# Math 1010 - Exam 1 

University of Utah

Fall 2009

Name: Solutions

1. Draw a real number line below, and plot and label the solutions to the following arithmetic problems. (10 points total)

(a) $3+2=$ ?
(2 points)
$3+2=5$
(b) $-1-(-3)=$ ?
$-1-(-3)=2$
(c) $(-2) \times 3=$ ?
(2 points)
$(-2) \times 3=-6$
(d) $\frac{2}{5}+\frac{3}{2}=$ ?
(3 points)
$\frac{2}{5}+\frac{3}{2}=\frac{4}{10}+\frac{15}{10}=\frac{19}{10}$
2. Evaluate the following expressions. (15 points total)
(a) $5 \frac{2}{3}+3 \frac{1}{5} \quad$ (3 points)
$5 \frac{2}{3}+3 \frac{1}{5}=\frac{17}{3}+\frac{16}{5}=\frac{85}{15}+\frac{48}{15}=\frac{133}{15}$.
(b) $(-3)^{3} \quad$ (3 points)

$$
(-3)^{3}=-3 \times-3 \times-3=9 \times-3=-27
$$

(c) $|-2|+(-|-4|)$
(3 points)
$|-2|+(-|-4|)=2+(-4)=-2$.
(d) $\frac{3}{5} \div \frac{4}{3}$
(3 points)
$\frac{3}{5} \div \frac{4}{3}=\frac{3}{5} \times \frac{3}{4}=\frac{9}{20}$.
(e) $21-5(7-5)$
(3 points)
$21-5(7-5)=21-5(2)=21-10=11$.
3. What property of real numbers is exemplified in the following expression: (5 points)

$$
a(b+c)=a b+a c
$$

The distributive law of real numbers.
4. Simplify the following algebraic expressions. (15 points total)
(a) $8 x-5 x+7 x$ (3 points)
$8 x-5 x+7 x=10 x$.
(b) $3 x^{2}-7+2 x+5 x^{2}+11 x-3$ (4 points)
$3 x^{2}-7+2 x+5 x^{2}+11 x-3=\left(3 x^{2}+5 x^{2}\right)+(11 x+2 x)+(-7+-3)$
$=8 x^{2}+13 x-10$.
(c) $8\left(z^{3}-4 z^{2}+2\right)$
(3 points)
$8\left(z^{3}-4 z^{2}+2\right)=8 z^{3}-32 z^{2}+16$.
(d) $x\left(x^{2}+3\right)-3(x+4)$
(5 points)
$x\left(x^{2}+3\right)-3(x+4)=x^{3}+3 x-3 x-12=x^{3}-12$.
5. Evaluate the following expressions for the specified values of the variable(s). If not possible, state the reason. (10 points total)
(a) $3 y^{2}+10$
i. $y=-2$ (2 points) $3(-2)^{2}+10=22$
ii. $y=\frac{1}{2} \quad$ (3 points)

$$
3\left(\frac{1}{2}\right)^{2}+10=\frac{3}{4}+10=10 \frac{3}{4} \text { or } \frac{43}{3} .
$$

(b) $\frac{x}{x-y}$
i. $x=0, y=10$

$$
\begin{equation*}
\frac{0}{0-10}=\frac{0}{-10}=0 . \tag{2points}
\end{equation*}
$$

ii. $x=3, y=3$
(3 points)
$\frac{3}{3-3}=\frac{3}{0}$ which is undefined, as we cannot divide by zero. Therefore, evaluating the expression at $x=3$ and $y=3$ is not possible.
6. Find the value of $x$ that satisfies the given linear equation. (10 points total)
(a) $8 x-10=0$ (4 points)
$8 x-10=0$
$\rightarrow 8 x=10$
$\rightarrow x=\frac{10}{8}=\frac{5}{4}$.
(b) $6(x+2)=30$
(6 points)
$6(x+2)=30$
$\rightarrow 6 x+12=30$
$\rightarrow 6 x=18$
$\rightarrow x=3$
7. Solve the following percentage problems. (10 points total)
(a) What is $250 \%$ of 32 ?
(5 points)
$2.5 \times 32=80$.
(b) What is $4 \%$ of 500 ?
(5 points)
$.04 \times 500=20$.
8. A restaraunt sells a bottle of wine for $\$ 25$ and paid $\$ 15$ for the bottle.
(a) What is the markup?
$\$ 25-\$ 15=\$ 10$.
(b) What is the markup rate?
(5 points)
$\frac{\$ 10}{\$ 15}=\frac{2}{3}$ or $.66 \overline{6}$ or $66 . \overline{6} \%$.
9. Using the formula:

$$
F=\frac{9}{5} C+32
$$

and given the fact that water freezes when $C=0^{\circ}$ and boils when $C=100^{\circ}$ calcualte: (7 points total)
(a) The temperature in Fahrenheit at which water freezes. (2 points)
$F=\frac{9}{5}(0)+32=32^{\circ} F$
(b) The temperature in Fahrenheit at which water boils.
(5 points)
$F=\frac{9}{5}(100)+32=180+32=212^{\circ} F$.
10. Solve the following inequality and sketch the solution on the real number line. ( 10 points)

$$
\begin{aligned}
& 3 x-11>-x+7 . \\
& 3 x-11>-x+7 \\
& \rightarrow 3 x>-x+18 \\
& \rightarrow 4 x>18 \\
& \rightarrow x>\frac{9}{2}
\end{aligned}
$$



