Practice for Exam 1
Math 05 Spring 2006

1. Evaluate the following expression:

$$-2 \cdot (3-5) - 4^2 \div 8 \cdot 2$$

Answer. 0 □

2. Evaluate: $\dfrac{-3}{10} \cdot \dfrac{28}{-9} \cdot \left(-\dfrac{15}{40}\right) \cdot \dfrac{2}{7}$.

Answer. $-\dfrac{1}{10}$. □

3. Evaluate, if $a = \dfrac{2}{3}$ and $b = -\dfrac{5}{6}$:

$$-2a + 5b$$

Answer. $-\dfrac{11}{2}$ □

4. Evaluate, if $a = -2$, $b = 2$ and $c = -1$:

$$-a^2 + b^2 - c(a-b)$$

Answer. 4. □

5. Solve the following equation for y:

$$ax + by = c^2$$

Answer. $y = \dfrac{c^2 - ax}{b}$ □

6. Solve the following equation

$$2(3x-1) + 2x + 5 = 5x - 2(x-3) + 12$$

Answer. $x = 3$. □

7. Solve the following equation

$$\frac{x-2}{5} + \frac{8-x}{3} = x$$

Answer. $x = 2$. □

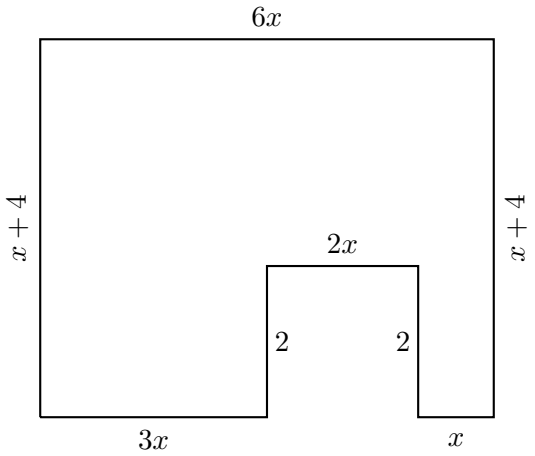


Figure 1: The shape

8. Find x if the perimeter of the shape in Figure 1 is 26.

   Answer. The equation we get is

   $$x + 4 + 6x + x + 4 + x + 2 + 2x + 2 + 3x = 26$$

   After solving we get:

   $$x = 1\,.$$

   □

9. At 2:15pm two cars leave a town heading in the same direction. One car travels 65 mph and the other travels at 60 mph. What time is it when they are 20 miles apart?

   Answer. We have the following table (the given data are shown in blue):

	Rate	Time	Distance
Car1	60	x	$60x$
Car 2	65	x	$65x$

   The equation we get is:

   $$65x - 60x = 20$$

   The solution to this equation is

   $$x = 4\,.$$

   The answer is: When the two cars are 20 miles apart the time is 6:15pm. □

10. How many liters of salt water with 30% concentration of salt do we need to mix with 10 liters of salt water with concentration 10% in order to get salt water with 20% concentration?

    Answer. We have the following table (initial data shown in blue):

	Volume	Concentration	Salt
Sol. 1	x	.3	$.3x$
Sol. 2	10	.1	1
Result	$x + 10$	.2	$.2(x + 10)$

    The equation we get is

    $$.3x + 1 = .2(x + 10)$$

    The solution to this equation is

    $$x = 10\,.$$

    The answer is: We need to mix 10 litters of salt water with 10% concentration with 10 litters of 30% concentration in order to get salt water with 20% concentration. □

	Capital	Rate	Interest
Plan A	x	.05	$.05x$
Plan B	$10000 - x$	.04	$.04(10000 - x)$
Total	10000		450

The equation we get is:

$$.05x + .04(10000 - x) = 450$$

The solution of this equation is

$$x = 5000\,.$$

The answer is: He should invest 5000 at 5% and 5000 at 4%. □

12. The length of a rectangle is 4 cm less than three times its width. If the perimeter of the rectangle is 40 cm find its dimensions.

Answer. The equation we get is

$$2x + 2(3x - 4) = 40$$

The solution to this equation is

$$x = 6$$

The answer is: The rectangle has length 14 cm and width 6 cm. □

13. Solve the following inequality

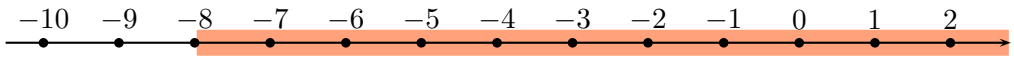
$$2(3 - 2x) + 15 \geq -7x - 3$$

graph the solution set and express your answer in interval notation.

Answer. The solution is

$$x \geq -8$$

The graph of the solution is



In interval notation the answer is $[-8, \infty]$.

□

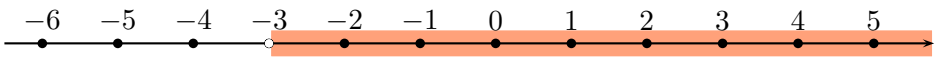
14. Ditto for

$$-3x + 2 < 11$$

Answer. The solution is

$$-3 < x$$

The graph of the solution is:



The solution in interval notation is $[-3, \infty]$. □

15. Rachel's grade in a class will be determined by the average of the scores on three tests. She got a 75 on the first test and a 90 on the second. She wants to get a B+ (or better) in this class. If B+ starts at 87, what score would she need to get in the third test?

Answer. The inequality is:

$$\frac{75 + 90 + x}{3} \geq 87$$

The solution is

$$x \geq 96$$

The answer is: In order to get a B+ she needs to get 96 or more in the third exam. □

16. Student A. Bee, attends *this* class. At the end of the semester he has 75 in the first exam, 95 on the second exam and an average of 88 in the quizzes. What score on the final will ensure him a grade of 90 or more?

Answer. The inequality is

$$.2 \cdot 75 + .2 \cdot 95 + .2 \cdot 88 + .4x \geq 90$$

The solution is

$$x \geq 96\,.$$

The answer is: In order to get a score of 90 or more he needs a score of 96 or more on the final. □

17. Solve the following equation

$$|-2x - 5| - 5 = 10$$

Answer. $x = -10$ or $x = 5$. □

18. Solve the following equation

$$|3x - 5| = |2x + 10|$$

Answer. $x = 15$ or $x = -1$. □