

# SUNY: REVIEW FOR COLLEGE ALGEBRA PLACEMENT EXAM

## SOLUTIONS:

1.  $x + \frac{1}{x} - 3 = \frac{1}{4} + \frac{1}{\frac{1}{4}} - 3 = \frac{1}{4} + \left(\frac{4}{1}\right) \cdot 1 - 3$   
 $\left[ x = \frac{1}{4} \right]$  SUBSTITUTE  $= \frac{1}{4} + 4 - 3 = \left[ \frac{5}{4} \right] \rightarrow 1 \frac{1}{4}$   $\boxed{D}$

2.  $\sqrt{169y^2 - 25y^2} = \sqrt{144y^2} = \boxed{12y}$   $\boxed{C}$   
↑  
LIKE TERMS

NOT INCORRECT  $\rightarrow 13y - 5y$

3.  $\frac{5}{5t} + \frac{5}{3t}$  NEED COMMON DENOMINATOR TO ADD FRACTIONS  
CD = "15t"  
 $= \left(\frac{3}{3}\right) \frac{5}{5t} + \frac{5}{3t} \left(\frac{5}{5}\right) = \frac{35}{15t} + \frac{55}{15t} = \left[ \frac{85}{15t} \right]$   $\boxed{B}$

4.  $\frac{x}{3} + 1 = \frac{7}{4}$   
-1 -1  
 $\frac{7}{4} - 1 = \frac{7}{4} - \frac{4}{4} = \frac{3}{4}$

$\frac{x}{3} = \frac{3}{4}$  CROSS-MULT

$4x = 9$   
 $\left[ x = \frac{9}{4} \right]$   $\boxed{B}$

5.

$$\left(\sqrt[3]{64}\right)^2 = 4^2 = 16$$

$$(64)^{\frac{2}{3}} (6)^{\frac{3}{4}} = 16 \cdot 8 = \boxed{128} \quad \boxed{B}$$

$$\left(\sqrt[4]{16}\right)^3 = 2^3 = 8$$

$$8(16) = 8(10+6) = 80 + 48 = 128$$

6.  $f(y) = y^2 - ky - 5$

$$f(2) = 7$$

$\uparrow$        $\uparrow$       PLUG-IN  
 INPUT    OUTPUT

$$7 = (2)^2 - k(2) - 5$$

$$7 = 4 - 2k - 5$$

$$7 = -1 - 2k$$

$$8 = -2k$$

$$\boxed{-4 = k} \quad \boxed{A}$$

7.

G.C.F. of 16

$$\frac{x+3}{x^2-16} \cdot \frac{16k+64}{4x+12} = \frac{x+3}{(x+4)(x-4)} \cdot \frac{16(x+4)}{4(x+3)} = \frac{4}{x-4} \quad \boxed{B}$$

DIFF OF 2 PERFECT SQUARES      FACTOR      "DIVIDE OUT"

8.

$$\log_{10} t = 5$$

$$10^5 = 1,00,000 \quad \text{5 zeros}$$

$$10^5 = t$$

$$\boxed{100,000 = t} \quad \boxed{A}$$

(9)  $\log_4(64) = x$

$$4^x = 64$$

$$4^x = 4^3$$

$x = 3$

A

(10) PICK A NUMBER GREATER THAN 5 & PLUG IN TO EVERYTHING

$$|5-6| = |-1| = 1 \quad \text{e) } -5+6 = 1 \quad \checkmark$$

↑  
ABS. VALUE

~~a) 0~~   ~~b) 5-6 = -1~~   ~~c) 5+6 = 11~~   ~~d) -5-6 = -11~~

OR ABS. VALUE → TWO EQUATIONS

$$5-x \quad \text{OR} \quad -(5-x) = -5+x$$

(11)  $p(x+q) = qx - s$

$$px + pq = qx - s$$

$$pq + s = qx - px$$

$$pq + s = x(q-p)$$

$$\frac{pq+s}{q-p} = \frac{x(q-p)}{q-p}$$

- DISTRIBUTE
  - BRING ALL TERMS w/  $x^a$  TO ONE SIDE
  - FACTOR OUT  $x$
  - DIVIDE OUT  $q-p$
- $x = \frac{pq+s}{q-p}$
- A

12.  $\frac{1}{1+\sqrt{3}} \cdot \frac{1-\sqrt{3}}{1-\sqrt{3}} = \frac{(-\sqrt{3})}{1+\sqrt{3}-\sqrt{3}-3} = \frac{(-\sqrt{3})}{-2}$

↑  
RATIONALIZE w/ CONJUGATE

FACTOR OUT -1 FROM TOP & BOTTOM

$$= \frac{-1(\sqrt{3}-1)}{-1 \cdot 2} = \left[ \frac{\sqrt{3}-1}{2} \right]$$

C

13.  $x^2 + 2x = -10$

$x^2 + 2x + 10 = 0$

$b^2 - 4ac = (2)^2 - 4(1)(10)$

$= -36 \rightarrow$  IMAGINARY ROOTS

ELIMINATE a, b, d

$\sqrt{-36} = \sqrt{36}\sqrt{-1}$   
 $= 6i$

$x = \frac{-(+2) \pm \sqrt{-36}}{2(1)} = \frac{-2 \pm 6i}{2} = \frac{-2}{2} \pm \frac{6i}{2} = -1 \pm 3i$

$x_1 = -1 + 3i$

$x_2 = -1 - 3i$  [C]

14.  $\begin{array}{r|rrrr} 3 & x^3 & x^2 & x & \# \\ & 1 & 0 & 0 & -27 \end{array}$

synthetic division

$\begin{array}{r} 3 \quad 9 \quad 27 \\ \hline 1 \quad 3 \quad 9 \quad 0 \end{array}$

$x^2 + 3x + 9$  [E]

15.  $3^x = 2$

$\log_3 3^x = \log_3 2$

$x \log_3 3 = \log_3 2$

$x = \frac{\log_3 2}{\log_3 3} = \log_3 2$  [D]

USE DEFINITION OF LOG

$\log_3 2 = x \Rightarrow \log_3 2 = x$  [D]

$3^x = 2$

16.  $x^2 - 13x - 14 < 0$  [ < 0 ]  $\rightarrow$  negative

$(x-14)(x+1) = 0$  FIND ROOTS

$\begin{array}{l} x-14=0 \quad | \quad x+1=0 \\ x=14 \quad \quad | \quad x=-1 \end{array}$   $-1 < x < 14$  [D]

A  $x = -2$  positive  
 $(-2)^2 - 13(-2) - 14 = 16$

B  $x = 0$  negative  
 $(0)^2 - 13(0) - 14 = -14$

C  $x = 15$  positive  
 $(15)^2 - 13(15) - 14 = 16$

