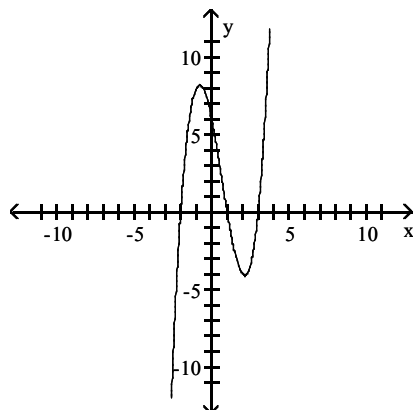
A)



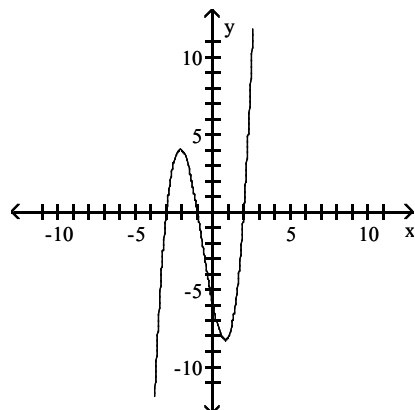
B)



C)



D)



Objective: (3.2) Graph Polynomial Functions

**ALVAREZ--VIDEO 43 S79-29,30,31,32**

**S67-24,25**

**SULLIVAN147-62 M90-26 M75-24**

**M99-19 M57-28 m102**

**#50 m44 #18 m37-20 m51-7,25**

Use synthetic division to show that the number given to the right of the equation is a solution of the equation, then solve the polynomial equation.

8)  $x^3 - 3x^2 - 10x + 24 = 0$ ; 2

A) {4, 3, 2}

B) {-4, 3, 2}

C) {-4, -3, 2}

D) {4, -3, 2}

8) \_\_\_\_\_

Objective: (3.3) Use the Factor Theorem to Solve a Polynomial Equation

**ALVAREZ--VIDEO 45 S79-33 S67-28**

**SULLIVAN147-99,100,101 M90-53 M75-43**

**M99-48,49,50,51,53 M57-25 m49-23 m50-22 m102 #54 m44#17**

**m37-17 m51-23,24,25**

Find a rational zero of the polynomial function and use it to find all the zeros of the function.

9)  $f(x) = x^3 - 7x^2 + 19x - 13$

A)  $\{-1, 3 + \sqrt{2}, 6 - \sqrt{2}\}$

B)  $\{1, 2 + \sqrt{2}, 2 - \sqrt{2}\}$

C)  $\{1, 3 + 2i, 3 - 2i\}$

D)  $\{1, 2 + 3i, 2 - 3i\}$

9) \_\_\_\_\_

Objective: (3.4) Find Zeros of a Polynomial Function

**ALVAREZ--VIDEO 47 S79-35 S67-29,30**

**SULLIVAN147-99,100,101 M90-55 M75-45 M99-52 M57-26**

**m49-24 m50-23 m102 #54 m44 #18 m37-19 m51-23,24,25**

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

10)  $\frac{x - 36}{x^2 - 11x + 24}$

A)  $x = 8, x = 3$

B)  $x = -8, x = -3$

C)  $x = -36$

D)  $x = 8, x = 3, x = -36$

10) \_\_\_\_\_

Objective: (3.5) Identify Vertical Asymptotes

**ALVAREZ--VIDEO 54 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 horizontal asymptote, if any, of the graph of the rational function.

11)  $g(x) = \frac{5x^2 - 8x - 7}{9x^2 - 3x + 3}$

A)  $y = \frac{8}{3}$

B)  $y = 0$

C)  $y = \frac{5}{9}$

D) no horizontal asymptote

11) \_\_\_\_\_

Objective: (3.5) Identify Horizontal Asymptotes

**ALVAREZ--VIDEO 56 S79-36 S67-31 SULLIVAN147-103,104**

**M90-60 M75-50 M99-56,62,63,64,65 M57-33 m49-29 m50-28**

**m102 #57 m44 #23 m37-24 m51-29,30**

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

12)  $f(x) = \frac{x^2 + 2x - 2}{x - 8}$

12) \_\_\_\_\_

A)  $y = x + 2$

B)  $y = x$

C)  $y = x + 10$

D) no slant asymptote

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**

Solve the problem.

- 13) The size of the beaver population at a national park increases at the rate of 5.1% per year. If the size of the current population is 180, find how many beavers there should be in 4 years. Use the function  $f(x) = 180e^{0.051t}$  and round to the nearest whole number.

13) \_\_\_\_\_

A) 223

B) 221

C) 225

D) 219

Objective: (4.1) Evaluate Functions with Base e

**ALVAREZ--VIDEO 60 S79-43 S67-38 SULLIVAN147-117 M90-80  
M75-68 M57-46 m50-29 m51-44**

- 14) The function  $D(h) = 6e^{-0.4h}$  can be used to determine the milligrams D of a certain drug in a patient's bloodstream h hours after the drug has been given. How many milligrams (to two decimals) will be present after 8 hours?

14) \_\_\_\_\_

A) 0.24 mg

B) 0.73 mg

C) 4.19 mg

D) 147.20 mg

Objective: (4.1) Evaluate Functions with Base e

**ALVAREZ--VIDEO 62 S79-43 S67-38 SULLIVAN147-117 M90-80  
M75-68 M99-87 M57-46 m50-29 m51-44**

Find the domain of the logarithmic function.

15)  $f(x) = \ln(2 - x)$

15) \_\_\_\_\_

A)  $(-\infty, 2)$

B)  $(-2, \infty)$

C)  $(-\infty, 0)$

D)  $(-\infty, 2)$  or  $(2, \infty)$

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

**ALVAREZ--VIDEO 63 S79-44,46,47,53 S67-39,41,47a  
SULLIVAN147-118 M90-64 M75-54 M99-66 M57-35  
m49-31 m50-30  
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.

16)  $\log_a \left( \frac{x^4 \sqrt[3]{x+5}}{(x-2)^2} \right)$  16) \_\_\_\_\_

A)  $4 \log_a x + \frac{1}{3} \log_a (x+5) - 2 \log_a (x-2)$

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

C)  $\log_a x^4 + \log_a (x+5)^{-3} - \log_a (x-2)^2$

D)  $4 \log_a x - 3 \log_a (x+5) - 2 \log_a (x-2)$

Objective: (4.3) Expand Logarithmic Expressions

**ALVAREZ--VIDEO 66 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 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.

17)  $25^x + 7 = 125^x - 2$

A) {16}

B) {20}

C) {13}

D) {9}

17) \_\_\_\_\_

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

**ALVAREZ--VIDEO 70 S79-39 S67-34 SULLIVAN147-113**

**M90-67 M75-57 M99-73 M57-38 m49-33 m50-33 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.

18)  $3^{x+6} = 8$

A) -4.11

B) 6.53

C) 1.31

D) -0.35

18) \_\_\_\_\_

Objective: (4.4) Use Logarithms to Solve Exponential Equations

**ALVAREZ VIDEO 73 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.

19)  $\log_4 (x+4) + \log_4 (x-2) = 2$

A) {4, -6}

B) {4}

C) {5}

D) {-6}

19) \_\_\_\_\_

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

**ALVAREZ--VIDEO 76 S79-62 S67-53 SULLIVAN147-127,129**

**M90-72 M75-62 M99-78 M57-40 m49-37 m50-35,36,37 m44**

**#30 m37-30 m51-38**

20)  $\log (4+x) - \log (x-4) = \log 3$

A) {8}

B)  $\left\{ \frac{3}{2} \right\}$

C) {-8}

D)  $\emptyset$

20) \_\_\_\_\_

Objective: (4.4) Use the One-to-One Property of Logarithms to Solve Logarithmic Equations

**ALVAREZ VIDEO79 S79-63,65 S67-54 SULLIVAN147-128 M90-73**

**M75-63 M99-80 M57-42 M50-37 m37-32 m51-40**

21)  $\ln x + \ln (x - 1) = \ln 12$

A)  $\{4, -3\}$

B)  $\{-3\}$

C)  $\left\{\frac{13}{2}\right\}$

D)  $\{4\}$

21) \_\_\_\_\_

Objective: (4.4) Use the One-to-One Property of Logarithms to Solve Logarithmic Equations

**ALVAERZ--VIDEO 80 S79-64 S67-55 SULLIVAN147-127**  
**M90-76 M75-65 M99-79,81 M57-43 m49-41 m50-38**  
**m44 #32 m37-33 m51-41**

Solve the problem.

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

22) \_\_\_\_\_

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

A) 8.8 years

B) 9 years

C) 8.6 years

D) 9.2 years

Objective: (4.4) Solve Applied Problems Involving Exponential and Logarithmic Equations

**ALVAREZ VIDEO81 S79-70 S67-59 SULLIVAN35-29 M90-77 M75-66**  
**M99-84 M57-44 M50-39 m37-34 m51-43**

23) The function  $A = A_0e^{-0.00693x}$  models the amount in pounds of a particular radioactive material stored in a concrete vault, where  $x$  is the number of years since the material was put into the vault. If 700 pounds of the material are placed in the vault, how much time will need to pass for only 375 pounds to remain?

23) \_\_\_\_\_

A) 100 years

B) 180 years

C) 90 years

D) 95 years

Objective: (4.4) Solve Applied Problems Involving Exponential and Logarithmic Equations

**ALVAREZ--VIDEO 83 S79-71 S67-45 SULLIVAN147-136**  
**M90-81 M75-69 M99-74,75,76,82,85,86,88 M57-48 m49-43**  
**m50-40 m44 #34 m51-42,45**

24) The population of a certain country is growing at a rate of 2.6% per year. How long will it take for this country's population to double? Use the formula  $t = \frac{\ln 2}{k}$ , which gives the time,  $t$ , for a population with growth rate  $k$ , to double. (Round to the nearest whole year.)

24) \_\_\_\_\_

A) 27 years

B) 26 years

C) 28 years

D) 29 years

Objective: (4.4) Solve Applied Problems Involving Exponential and Logarithmic Equations

**ALVAREZ--VIDEO 84 S79-70 S67-59 SULLIVAN35-29**  
**SULLIVAN147-136,140 M90-83 M75-70 M57-48 m49-44**  
**m50-43 m44 #37 m51-46**

Solve.

25) A fossilized leaf contains 9% of its normal amount of carbon 14. How old is the fossil (to the nearest year)? Use 5600 years as the half-life of carbon 14.

25) \_\_\_\_\_

A) 36,378

B) 19,419

C) 761

D) 17,720

Objective: (4.5) Model Exponential Growth and Decay

**ALVAREZ--VIDEO 87 S79-73,74 S67-62 SULLIVAN147-141,142**  
**M90-81 ANOTHER METHOD M57-47 m51-45**

## Answer Key

Testname: AAFM1314SULL079T2SU

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