Skills Assessment Solutions

The Skills Assessment is *not* a test. This part of the Readiness Check includes 24 math problems designed to identify skills your student may need to review or practice before starting algebra.

- **Do** use the Formula Sheet.
- **Do** show your work.
- **Do** check your work.
- **Do not** use a calculator.
- **Do** your best, even if you are unsure how to solve a problem. It is important to attempt and to persevere through each problem.

Evaluate. Write answers in simplest terms.

1) $3\frac{1}{2} \div 4\frac{1}{3}$

$\frac{7}{2} \div \frac{13}{3} = \frac{7}{2} \cdot \frac{3}{13} = \frac{21}{26}$

2) $\frac{7}{8} - \frac{5}{12}$ $\text{LCD}(8, 12) = 24$

$\frac{21}{24} - \frac{10}{24} = \frac{11}{24}$

3) $|6 - 10| + 2^3 - (4 + 2)^2 \div 6 + \sqrt{81}$

$|-4| + 8 - (6)^2 \div 6 + 9$

$4 + 8 - 36 \div 6 + 9$

$12 - 6 + 9$

15

4) Evaluate: -7^2

Is the answer positive or negative? Explain your reasoning.

-49

The answer is negative because $(-1)(7)(7)$ only has one negative number.

5) Evaluate: $(-3)^4$

Is the answer positive or negative? Explain your reasoning.

81

The answer is positive because an even number of negatives multiplied together result in a positive value. $(-3)(-3)(-3)(-3) = 81$

6) At Floyd's Family Farm the ratio of chickens to goats was seven to eight. If the farm owned 14 goats, how many chickens do they own? Show your work.

$$\frac{c}{g} = \frac{7}{8}$$

$$\frac{7}{8} = \frac{c}{14}$$

$$8c = 7(14)$$

$$\frac{8c}{8} = \frac{98}{8}$$

$$c = 12\frac{2}{8} = 12\frac{1}{4}$$

The Farm owns 12 chickens since you cannot have a fraction of a chicken.

7) Given $3x - 4 = 17$ and $\frac{1}{2}y + 2 = 5$, find the **sum** of x and y. Show your work.

$3x - 4 = 17$

$+4 \quad +4$

$\left(\frac{1}{3}\right)3x = 21\left(\frac{1}{3}\right)$

$x = 7$

$\frac{1}{2}y + 2 = 5$

$-2 \quad -2$

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

$y = 6$

Sum of x and y

$x + y$

$7 + 6$

13

8) Solve. Show all your work. Check your solution.

$$-\frac{5}{2}(x-2) = 15$$

$$-\frac{5}{2}x + 5 = 15$$

$$-5 \quad -5$$

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

$$x = -4$$

Check

$$-\frac{5}{2}(-4-2) = 15$$

$$-\frac{5}{2}(-6) = 15$$

$$15 = 15$$

9) Find the error, describe it, and then solve the equation correctly.

$$\frac{3}{4}x - 5 = 2$$
$$+5 \quad +5$$
$$\frac{3}{4}x = 7$$
$$-\frac{3}{4} \quad -\frac{3}{4}$$
$$x = 6\frac{1}{4}$$

The highlighted step is incorrect. The reciprocal of $\frac{3}{4}$ should be multiplied on both sides instead of subtracting $-\frac{3}{4}$.

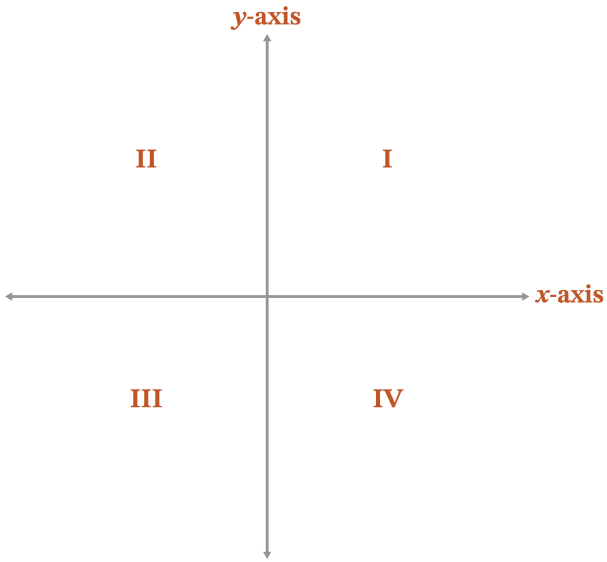
$$x = 7\left(\frac{4}{3}\right) = \frac{28}{3}$$

10) Write an equation and solve.
Three times a number (n) is equal to four times the same number minus two.

$$3n = 4n - 2$$
$$-4n \quad -4n$$
$$(-1) - 1n = -2(-1)$$
$$n = 2$$

Instructor Note: *If your student writes the equation incorrectly but solves their equation correctly, they have shown perseverance.*

11) Label the quadrants on the coordinate plane.
Then, label the x- and y-axis.



List *all* the factors of each number. Circle any factors that are a perfect square.

12) 49

(1), 7, (49)

13) 48

(1), 2, 3, (4), 6, 8, 12, (16), 24, 48

14) Evalute $-2x^2y^3$ when $x = -3$ and $y = 2$.

$$-2(-3)^2(2)^3$$
$$-2(9)(8)$$
$$-144$$

15) Given $3x - 5 = 10$, what is $2 - 5x$?

$$3x - 5 = 10 \qquad 2 - 5x$$
$$+5 \quad +5 \qquad 2 - 5(5)$$
$$\left(\frac{1}{3}\right)3x = 15\left(\frac{1}{3}\right) \qquad 2 - 25$$
$$x = 5 \qquad \boxed{-23}$$

Instructor Note: *Your student should solve the equation $3x - 5 = 10$, then substitute the x-value into the expression $2 - 5x$.*

16) Using the values 1, 4, and 7 *only once*, find the combination that yields the **smallest possible** solution. Explain your thinking.

$$5 = \frac{\square}{\square}x - \square$$

Solution:

$$5 = \frac{7}{1}x - 4$$
$$+4 \qquad +4$$
$$\left(\frac{1}{7}\right)9 = 7x\left(\frac{1}{7}\right)$$
$$\frac{9}{7} = x$$
$$x = \frac{9}{7}$$

The smallest number comes from dividing by the largest possible number: 7.

Instructor Note: *Your student should make at least 2, but preferably 3 attempts to confirm that they have the smallest possible solution. Answers do not need to be written as mixed numbers. Your student can explain their thinking verbally or in writing for this problem. Here are some other possible solutions your student may attempt:*

$5 = \frac{7}{4}x - 1;\ x = \frac{24}{7}$ $\quad 5 = \frac{4}{7}x - 1;\ x = \frac{21}{2}$ $\quad 5 = \frac{1}{7}x - 4;\ x = 63$

$5 = \frac{1}{4}x - 7;\ x = 48$ $\quad 5 = \frac{4}{1}x - 7;\ x = 3$

17) Name the GCF and LCM of 12 and 15.

$\text{GCF}(12, 15) = 3$

12: 1, 2, (3), 4, 6, 12

15: 1, (3), 5, 15

$\text{LCM}(12, 15) = 60$

12, 24, 36, 48, (60), …

15, 30, 45, (60), …

18) The length (l) of a rectangle is twice the width (w). Find the *area* when the perimeter of the rectangle is 54 units.

$P = 54,\ l = 2w$

$P = 2l + 2w$

$54 = 2(2w) + 2w$

$54 = 4w + 2w$

$54 = 6w$

$w = 9$ *units*

$l = 2w = 2(9) = 18$ *units*

$A = lw$

$A = (18)(9)$

$A = 162$

Instructor Note: *Using the Formula Sheet to find the perimeter formula should help your student understand where to substitute values. They may also want to draw a figure and test values until they find the correct answer. After your student finds the dimensions of the rectangle, they can use the formula to find the area of the rectangle.*

The area of the rectangle is 162 square units.

19) Plot and label the points to create a triangle.
Use your graph to determine the base and height and find the area of the triangle. Remember to include the proper units.

A: $(-3, -1)$

B: $(4, 5)$

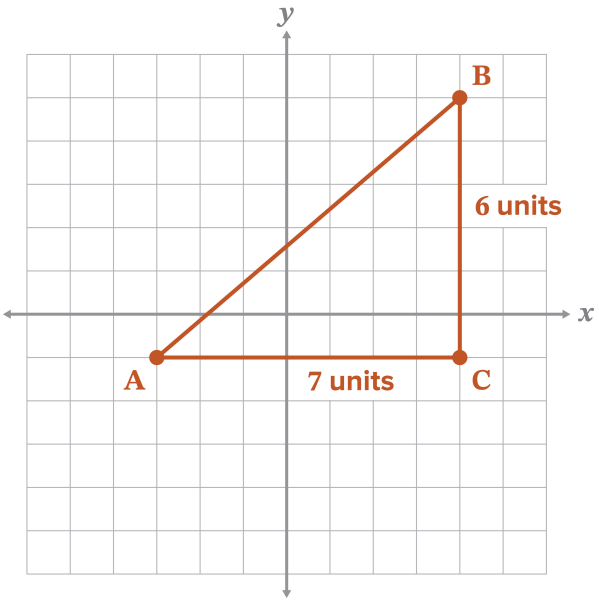
C: $(4, -1)$

$b = 7,\ h = 6$

$A = \frac{1}{2}bh$

$A = \frac{1}{2}(7)(6)$

$A = 21$ square units



Instructor Note: *Use the base and height your student writes to determine if they can find the area of a triangle.*

20) Solve. Show all your work. Checking your solution is *required*.

$3x+4-5x=1$

$-2x+4=1$

$-4\quad -4$

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

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

Check

$3\left(\frac{3}{2}\right)+4-5\left(\frac{3}{2}\right)=1$

$\frac{9}{2}+\frac{8}{2}-\frac{15}{2}=\frac{2}{2}$

$\frac{2}{2}=\frac{2}{2}$

21) Solve the inequality. Graph the solution(s) on the number line.

$x+4<5$

$-4\quad -4$

$x<1$

22) If the volume of the pyramid is 32 and the length is 4 and the width is 2, find the height. Write the formula and solve. Use your formula sheet and show your work.

$V=32,\ l=4,\ w=2$

$V=\frac{1}{3}lwh$

$32=\frac{1}{3}(4)(2)h$

$\left(\frac{3}{8}\right)32=\frac{8}{3}h\left(\frac{3}{8}\right)$

$h=12$ units

Instructor Note: *Most problems ask for the volume. This is asking for the missing height to determine if your student can work backwards through a formula.*

23) Complete the table of values for the equation: $y = 3x - 4$

x	work for $y = 3x - 4$	y
–1	$3(-1) - 4$	-7
0	$3(0) - 4$	-4
1	$3(1) - 4$	-1
2	$3(2) - 4$	2

24) Describe the pattern for the x- and y-values from the table.

As the x-value increases by 1, the y-value increases by 3.

Readiness Check Formula Sheet

Perimeter of a rectangle

$P = 2l + 2w$

Area of a rectangle

$A = lw$

Area of a triangle

$A = \frac{1}{2}bh$

Volume of a rectangular pyramid

$V = \frac{1}{3}lwh$

Distance formula

$\text{distance} = \text{rate} \cdot \text{time}$

$d = rt$