

Test: Statistics, exponential, & polynomial functions

1. In an arithmetic sequence, the first term is 5 and the second term is 7.

(a) Find the common difference.

[2]

(b) Find the tenth term.

[2]

(c) Find the sum of the first fifteen terms of the sequence.

[2]

2. Simplify the expression $\sqrt{x^4y^2}$.

[2]

3. Carlos puts \$12,500 into an investment account with interest compounded continuously. If the annual interest rate is 3.15% what is the balance after 5 years?

[5]

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4. Given the function $f(x) = x^3 - 2x^2 - 5x + 6$.

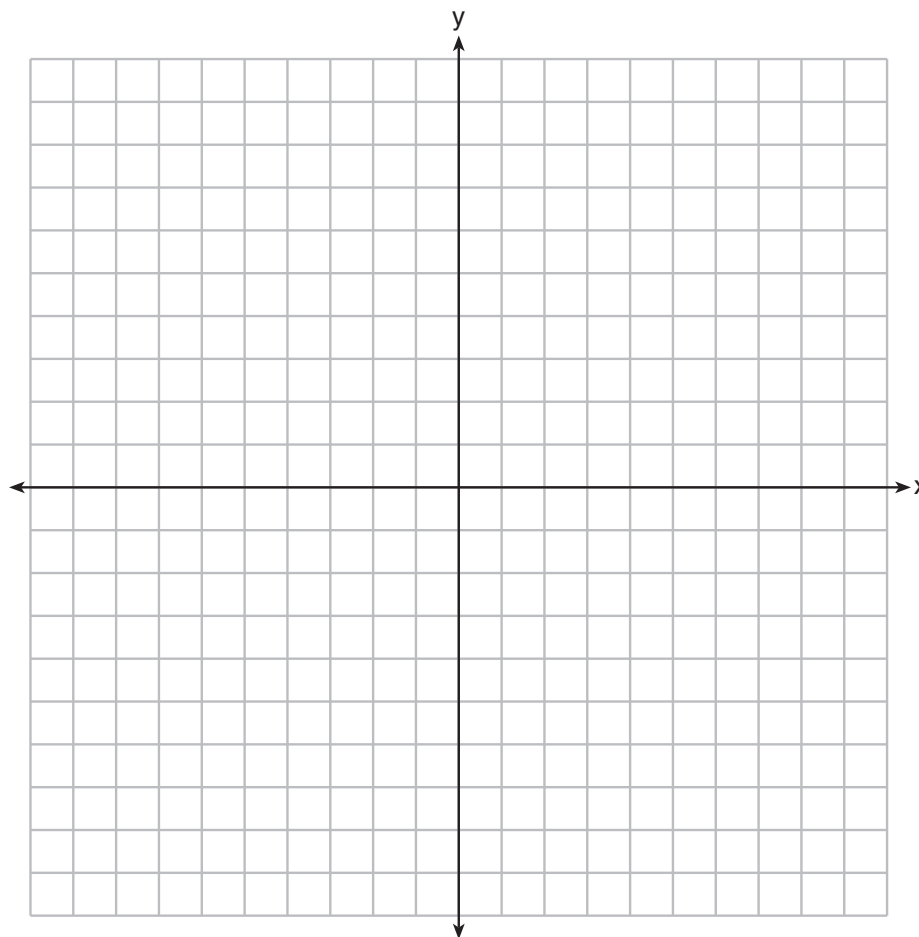
(a) Write down the y -intercept.

[2]

(b) Find the x -intercepts, rounding to the nearest hundredth.

[2]

(c) Graph the function on the grid below, carefully passing through the correct intercepts.



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5. The expression $(x + a)(x + b)$ can not be written as

(a) $a(x + b) + b(x + b)$

(b) $x^2 + ax + bx + ab$

(c) $x^2 + (a + b)x + ab$

(d) $x(x + a) + b(x + a)$

[3]

6. Consider a geometric sequence where the first term is 138 and the second term is 115.

(a) Find the common ratio, r .

[1]

(b) Find the seventh term.

[2]

(c) Find the least value of n such that the n th term of the sequence is less than 20.

[3]

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7. Algebraically determine the values of h and k to correctly complete the identity stated below.

$$3x^3 - 5x^2 + 3 = (x - 2)(3x^2 + hx + 2) + k$$

[4]

8. Three consecutive terms of a geometric sequence are $x - 5$, 8, and $x + 7$. Find the possible values of x .

[6]

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9. A bank account earns interest at a continuous interest rate of 3.925% per year. The initial deposit is \$175. Which function models the value of the balance? [5]

(a) $P(t) = 175 \cdot 1.04^t$

(b) $P(t) = 175(1 + 0.03925)^t$

(c) $P(t) = 175 \cdot 1.03925^t$

(d) $P(t) = 175 \cdot e^{0.04t}$

10. Write $\sqrt{a^5} \div a^{\frac{1}{2}}$ as an expression with positive, integer exponents.

[3]

11. The function $p(t) = 110e^{0.0325t}$ models the population of a city, in millions, t years after 2010.

- (a) Initially, as of 2010, what is the population in millions?

[1]

- (b) What is the annual continuous rate, expressed as in percent, that the population increases?

[1]

- (c) Find the population in 2015, rounded to the nearest million.

[2]

- (d) In what year will the population be approximately 138 million?

[2]