

ANSWERS

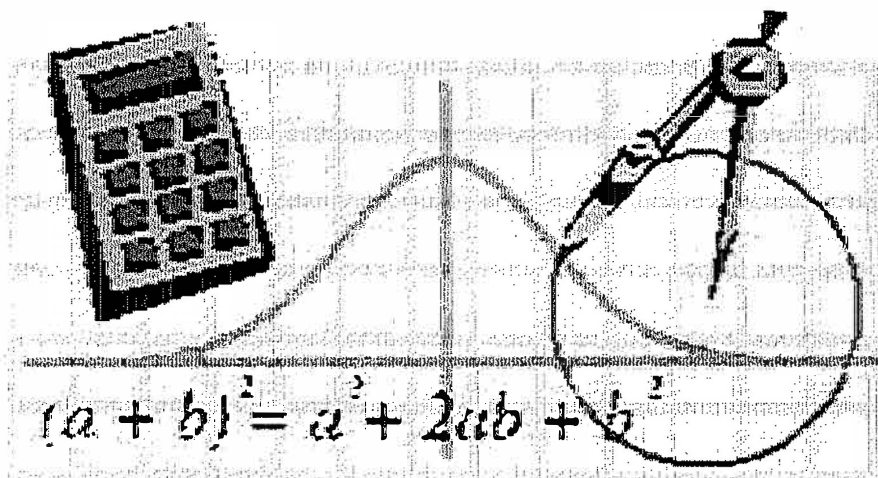
Downingtown High School

East/West

Keystone Algebra 1 Review

Module 1

Operations with Real Numbers and Expressions



1. Evaluate the following expression for $m = 9$.

$$\sqrt{4m} + 5$$

$$\sqrt{4 \cdot 9} + 5 = \sqrt{36} + 5 = 6 + 5 = 11$$

- A. 7
- B. 11**
- C. 1
- D. 17

2. Simplify the following expression.

$$8^4 \cdot 8^3 = 8^{4+3} = 8^7$$

- A. $8(12)$
- B. 8^7**
- C. 8^{12}
- D. $8(7)$

3. Simplify: $7\sqrt{54} - 2\sqrt{24}$

- A. $25\sqrt{6}$
- B. $9\sqrt{6}$
- C. $17\sqrt{6}$**
- D. $55\sqrt{6}$

$$\begin{aligned} 7\sqrt{54} - 2\sqrt{24} \\ 7 \cdot \sqrt{9} \cdot \sqrt{6} - 2\sqrt{4} \cdot \sqrt{6} \\ 7 \cdot 3\sqrt{6} - 2 \cdot 2\sqrt{6} \\ 21\sqrt{6} - 4\sqrt{6} \\ 17\sqrt{6} \end{aligned}$$

4. The expression below should be further simplified for which value of x ?

$$\sqrt{85x}$$

- A. 185**
- B. 53
- C. 74
- D. 3

$$\begin{aligned} \sqrt{85x} \\ \sqrt{5 \cdot 17 \cdot x} \end{aligned}$$

So I need another #
which can be divided
by 5 or 17, so **A. 185**

5. Factor the following polynomial completely.

$$-0.9x^2 - 4.5x + 12.6$$

A. $-0.9(x+7)(x+2)$

B. $0.9(x+7)(x-2)$

C. $-0.9(x^2 + 5x - 14)$

D. $-0.9(x+7)(x-2)$

First factor out -0.9
 $-0.9(x^2 + 5x - 14)$ → find 2 # whose product is -14 ,
 $-0.9(x-2)(x+7)$ & whose sum is 5

6. Order the following from least to greatest.

$$\frac{.6666}{3}, 0.56, 14\%, 77\%, \frac{1}{2}$$

change all to decimals then order.

A. $\frac{1}{2}, \frac{2}{3}, 0.56, 14\%, 77\%$

B. $14\%, \frac{1}{2}, 0.56, \frac{2}{3}, 77\%$

C. $14\%, \frac{1}{2}, \frac{2}{3}, 77\%, 0.56$

D. $77\%, \frac{2}{3}, 0.56, \frac{1}{2}, 14\%$

7. The Rose Theater seats 146 people, and the theater is hosting a play for 8 nights. If the theater is at about 80% capacity for each night of the play, approximately how many people will attend the play?

A. 1168

B. 934

C. 123

D. 1176

$$146 \cdot 80\% = 146 \cdot .8 \approx 117 \text{ people per night; times 8 nights } \approx 934$$

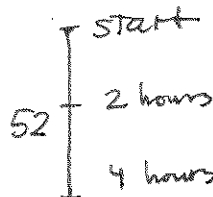
8. Mick is participating in a cross county bike race. Every 2 hours he travels between 38 and 50 miles. Four hours ago, Mick had traveled 52 miles from the start of the race. Which is a reasonable measure of Mick's distance from the start of the race now?

A. 158 miles

B. 142 miles

C. 166 miles

D. 118 miles



average of 38 and 50 is

$$\frac{38+50}{2} = 44$$

so every 2 hours he travels 44 miles.

In 4 hours he would go 88 miles, then add the original 52 miles & you have 140 miles.

9. Evaluate the following expression when $n = 2$.

$$2|3 - 6n| + |2|$$

A. 20

B. 16

C. -20

D. -16

$$2|3 - 6 \cdot 2| + |2|$$

$$2|3 - 12| + 2$$

$$2|-9| + 2$$

$$2 \cdot 9 + 2 = 18 + 2 = 20$$

10. Simplify the following expression.

$$\frac{3x^3 + 18x^2 - 15x}{3x}$$

A. $3x^3 + 18x^2 - 5$

B. $x^2 + 6x - 5$

C. $19x^2 + 5x$

D. $x^2 + 15x - 12$

$$\frac{\cancel{3x}(x^2 + 6x - 5)}{\cancel{3x}} = (x^2 + 6x - 5)$$

11. Simplify: $(7x^2 + 6x + 3) - (2x^2 - 3x + 7)$

A. $9x^2 + 9x - 4$

B. $5x^2 + 9x - 4$

C. $9x^2 + 9x - 10$

D. $5x^2 + 3x - 4$

$$\begin{array}{r} 7x^2 + 6x + 3 \\ - 2x^2 + 3x - 7 \\ \hline 5x^2 + 9x - 4 \end{array}$$

12. Factor the following polynomial.

$$16x^2 + 20x$$

A. $4x(4x + 20)$

B. $4x^2(4x + 5)$

C. $4x(4x + 5)$

D. $4(4x + 5)$

$$4x(4x + 5)$$

13. Factor the following expression completely.

$$x^4 - 1$$

- A. $(x - 1)(x^3 + 1)$
- B. $(x - 1)(x + 1)(x^2 + 1)$**
- C. $(x - 1)(x + 1)(x - 1)(x + 1)$
- D. $(x^2 - 1)(x^2 + 1)$

$$(x^2 + 1)(x^2 - 1)$$

$$(x^2 + 1)(x + 1)(x - 1)$$

when you see this, you'll have to factor more than once

14. First State Bank has a drive-thru for customers who are making withdrawals or deposits. The drive-thru is open 5 days a week for 8 hours per day. Every hour, the bank serves 4 to 8 drive-thru customers. If two-thirds of drive-thru customers make a deposit, then about how many drive-thru customers will make a deposit in one work week?

- A. 160 drive-thru customers**
- B. 80 drive-thru customers
- C. 20 drive-thru customers
- D. 224 drive-thru customers

$$\frac{4+8}{2} = \frac{12}{2} = 6 \text{ per hour}$$

$$\frac{2}{3} \cdot \frac{6}{1} = \frac{12}{3} = 4 \text{ make a deposit}$$

$$4 \cdot 8 \text{ hours} = 32 \cdot 5 \text{ days} = 160$$

15. Simplify: $4(13 - |-9 + 4|) - |9 - 7|^2$

- A. -4
- B. 28**
- C. 43
- D. 16

$$4(13 - |-9 + 4|) - |9 - 7|^2$$

$$4(13 - |-5|) - |2|^2$$

$$4(13 - 5) - 2^2$$

$$4(8) - 2^2 = 32 - 4 = 28$$

16. Evaluate the following expression when $r = 3$ and $t = 2$.

$$(2 \times r^t)^{-2}$$

- A. $\frac{4}{81}$
- B. -36
- C. $\frac{1}{2}$
- D. $\frac{1}{324}$**

$$(2 \cdot 3^2)^{-2}$$

$$(2 \cdot 9)^{-2}$$

$$(18)^{-2} = \frac{1}{18^2} = \frac{1}{324}$$

17. Simplify: $(6x^2 - 8x - 1)(2x - 5)$

- A. $12x^3 - 46x^2 + 38x - 5$
- B. $12x^3 - 14x^2 - 42x + 5$
- C. $12x^3 + 14x^2 - 42x - 5$
- D. $12x^3 - 46x^2 + 38x + 5$**

$$\begin{array}{r} 12x^3 - 30x^2 + 0x + 0 \\ 0x^3 - 16x^2 + 40x + 0 \\ \hline 0x^3 + 0x^2 - 2x + 5 \\ \hline 12x^3 - 46x^2 + 38x + 5 \end{array}$$

18. What is the greatest common factor (GCF) of the monomials shown below?

$$14x^3y^3z^2 \quad 22xy^2$$

A. $2xy^2$

B. $2x^3y^3z^2$

C. $154x^4y^5z^2$

D. $154x^3y^3z^2$

$14 = 2 \cdot 7$

$22 = 2 \cdot 11$

so z is common

$x^3 = x \cdot x \cdot x$

$x = x$

so x is "

$y^3 = y \cdot y \cdot y$

$y^2 = y \cdot y$

so y^2 is "

$2xy^2$

19. Look at the two monomials below.

$$6u^2v^2w^3 \quad 10u^3vw^4$$

What is the least common multiple (LCM) of the monomials shown above?

A. $30u^3v^2w^4$

B. $30u^5v^3w^7$

C. $2u^5v^3w^7$

D. $2u^2vw^3$

$6 = 6, 12, 18, 24, 30, \dots$

$10 = 10, 20, 30, \dots$

then take largest of each variables exponents

20. Simplify the following expression.

$$\frac{2x^2 + 12x + 16}{2x^2 + 4x - 16}$$

$$= \frac{2(x^2 + 6x + 8)}{2(x^2 + 2x - 8)} = \frac{\cancel{2}(x+4)(x+2)}{\cancel{2}(x+4)(x-2)}$$

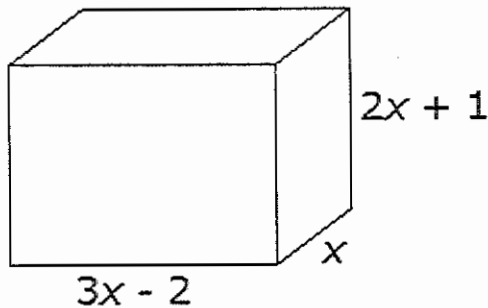
A. $\frac{2x + 4}{x + 2}$

B. $\frac{x + 2}{x - 2}$

C. $\frac{x - 2}{2x - 1}$

D. $\frac{x - 2}{x + 4}$

21. Alena is packing a box that has a height of one inch more than twice the width and a length of two inches less than three times the width, as shown in the diagram below.



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

$$x(6x^2 - 4x + 3x - 2) =$$

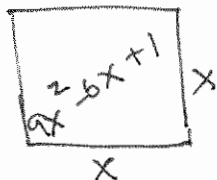
$$x(6x^2 - x - 2) = 6x^3 - x^2 - 2x$$

on formula sheet

A. Write a polynomial expression, in simplified form, that represents the volume of the box.

$$\begin{aligned} \text{Volume} &= \text{Length} \cdot \text{width} \cdot \text{height} \\ &= x(3x-2)(2x+1) \\ &= 6x^3 - x^2 - 2x \text{ cubic units} \end{aligned}$$

B. Alena packs another box. This box has a square base with an area of $9x^2 - 6x + 1$ square inches. Write an expression to represent one side length of the base.



factor!

$$9x^2 - 6x + 1$$

$$(3x-1)(3x-1)$$

each side is $3x-1$ units long

C. Alena has a third box whose height is the same as the first box, but whose volume is $6x^3 + 15x^2 + 6x$ cubic inches. Determine how much wider and longer this box is than the first box. Assume that the length of the box has a larger coefficient than the width. Show all your work. Explain why you did each step.

$$6x^3 + 15x^2 + 6x$$

$$3x(2x^2 + 5x + 2)$$

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

new length height is same new width

① I factored to find a variable expression for the length, width + height.

② I compared the expressions for the new + old expressions dimensions & found that new ones were 2 inches longer.

old: $3x-2$ } new is 2" longer

new: $3x$

old: x

new: $x+2$ } new is 2" longer