East Los Angeles College
Department of Mathematics
Math 115
Test 3

40 ✓

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

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

$2+3$
2^5 (32) ✓

2. $5^{-2} \cdot 5^4$

5^{-2+4}
5^2 (25) ✓

3. $\frac{3^4}{3^3}$

$4-3$
3^1 (3) ✓

4. $(-2x^2)(-3x^3)$

$-2x^2(-3x^3)$
$-2(-3)\,x^2 x^3$
$6x^{2+3}$
$6x^5$ ✓

5. $x^{-4}x$

x^{-4+1}
x^{-3} $\boxed{\frac{1}{x^3}}$ ✓

6. $(x^2)^{-4}$

$x^{2(-4)}$
x^{-8} $\boxed{\frac{1}{x^8}}$ ✓

7. $(ab^2)^3$ $\boxed{a^3 b^6}$ ✓

8. $\frac{9x^{-2}}{3x}$

$3x^{-2-1}$
$3x^{-3}$ $\boxed{\frac{3}{x^3}}$ ✓

9. $12x^2y^{-3} \cdot 2xy^2$

$12 \cdot 2 \cdot x^2 \cdot x^1\, y^{-3} y^2$
$24x^3 y^{-1}$ $\boxed{\frac{24x^3}{y}}$

10. 2^{-3}

$\frac{1}{2^3}$ $\boxed{\frac{1}{8}}$

10 ✓

11. $\frac{a^{-3}}{b}$

$\frac{1}{a^3 b}$

12. $\frac{c^{-1}}{d^{-3}}$

$\frac{d^3}{c}$ ✓

13. $\frac{4x}{2x^{-3}}$

$2x^{1--3}$

$2x^{1+3}$

$2x^4$ ✓

14. $(2xy^3)^4$

$2^4 x^4 y^{12}$

$16x^4 y^{12}$ ✓

15. $\frac{20x^{-2}y}{4xy^{-3}}$

$5x^{-2-1} y^{1--3}$

$5x^{-3} y^{1+3}$ ✓

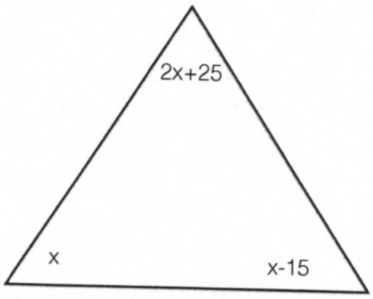
$\frac{5y^4}{x^3}$

16. $(4x^3y^2z)^0$

1 ✓

6✓

17. Determine the smallest angle.



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

$4x + 10 = 180$

$-10 \quad -10$

$\frac{4x}{4} = \frac{170}{4}$; $x = 42.5$

note $42.5 - 15 = 27.5$ smallest

$2 \cdot 42.5 + 25 = 110$

18. **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?

$x + y = 90$

$x = 2y + 15$

one = 2 other -15

$x \quad y$

use Sub

$2y + 15 + y = 90$

$3y + 15 = 90$

$-15 \quad -15$

$3y = 105$

$\frac{3y}{3} = \frac{105}{3}$

$y = 35$

$y = 25$

Back sub

$x = 2y + 15$

$x = 2 \cdot 35 + 15$

$x = 70 + 15$

$x = 85$

65

19. **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)?

$P = 42$;

$2L + 2w = 42$ ✓

$L = 3w + 1$ ✓

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

$6w + 2 + 2w = 42$

$8w + 2 = 42$

$-2 \quad -2$

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

$w = 5$ ✓

$L = 3w + 1$

$L = 3 \cdot 5 + 1$

$L = 15 + 1$

$L = 16$ ✓

4 ✓

20. Marlene has 11 coin in quarters and dimes for a value of $ 2.15. How many of each coin does she have?

$Q + D = 11$ ✓

$0.25Q + 0.10D = 2.15$; $25Q + 10D = 215$

i.e, $Q + D = 11$; $D = 11 - Q$

$25Q + 10D = 215$ ✓

$25Q + 10(11 - Q) = 215$

$25Q + 110 - 10Q = 215$

$15Q + 110 = 215$ ✓

$-110 \quad -110$

$15Q = 105$; $Q = 7$

$Q = 105/15$

$Q = 7$

$D = 11 - 7$

$D = 4$

4 ✓

8 ✓

21. 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%	Type II 4%	total 10%
Q	x	30	y
A	$15\%x$	$4\% \cdot 30$	$10\%y$

$x + 30 = y$ ✓

$0.15x + 1.2 = 0.10y$

$15x + 120 = 10y$ ✓

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

$15x + 120 = 10x + 300$

$-10x \quad -10x$

$5x + 120 = 300$

$-120 \quad -120$

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

$x = 36$ ✓

$y = 36 + 30$

$y = 66$ ✓

22. 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%	Type II 84%	total 54%
Q	x	y	90
A	$30\%x$	$84\%y$	$54\% \cdot 90$

48.6

$x + y = 90$ ✓ $\rightarrow x = 90 - y$

$0.30x + 0.84y = 48.6$ ✓

$30x + 84y = 4860$

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

$2700 - 30y + 84y = 4860$

$2700 + 54y = 4860$

$-2700 \quad -2700$

$\frac{54y}{54} = \frac{2160}{54}$

$y = 40$ ✓

$x = 90 - 40$

$x = 50$ ✓

8 ✓