MAT 52 Exam I

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Show all work! Little or no credit will be given for correct answers that lack sufficient justification. No calculators or other electronic devices allowed! BOX YOUR ANSWERS!

Exercise 1. Solve for the specified variable.

3
a) \(-5x + y = 4\) for \(y\)

\[
\begin{align*}
5x + 5x & = 5x + y \\
\hline
y & = 5x + 4
\end{align*}
\]

3
b) \(\frac{3}{4}m - \frac{t}{3} = 5b\) for \(m\)

\[
\begin{align*}
\frac{4}{3} \cdot \frac{3}{4}m & = \left(5b + \frac{t}{3}\right) \cdot \frac{4}{3} \\
m & = \frac{4}{3} \cdot \left(5b + \frac{t}{3}\right)
\end{align*}
\]

\[m = \frac{4}{3} \left(5b + \frac{t}{3}\right) \quad \text{or} \quad \frac{20}{3}b + \frac{4}{3}t\]

TURN OVER
Exercise 2. Simplify according to the rule for order of operations.

a) $|16 - 3 \cdot 8| + 9$

\[
= |16 - 24| + 9 \\
= |-8| + 9 \\
= 8 + 9 \\
= 17
\]

b) $5^2 + 3(9 - 7) + 3^2$

\[
= 25 + 3(2) + 9 \\
= 25 + 6 + 9 \\
= 31 + 9 \\
= 40
\]

c) $7 - \frac{4}{7} \div \frac{14}{7} + \frac{1}{3}$

\[
= 7 - \frac{4}{7} \cdot \frac{7}{14} + \frac{1}{3} \\
= 7 - \frac{4}{7} + \frac{1}{3} \\
= -1 + \frac{1}{3} \\
= -\frac{2}{3} + \frac{1}{3} \\
= \frac{-2}{3}
\]

TURN OVER
Exercise 3. Evaluate each expression. Write each answer in simplest form.

a) \( \frac{3 \cdot \frac{3}{8} \cdot \frac{5}{12} \cdot 2}{9 + 10} = \frac{19}{24} \)

b) \( \frac{5}{3} \cdot \frac{\sqrt{2}}{\sqrt{11}} = \frac{10}{33} \)

c) \( \frac{\frac{8}{15} \div \frac{2}{5}}{\frac{4}{3}} = \frac{4}{3} \) or \( 1 \frac{1}{3} \)

d) \( 2 \frac{1}{2} \div 1 \frac{5}{8} = \frac{5}{8} \div \frac{13}{8} = \frac{5}{8} \cdot \frac{8}{13} = \frac{20}{13} \) or \( 1 \frac{7}{13} \)

TURN OVER
Exercise 4. Solve each equation.

a) \(7 - 4x = -5\)
\[-4x = -5 - 7\]
\[-4x = -12\]
\[\boxed{x = 3}\]

b) \(\frac{x}{3} - 2 = 3\)
\[\frac{x}{3} = 5\]
\[\boxed{x = 15}\]

c) \(\frac{2}{3}n = -\frac{7}{8}\)
\[n = -\frac{7}{8} \times \frac{3}{2}\]
\[\boxed{n = -\frac{21}{16}}\] or \[-1 \frac{5}{16}\]

d) \(\frac{2x}{3} + \frac{x}{8} = 11.30\)
\[6x + 3x = 330\]
\[\boxed{x = 330}\]
\[\boxed{x = 30}\]

TURN OVER
e) \(-4 - m = -10\)

\[-4 + m = -10\]
\[+4 + 4\]
\[m = -6\]

f) \(16y - 8(3y - 2) = -24\)

\[16y - 24y + 16 = -24\]
\[-8y - 16 - 8y = -40\]
\[y = 5\]

g) \(5(x + 3) - 3x = 2(x + 8)\)

\[5x + 15 - 3x = 2x + 16\]
\[2x + 15 = 2x + 16\]
\[15 = 16\]

\[\text{No solution}\]
Exercise 5. Solve each inequality. Write solution set in interval notation and graph it.

a) \(-20 > 3m - 5\)
\[\text{Graph:} \quad \begin{array}{c}
\circ \circ \circ \circ \circ \circ \\
-5
\end{array}\]
\[\text{Interval:} \quad (-\infty, -5)\]

b) \(3(3x + 3) - 2 \leq 2(2x - 1) + 6x\).
\[9x + 9 - 2 \leq 4x - 2 + 6x\]
\[9x + 7 \leq 10x - 2\]
\[-10x \quad -7 \quad -10x \quad -2\]
\[x \geq -9\]
\[\text{Graph:} \quad \begin{array}{c}
\circ \circ \circ \circ \circ \\
0 \\
3 \\
6 \\
9 \\
\end{array}\]
\[\text{Interval:} \quad [-9, \infty)\]
Exercise 6. Solve $0 < \frac{1}{3}x + 1 \leq 16$. Write the solution set in interval notation and graph it.

\[
0 < \frac{1}{3}x + 1 \leq 16 \\
-1 -1 -1 \\
\frac{2}{3} \leq \frac{1}{3}x \leq 15 - 3 \\
-3 < x \leq 45
\]

Graph:

[Graph showing the solution on the number line with points at -3, 0, 15, 30, and 45.

Interval:

\((-3, 45]\)

Exercise 7. Graph: \(y = -3x + 2\)

[Graph showing the line \(y = -3x + 2\) on a coordinate plane.

TURN OVER
Exercise 8. Graph: $x = -3$

Exercise 9. Evaluate $b^2 - 4ac$ for $a = -3$, $b = 5$, and $c = -1$

\[ b^2 - 4ac = 5^2 - 4(-3)(-1) \]
\[ = 25 - 12 \]
\[ = \sqrt{13} \]
Exercise 10. Find the $x$- and $y$-intercepts then graph the line.

$$5x - 10y = 20$$

a) Find the $x$-intercept and write it as a coordinate.

$$5x - 10 \cdot 0 = 20$$
$$5x = 20$$
$$x = 4$$

$$\left(4, 0\right)$$

b) Find the $y$-intercept and write it as a coordinate.

$$5 \cdot 0 - 10y = 20$$
$$-10y = 20$$
$$y = -2$$

$$\left(0, -2\right)$$

c) Graph the line using your answers to parts (a) and (b).
Exercise 11. Solve

$$3 \cdot \frac{2(5a-7)}{4} = \frac{9(a-1)}{8} \cdot 12$$

$$6(5a-7) = 36(a-1)$$

$$30a - 42 = 36a - 36$$

$$-36a + 42 = 36a + 42$$

$$-6a = 6$$

$$a = -1$$

CHECK YOUR WORK!