Central Arizona College

2019 Pinal County High School Math Competition

Qualifier

Identify the equation as a parabola, circle, ellipse, or hyperbola.

$$4x^2 = 16y^2 + 64$$

a.) Ellipse

b.) Hyperbola

c.) Parabola

d.) Circle

e.) None of the above.

How many ways can a president, vice-president, and secretary be chosen from a club with 12 members? Assume that no member can hold more than one office.

a.) 220

b.) 6

c.) 36

d.) 1320

e.) None of the above.

Evaluate the sum. Round nearest integer, if necessary.

$$\sum_{k=2}^{5} (-1)^{k+1} (k+8)^2$$

a.) 534

b.) 351,788

c.) 46

d.) -534

e.) None of the above.

Find the domain and range of the inverse of the given function.

$$f(x) = \frac{1}{x + 4}$$

a.) domain: $(-\infty, -4) \cup (-4, \infty)$; Range: $(-\infty, 0) \cup (0, \infty)$

b.) domain and Range: All Real Numbers

c.) domain: All Real Numbers; Range: $(-\infty, -4) \cup (-4, \infty)$

d.) domain: $(-\infty, 0) \cup (0, \infty)$; Range: $(-\infty, -4) \cup (-4, \infty)$

e.) None of the above.

Factor f(x) into linear factors given that k is a zero of f(x).

$$f(x) = x^3 - 12x - 16; \quad k = -2 \text{ (multiplicity 2)}$$

a.) $f(x) = (x+2)^2(x+4)$

b.) $f(x) = (x+2)^2(x-4)$

c.) $f(x) = (x-2)^2(x-4)$

d.) $f(x) = (x+4)(x+2)(x-2)$

e.) None of the above.

Solve the problem.
How much pure acid should be mixed with 6 gallons of a 50% acid solution in order to get an 80% acid solution?

a.) 15 gallons

b.) 24 gallons

c.) 9 gallons

d.) 3 gallons

e.) None of the above.

Write an equation for the line described. Write the equation in the form specified.

parallel to y + 8x = 4, through (4, 5); standard form

a.) $y = -8x + 37$

b.) $y = -8x - 37$

c.) $y = -\frac{1}{8}x - \frac{37}{8}$

d.) $y = 8x - 37$

e.) None of the above.