

East Los Angeles College
Department of Mathematics
Math 115
Test 3

Solutions

Use properties of exponents to evaluate the following. Write as positive exponents:

1. $2x^3 \cdot 4x^2$

2. $\frac{15x^4}{5x^2}$

3. $(z^5)^3$

4. $(5x^4)^2$

5. 12345^0

6. 2^{-3}

7. 5^{-2}

8. 10^{-1}

9. $5x^2 \cdot 3x^{-4}$

10. $\frac{20x}{4x^5}$

11. $\frac{12x^{-3}}{4x}$

12. $\frac{18a^4b^{-2}}{2a^{-1}b}$

13. $3xy^2 \cdot 5xy$

14. $\frac{28xy^3}{4x^2y}$

15. $4a^{-2}b \cdot 2ab^{-4}$

16. $\frac{16ab^{-2}}{2a^{-3}b}$

17. $(xy^2)^{-3}$

18. $(6x^3y)^2$

19. Solve the following system by the Addition Method.

$$l_1 \quad 5x - y = -11$$

$$l_2 \quad 2x + 5y = 1$$

$$l_1 \quad 5 \cdot (5x - y) = -11 \cdot 5$$

use back sub for y

$$l_1 \quad 25x - 5y = -55$$

$$l_2 \quad 2(-2) + 5y = 1$$

$$l_2 \quad 2x + 5y = 1$$

$$-4 + 5y = 1$$

+

$$+4 \quad \quad +4$$

$$\frac{27x = -54}{27} \quad \frac{-54}{27}$$

$$\frac{5y = 5}{5} \quad \frac{5}{5}$$

$$x = -2$$

$$y = 1$$

$$\boxed{(-2, 1)}$$

20. Solve the following system by the Substitution Method.

$$l_1 \quad x + 4y = 5 \quad ; \quad l_1 \quad x = 5 - 4y$$

$$l_2 \quad 3x + y = -7$$

$$3(5 - 4y) + y = -7$$

use back sub

$$15 - 12y + y = -7$$

$$x = 5 - 4 \cdot 2$$

$$15 - 11y = -7$$

$$x = 5 - 8$$

$$-15 \quad \quad -15$$

$$\frac{-11y = -22}{-11} \quad \frac{-22}{-11}$$

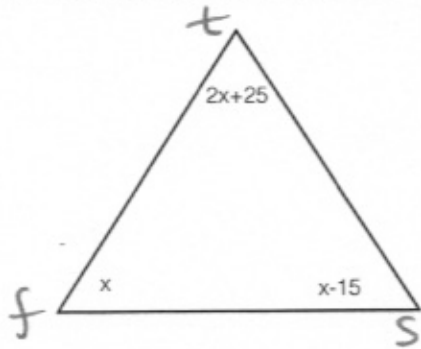
$$x = -3$$

$$y = 2$$

$$\boxed{(-3, 2)}$$

4-

21. Determine the smallest angle.



$$f \quad s \quad t \quad \checkmark$$

$$x + x - 15 + 2x + 25 = 180$$

$$4x + 10 = 180$$

$$\quad \quad -10 \quad \quad -10$$

$$\frac{4x}{4} = \frac{170}{4} \quad \therefore \boxed{x = 42.5}$$

$$s = 42.5 - 15$$

$$\boxed{s = 27.5} \quad \checkmark$$

$$\boxed{\text{Smallest} = 27.5}$$

$$t = 2x + 25$$

$$t = 2 \cdot 42.5 + 25 \quad \checkmark$$

$$\boxed{t = 110}$$

or

22. **Complementary Angles**- Two angles are complementary. If one angle measures 15 degrees more than twice the other angle, what is the measure of the angles?

$$\boxed{x + y = 90^\circ} \quad \checkmark$$

$$\boxed{x = 2y + 15} \quad \checkmark$$

$$\text{one} = 2 \cdot \text{other} + 15$$

$$x = 2y + 15$$

use Sub

use back Sub to find x

$$2y + 15 + y = 90$$

$$x = 2y + 15$$

$$3y + 15 = 90$$

$$\quad \quad -15 \quad -15$$

$$x = 2 \cdot 25 + 15$$

$$\frac{3y}{3} = \frac{75}{3} \quad \checkmark$$

$$x = 50 + 15$$

$$\boxed{y = 25}$$

$$\boxed{x = 65} \quad \checkmark$$

23. **Rectangle**- The perimeter of a rectangle is 42 meters. If the length is one more than three times the width, what are the dimensions (length and width)?

$$P = 2L + 2W = 42$$

$$L = 3W + 1$$

$$2L + 2W = 42$$

$$L = 3W + 1$$

use Sub

$$2(3W + 1) + 2W = 42$$

$$6W + 2 + 2W = 42$$

$$8W + 2 = 42$$

$$\begin{array}{r} -2 \\ -2 \end{array}$$

$$\frac{8W}{8} = \frac{40}{8}$$

$$W = 5$$

use back Sub ;

$$L = 3 \cdot 5 + 1$$

$$L = 15 + 1$$

$$L = 16$$

24. How many ounces of a 15% saline solution must be mixed with 30 ounces of a 4% saline solution to obtain a 10% saline solution.

	Type I 15% 0.15	Type II 4% 0.04	Mix 10% 0.10
Q	x	30	y
A	0.15x	0.04 \cdot 30 1.2	0.10y

$$x + 30 = y$$

$$0.15x + 1.2 = 0.10y$$

$$y = x + 30$$

$$15x + 120 = 10y$$

use Sub

$$15x + 120 = 10(x + 30)$$

$$15x + 120 = 10x + 300$$

$$15x - 10x = 300 - 120$$

$$\frac{5x}{5} = \frac{180}{5}$$

$$x = 36$$

$$y = 36 + 30$$

$$y = 66$$

25. A chemist needs 90 mL of a 54% solution. He mixes 30% solution with 84% solution. How much of each should be mixed in order to obtain his desired mixture?

	type I 30% 0.3	TYPE II 84% 0.84	total (mL) 54% 0.54
Q	x	y	90
A	0.3x	0.84y	0.54 · 90 48.6

$$x + y = 90$$

$$0.3x + 0.84y = 48.6 \quad (\text{move } 2 \text{ spaces})$$

$$\begin{aligned} x + y &= 90 \\ 30x + 84y &= 4860 \end{aligned}$$

$$y = 90 - x$$

Sub ;

$$30x + 84(90 - x) = 4860$$

$$30x + 7560 - 84x = 4860$$

$$-54x + 7560 = 4860$$

$$-7560 \quad -7560$$

$$-54x = -2700$$

$$x = 50$$

use back sub

$$y = 90 - 50$$

$$y = 40$$

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math 11S Test 3

(1) $2x^3 \cdot 4x^2$

$2 \cdot 4 \cdot x^3 \cdot x^2$

$8x^5$

(2) $\frac{15x^4}{5x^2}$

$3x^{4-2}$

$3x^2$

(3) $(2^5)^3$

$2^{5 \cdot 3}$

2^{15}

(4) $(5x^4)^2$

$5^2 \cdot x^8$

$25x^8$

(5) $12345^0 = 1$

(6) $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

(7) $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

(8) $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

(9) $5x^2 \cdot 3x^{-4}$

$5 \cdot 3 \cdot x^2 \cdot x^{-4}$

(10) $\frac{20x^4}{4x^5} = 5x^{1-5}$

$5x^{-4} = \frac{5}{x^4}$

(11) $15x^{-2}$

$\frac{15}{x^2}$

(12) $\frac{(6x^3y)^2}{9a^4b^{-2}}$

$9^2 a^{4-1} b^{-2-1}$

$9^2 a^{4+1} b^{-3}$

(ii) $\frac{12x^{-3}}{4x} = 3x^{-3-1}$

$= 3x^{-4} = \frac{3}{x^4}$

$\frac{9a^5}{b^3}$

Answer Sheet

1	$8x^5$ -	14	$\frac{7y^2}{x}$ -
2	$3x^2$ -	15	$\frac{8}{ab^3}$ -
3	z^{15} -	16	$\frac{8a^4}{b^3}$ -
4	$25x^8$ -	17	$\frac{1}{x^3y^6}$ -
5	1 -	18	$36x^6y^2$ -
6	$\frac{1}{8}$ -	19	See Q sheet
7	$\frac{1}{25}$ -	20	See Q sheet
8	$\frac{1}{810}$ -	21	Use Questions Sheet
9	$\frac{15}{x^2}$ -	22	Use Questions Sheet
10	$\frac{5}{x^4}$ -	23	Use Questions Sheet
11	$\frac{3}{x^4}$ -	24	Use Questions Sheet
12	$\frac{9a^5}{b^3}$ -	25	Use Questions Sheet
13	$15x^2y^3$ -	26	What is your name?

$$18 + 24 = (42)^1$$