

Math251

Practice Exam #01

1. Find the value of the exponential expression.

a) $(2+3)^2$

$$\begin{aligned} &(5)^2 \\ &5 \cdot 5 \\ &\boxed{25} \end{aligned}$$

b) $\left(\frac{2}{3}\right)^3$

$$\begin{aligned} &\frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \\ &\boxed{\frac{8}{27}} \end{aligned}$$

c) $-\left[-\frac{1}{2}(2-(-4))\right]^2$

$$\begin{aligned} &-\left[-\frac{1}{2}(2+4)\right]^2 \\ &-\left[-\frac{1}{2}(6)\right]^2 \\ &-\left[-3\right]^2 \\ &\boxed{-9} \end{aligned}$$

2. Solve the following equations for x.

a) $3x - 4 = 2x + 8$

$$\begin{array}{r} 3x - 4 = 2x + 8 \\ -2x \quad -2x \\ \hline x = 12 \end{array}$$

$\boxed{x = 12}$

b) $4(x-2) = 2(3+x)$

$$\begin{array}{r} 4x - 8 = 6 + 2x \\ -2x \quad -2x \\ \hline 2x - 8 = 6 \\ +8 \quad +8 \\ \hline 2x = 14 \\ \frac{2x}{2} = \frac{14}{2} \end{array}$$

$\boxed{x = 7}$

c) $\frac{x}{2} + \frac{3}{5} = 3x - 1$ LCD 10

$$10\left(\frac{x}{2}\right) + 10\left(\frac{3}{5}\right) = 10(3x) - 10(1)$$

$$\begin{array}{r} 5x + 6 = 30x - 10 \\ -30x \quad -30x \\ \hline -25x + 6 = -10 \end{array}$$

$$\begin{array}{r} -25x + 6 = -10 \\ -6 \quad -6 \\ \hline -25x = -16 \end{array}$$

$$\begin{array}{r} -25x = -16 \\ -25 \quad -25 \\ \hline x = \frac{16}{25} \end{array}$$

$\boxed{x = \frac{16}{25}}$

d) $\frac{1}{2}(x+1) = \frac{2}{3}(2x+2)$ LCD 6

$$6\left[\frac{1}{2}(x+1)\right] = 6\left[\frac{2}{3}(2x+2)\right]$$

$$3(x+1) = 4(2x+2)$$

$$\begin{array}{r} 3x + 3 = 8x + 8 \\ -8x \quad -8x \\ \hline -5x + 3 = 8 \end{array}$$

$$\begin{array}{r} -5x + 3 = 8 \\ -3 \quad -3 \\ \hline -5x = 5 \end{array}$$

$$\begin{array}{r} -5x = 5 \\ -5 \quad -5 \\ \hline x = -1 \end{array}$$

$\boxed{x = -1}$

3. How many gallons of 50% antifreeze must be mixed with 80 gallons of 20% antifreeze to get a mixture that is 40% antifreeze?

	Amount	%	Amount of Antifreeze
Solution 1	x	0.50	$0.50x$
Solution 2	80	0.20	$0.20(80)$
Final Solution	$x+80$	0.40	$0.40(x+80)$

Don't get scared!!

$$\begin{array}{r}
 5x + 160 = 4x + 320 \\
 -4x \quad -4x \\
 \hline
 x + 160 = 320 \\
 -160 \quad -160 \\
 \hline
 x = 160
 \end{array}$$

$0.50x + 0.20(80) = 0.40(x+80)$
 Clear the decimals by multiplying both sides by 10. Math Kung Fu!

160 gallons of 50% antifreeze.

$$\begin{aligned}
 10(0.50x) + 10[0.20(80)] &= 10[0.40(x+80)] \\
 5x + 2(80) &= 4(x+80) \\
 5x + 160 &= 4x + 320
 \end{aligned}$$

4. Find the value of the expression $\frac{2(5^2-5)+8}{4 \cdot 3 - |-10|}$.

PEMDAS

$$\frac{2(25-5)+8}{4 \cdot 3 - 10}$$

$$\frac{2(20)+8}{12-10}$$

$$\frac{40+8}{2}$$

$$\frac{48}{2}$$

$$\boxed{24}$$

5. Solve the problems below. Use x as the unknown number.

- a) If two is subtracted from a number and this difference is tripled, the result is four more than the number. Find the number.

$$* 3(x - 2) = x + 4$$

$$\begin{array}{r} 3x - 6 = x + 4 \\ -x \quad -x \\ \hline 2x - 6 = 4 \\ +6 \quad +6 \\ \hline 2x = 10 \\ \frac{2x}{2} = \frac{10}{2} \end{array}$$

$$x = 5$$

- b) If half of a number is tripled, the result is three less than twice the number. Find the number.

$$3\left(\frac{x}{2}\right) = 2x - 3$$

$$\frac{3}{1}\left(\frac{x}{2}\right) = 2x - 3$$

$$\frac{3x}{2} = 2x - 3 \quad \text{LCD} = 2$$

$$2\left(\frac{3x}{2}\right) = 2(2x) - 2(3)$$

$$\begin{array}{r} 3x = 4x - 6 \\ -4x \quad -4x \\ \hline -x = -6 \end{array}$$

$$\frac{-x}{-1} = \frac{-6}{-1}$$

$$x = 6$$

This is a challenging problem!!

6. A collection of 42 coins has a value of \$6.45. The collection contains dimes and quarters. Find the number of quarters in the collection.

	# of coins	coin value	Total coin Value
dimes	x	0.10	0.10x
quarters	42-x	0.25	0.25(42-x)

Total: 6.45

$$0.10x + 0.25(42-x) = 6.45$$

Clear Decimals. This time you need to multiply both sides by 100!

$$100(0.10x) + 100[0.25(42-x)] = 100(6.45)$$

$$10x + 25(42-x) = 645$$

Don't get scared!!

$$10x + 1050 - 25x = 645$$

$$-15x + 1050 = 645$$

$$\begin{array}{r} 01050 \\ - 645 \\ \hline 405 \end{array}$$

$$\begin{array}{r} -15x + 1050 = 645 \\ -1050 -1050 \\ \hline \end{array}$$

$$\begin{array}{r} -15x = -405 \\ \hline -15 \end{array}$$

$$x = 27 \text{ dimes}$$

$$\begin{array}{r} 27 \\ 15 \overline{)405} \\ \underline{-30} \\ 105 \\ \underline{-105} \\ 0 \end{array}$$

The number of quarters is $42 - x = 42 - 27 = \boxed{15}$

7. Decide whether the statement is True or False.

a) $6^2 - (-2)^2 = 4^2$

$$36 - 4 = 16$$

$$32 = 16$$

False

b) $3[3 - 4(-2)] \geq 32$

$$3[3 - (-8)] \geq 32$$

$$3[3 + 8] \geq 32$$

$$3(11) \geq 32$$

$$33 \geq 32$$

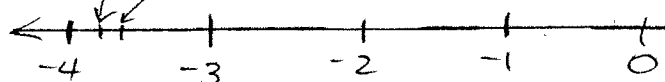
True

8. Select the smaller number.

a) $-(-12)$, $-|-13|$ Smaller

$$12, -13$$

b) -3.592 , -3.583 Smaller



9. Evaluate the expression, given $x = -3$ and $y = 4$.

a) $3x^2 - 4y$

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

$$3(9) - 16$$

$$27 - 16$$

$$(11)$$

b) $\frac{3x-5y}{y-3}$

$$\frac{3(-3) - 5(4)}{4 - 3}$$

$$4 - 3$$

$$\frac{-9 - 20}{1}$$

$$1$$

$$\frac{-29}{1}$$

$$1$$

$$(-29)$$

c) $\frac{-x + (2y)^2}{3 - x - y}$

$$\frac{-(-3) + [2(4)]^2}{3 - (-3) - 4}$$

$$3 - (-3) - 4$$

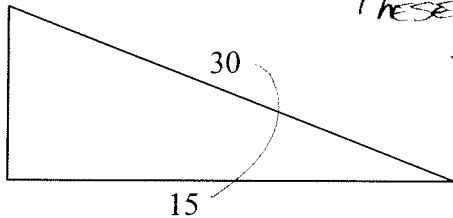
$$\frac{3 + [8]^2}{3 + 3 - 4}$$

$$3 + 3 - 4$$

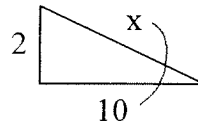
$$\frac{3 + 64}{6 - 4}$$

$$\boxed{\frac{67}{2}}$$

10. Use a proportion to find the length of x .



These are similar triangles!



$$\frac{x}{10} = \frac{30}{15} \quad \leftarrow \text{Reduce!!}$$

Cross
Multiply!

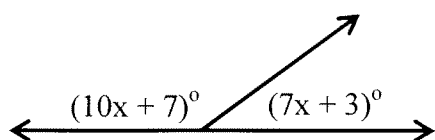
$$\frac{x}{10} = \frac{2}{1}$$

$$\boxed{x = 20}$$

Shazzam!!
Notice: $x = 20$

$$\frac{30}{15} = \frac{20}{10}$$

11. Find the measures of each marked angle.



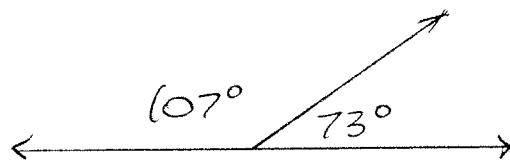
These are supplementary angles!! They sum to 180° !

$$10x + 7 + 7x + 3 = 180$$

$$\begin{array}{r} 17x + 10 = 180 \\ -10 \quad -10 \end{array}$$

$$\frac{17x}{17} = \frac{170}{17}$$

$x = 10$ Note: Don't forget to label the angles!!



12. Solve for x.

Cross Multiply!!

a) $\frac{x+2}{3} = \frac{4}{5}$

$$5(x+2) = 12$$

$$5x + 10 = 12$$

$$\begin{array}{r} 5x + 10 = 12 \\ -10 \quad -10 \end{array}$$

$$\frac{5x}{5} = \frac{2}{5}$$

$$x = \frac{2}{5}$$

Using the LCD = 15

$$15\left(\frac{x+2}{3}\right) = 15\left(\frac{4}{5}\right)$$

$$5(x+2) = 12$$

$$5x + 10 = 12$$

$$\begin{array}{r} 5x + 10 = 12 \\ -10 \quad -10 \end{array}$$

$$\frac{5x}{5} = \frac{2}{5}$$

$$x = \frac{2}{5}$$

b) $\frac{3-2x}{7} = -\frac{2}{3}$

Note: $-\frac{2}{3} = \frac{-2}{3} = \frac{2}{-3}$

$$\frac{3-2x}{7} = \frac{-2}{3}$$

$$3(3-2x) = 7(-2) \quad \text{By cross multiplying!}$$

$$9 - 6x = -14$$

$$\begin{array}{r} 9 - 6x = -14 \\ -9 \quad -9 \end{array}$$

$$\frac{-6x}{-6} = \frac{-23}{-6}$$

$$x = \frac{23}{6}$$

Using the Distributive Property!