

No Calculator

STACK AND SOLVE

5 CAREFULLY

$$(x^2y - 3y^2 + 5xy^2) - (-x^2y + 3xy^2 - 3y^2)$$

Which of the following is equivalent to the expression above?

- A) $4x^2y^2$
- B) $8xy^2 - 6y^2$
- C) $2x^2y + 2xy^2$
- D) $2x^2y + 8xy^2 - 6y^2$

$$\begin{array}{r} (x^2y - 3y^2 + 5xy^2) \\ - (-x^2y + 3xy^2 - 3y^2) \\ \hline 2x^2y \qquad \qquad \qquad 2xy^2 \end{array}$$

YOU COULD STOP RIGHT HERE

7 TRANSLATE

Also Used as Analysis in History/Social Studies

BLIGGETY BLAH

$$m = \frac{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N}{\left(1 + \frac{r}{1,200}\right)^N - 1}$$

DIVIDE BY BOTH SIDES
MULT BY BOTH SIDES

The formula above gives the monthly payment m needed to pay off a loan of P dollars at r percent annual interest over N months. Which of the following gives P in terms of m , r , and N ?

- A) $P = \frac{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N}{\left(1 + \frac{r}{1,200}\right)^N - 1} m$
- B) $P = \frac{\left(1 + \frac{r}{1,200}\right)^N - 1}{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N} m$
- C) $P = \left(\frac{r}{1,200}\right) m$
- D) $P = \left(\frac{1,200}{r}\right) m$

IN OTHER WORDS, SOLVE FOR P

FLIP AND GO

8

If $\frac{a}{b} = 2$, what is the value of $\frac{4b}{a}$?

- A) 0
- B) 1
- C) 2
- D) 4

$$\frac{a}{b} = 2 \qquad \frac{4b}{a} = \frac{4(1)}{2} = 2$$

PLUG IN AND GO

10

$$g(x) = ax^2 + 24$$

For the function g defined above, a is a constant and $g(4) = 8$. What is the value of $g(-4)$?

- A) 8
- B) 0
- C) -1
- D) -8

$$\begin{aligned} g(x) &= ax^2 + 24 \\ g(4) &= a(4)^2 + 24 = 8 \\ a(16) &= -16 \\ a &= -1 \\ \text{so, } g(-4) &= -1(-4)^2 + 24 = \\ &= -1(16) + 24 = \\ &= -16 + 24 = 8 \end{aligned}$$

GET FAMILIAR!

13 THEY EXPECT YOU TO PLOD THRU THIS

If $x > 3$, which of the following is equivalent

$$\text{to } \frac{1}{\frac{1}{x+2} + \frac{1}{x+3}} \quad ? \times \frac{(x+2)(x+3)}{(x+2)(x+3)} =$$

$$\text{A) } \frac{2x+5}{x^2+5x+6}$$

$$\text{B) } \frac{x^2+5x+6}{2x+5}$$

$$\text{C) } 2x+5$$

$$\text{D) } x^2+5x+6$$

$$\begin{aligned} &\frac{(x+2)(x+3)}{(x+3) + (x+2)} = \\ &\frac{x^2+5x+6}{2x+5} \end{aligned}$$

GET FAMILIAR

14

If $3x - y = 12$, what is the value of $\frac{8^x}{2^y}$? $\frac{8^x}{2^y} = \frac{(2^3)^x}{2^y} = \frac{2^{3x}}{2^y}$

- A) 2^{12}
- B) 4^4
- C) 8^2
- D) The value cannot be determined from the information given.

SO, $3x - y = 12$
THEN, $2^{12} = 2^{3x-y}$

GET FAMILIAR

15

If $(ax+2)(bx+7) = 15x^2 + cx + 14$ for all values of x , and $a+b=8$, what are the two possible values for c ?

- A) 3 and 5
- B) 6 and 35
- C) 10 and 21
- D) 31 and 41

TRY

$$\begin{array}{r} 3x+2 \\ 5x+7 \\ \hline 15x^2+10x \\ \hline 21x+14 \\ \hline 15x^2+31x+14 \end{array} \qquad \begin{array}{r} 5x+2 \\ 3x+7 \\ \hline 15x^2+6x \\ \hline 35x+14 \\ \hline 15x^2+41x+14 \end{array}$$

$a+b=8$
 $1+7$
 $2+6$
 $3+5 = 13 \cdot 5 = 15$
 $4+4$

FACTOR

16

If $t > 0$ and $t^2 - 4 = 0$, what is the value of t ?

$$\begin{aligned} t^2 - 4 &= 0 && \text{ALSO KNOW THAT} \\ t^2 &= 4 && t^2 - 4 = 0 \\ t &= 2 && (t+2)(t-2) = 0 \\ &&& t = -2 \quad t = 2 \end{aligned}$$

RATIO

20

If $a = 5\sqrt{2}$ and $2a = \sqrt{2x}$, what is the value of x ?

$$\begin{aligned} a &= 5\sqrt{2} \\ 2a &= 10\sqrt{2} = \sqrt{2x} \\ 10\sqrt{2} &\text{ ALSO EQUALS } \sqrt{200} \\ \text{SO } \sqrt{2x} &= \sqrt{200} \quad x = 100 \end{aligned}$$

With Calculator

$$a = 1,052 + 1.08t$$

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between a , the speed of a sound wave, in feet per second, and t , the air temperature, in degrees Fahrenheit ($^{\circ}\text{F}$).

BLIGGETY BLAH! TRANSLATE

9 Also Used as Analysis in Science

Which of the following expresses the air temperature (t) in terms of the speed of a sound wave?

A) $t = \frac{a - 1,052}{1.08}$

B) $t = \frac{a + 1,052}{1.08}$

C) $t = \frac{1,052 - a}{1.08}$

D) $t = \frac{1.08}{a + 1,052}$

* IN OTHER WORDS, SOLVE FOR T

$$a = 1052 + 1.08t$$

$$a - 1052 = 1.08t$$

$$\frac{a - 1052}{1.08} = t$$

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25 Also Used as Analysis in Science

$$h = -4.9t^2 + 25t$$

The equation above expresses the approximate height h , in meters, of a ball t seconds after it is launched vertically upward from the ground with an initial velocity of 25 meters per second. After approximately how many seconds will the ball hit the ground?

A) 3.5

B) 4.0

C) 4.5

D) 5.0

HEIGHT WILL BE 0 TWICE.

WHEN LEAVING GROUND AND, LASTLY, HITTING GROUND.

SO $t = 0$ AND...

$$0 = -4.9t^2 + 25t$$

$$0 = t(-4.9t + 25)$$

$$-4.9t + 25 = 0$$

$$25 = 4.9t$$

GET FAMILIAR! $5.1 \approx \frac{25}{4.9} = t$

29 HARDER BE NIMBLE QUESTION

For a polynomial $p(x)$, the value of $p(3)$ is -2 .

Which of the following must be true about $p(x)$?

A) $x - 5$ is a factor of $p(x)$.

B) $x - 2$ is a factor of $p(x)$.

C) $x + 2$ is a factor of $p(x)$.

D) The remainder when $p(x)$ is divided by $x - 3$ is -2 .

$$P(x) = \text{FORMULA} = y$$

$$P(3) = \text{FORMULA} = -2$$

$$\text{SAY } P(x) = 2x - 8$$

$$P(3) = 2(3) - 8 = -2$$

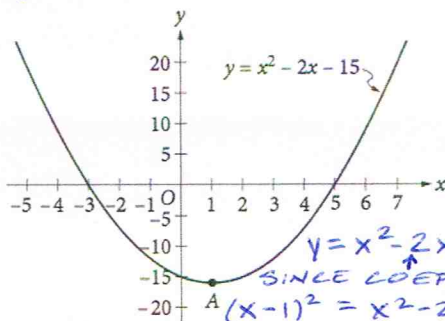
$$\begin{array}{r} 2 \\ 50 \overline{) 2x - 8} \\ \underline{- 2x - 6} \\ -2 \end{array}$$

(CAN ALSO BE WRITTEN AS:)

$$\begin{array}{r} 2 \\ 2 \overline{) -2} \\ \underline{-2} \\ x - 3 \end{array}$$

GET FAMILIAR W/ QUADRATIC FUNCTION

30 $q(x) = a(x-h)^2 + k$ (h, k) = VERTEX



$$y = x^2 - 2x - 15 = (x^2 - 2x + 1) - 16$$

Which of the following is an equivalent form of the equation of the graph shown in the xy -plane above, from which the coordinates of vertex A can be identified as constants in the equation?

A) $y = (x + 3)(x - 5)$

B) $y = (x - 3)(x + 5)$

C) $y = x(x - 2) - 15$

D) $y = (x - 1)^2 - 16$

TOO OBVIOUS

$$(x-1)^2 - 16$$

36 DISTRIBUTE AND SOLVE

$$h(x) = \frac{1}{(x-5)^2 + 4(x-5) + 4}$$

For what value of x is the function h above undefined?

* CODE FOR DENOMINATOR = 0

$$(x^2 - 10x + 25) + (4x - 20) + 4 = \frac{1}{x^2 - 6x + 9}$$

$$= \frac{1}{(x-3)^2} = 50$$

$$x - 3 = 0$$

$$x = 3$$

GET FAMILIAR!

Questions 37 and 38 refer to the following information.

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was \$100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

YOU WILL SEE THIS AND #38

37 Also Used as Analysis in History/Social Studies

What is the value of x in the expression?

1.02

EX. 2 YEARS

$$100(1.02) = 102 \text{ YR 1}$$

$$102(1.02) = 104.04 \text{ YR 2}$$

SAME AS

$$100(1.02)^2$$

$$= 100(1.0404)$$

$$= 104.04$$

38 Also Used as Analysis in History/Social Studies

Jessica's friend Tyshaun found an account that earns 2.5 percent interest compounded annually. Tyshaun made an initial deposit of \$100 into this account at the same time Jessica made a deposit of \$100 into her account. After 10 years, how much more money will Tyshaun's initial deposit have earned than Jessica's initial deposit? (Round your answer to the nearest cent and ignore the dollar sign when gridding your response.)

OR

$$100(x)^2 = 104.04$$

$$x^2 = \frac{104.04}{100}$$

$$\sqrt{x^2} = \sqrt{1.0404}$$

$$x = 1.02$$

$$\begin{array}{r} \text{I} \\ 100(1.025)^{10} \\ 128.008 \end{array} - \begin{array}{r} \text{J} \\ 100(1.02)^{10} \\ 121.899 \end{array} = 6.109$$

$$\approx 6.11$$