

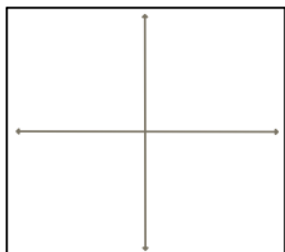
DIRECT & SYNTHETIC SUBSTITUTION

1. Evaluate $h(x) = 6x^5 + 10x^3 - 27$; $x = -3$, using Direct Substitution
2. Evaluate $f(x) = 2x^4 - 5x^3 - 4x + 8$; $x = 4$, using Synthetic Substitution

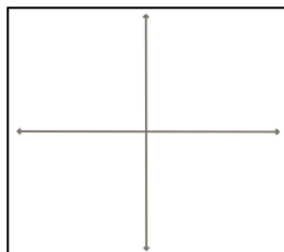
GRAPHS OF POLYNOMIAL FUNCTIONS

Make a sketch of the following polynomial functions. Identify the degree and leading coefficients.

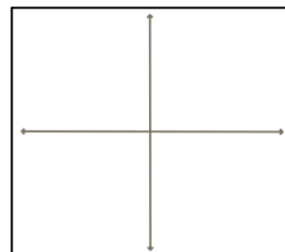
1. $f(x) = 3x^3 - 2x$



2. $g(x) = -2x^2 + 1$



3. $h(x) = -3x^4 + x^2 - x + 2$

**OPERATIONS WITH POLYNOMIAL FUNCTIONS**

1. Simplify $(2x^3 - 5x^2 + 3x - 9) + (x^3 + 6x^2 + 11)$
2. Simplify $(12x^2 + 2x - 5) - (4x^2 + 10)$
3. Simplify $(y - 2)(2y^2 + 3y - 6)$
4. Simplify $(2x + 5)^2$
5. Write in standard form $(x + 5)^2(x + 2)$

FACTORING COMPLETELY

1. Factor: $20x^3 - 5x^2 + 10x$
2. Factor: $27x^3 + 125$
3. Factor: $16x^2 - 25$
4. Solve by factoring: $x^2 + 12x + 27 = 0$
5. Solve by factoring: $8m^2 - 10m - 3 = 0$

EXPONENTS

1. Simplify: $(3x^2y)^3(2x^4y)$
2. Simplify: $\frac{-49a^0b^{-4}c}{7a^{-3}b^{-5}c^3}$
3. Simplify: $\left(\frac{4w^{-5}x^2y^{-1}}{5w^{-3}xy^{-2}}\right)^{-2}$

EVALUATE FUNCTIONS

1. Find $f(-3)$ if $f(x) = x^2 - 4x + 2$.
2. Find $g\left(\frac{1}{2}\right)$ if $g(x) = 4x^2$.
3. Find $h(0)$ if $h(x) = 5x^2 - 10x + 15$.

OPERATIONS WITH FUNCTIONS

Use the following functions: $f(x) = 3x - 2$ $g(x) = x^2 + 3$ $h(x) = 2x$

1. Find $f + g$
2. Find $g - f$
3. Find $h \cdot f$
4. Find $\frac{f}{h}$ and state the domain restriction.

COMPOSITE FUNCTIONS

Use the following functions: $f(x) = 3x - 2$ $g(x) = x^2 + 3$ $h(x) = 2x$

1. Find $f(g(x))$
2. Find $f(h(x))$
3. Find $g(f(2))$

INVERSE FUNCTIONS

1. Find the inverse of the following function: $\{(-1, 2), (3, 6), (7, 10), (11, 2)\}$
2. Is the inverse a function?
3. Find the inverse of the function: $f(x) = 4x - 3$
4. Find the inverse of the function: $g(x) = \frac{1}{3}(x - 4)$

Rational Exponents

Evaluate: 1. $32^{3/5}$ 2. $125^{-2/3}$ 3. $16^{-1/2}$

Solving Radical Equations

Solve each equation. Check for extraneous solutions.

1. $(x+5)^4 - 3 = 13$ 2. $9x^{\frac{2}{5}} = 36$ 3. $(x-5)^{\frac{5}{3}} - 73 = 170$

4. $5\sqrt[3]{x-3} - 2 = 18$ 5. $\sqrt{8x+3} - \sqrt{3x+2} = 0$

Properties of Exponential Functions

Determine whether each function represents a quadratic, linear, or exponential function.

1. $y = 5x$ 2. $y = 4x^2$ 3. $y = 4x(3 - 20x)$ 4. $y = 2(3)^x$

Graphs of Exponential Functions

1. Graph $f(x) = 2^x$ and $g(x) = 2^x + 3$ and describe the transformation that occurred.

2. What is the domain and range of each function?

3. Which graph(s) are exponential growth? $y = 2^x$, $y = 2(4)^x$, or $y = \left(\frac{1}{2}\right)^x$

Exponential Growth

1. Predict the population of 75 bacteria after 3 hours that doubles every hour.

2. Predict the population of 35 bacteria after 3 hours that doubles every 30 minutes.

3. The population of a small US city was 15,560 people in 1980 and was growing at a rate of 2.3% each decade. Find the population of the city in the year 2010.

Exponential Decay

1. The rate of which caffeine is eliminated from the bloodstream is about 15% per hour. If you have 56 milligrams of caffeine in your bloodstream now, find the amount of caffeine left after 4 hours.

2. The population of a school was 1800 students in 2010 and was declining at a rate of 4.5% each year. Find the number of students in the school in the year 2012.

3. Determine if the functions represent exponential growth or decay:

a) $y = 20\left(\frac{1}{4}\right)^x$

b) $y = \frac{1}{2}(4)^x$

Compound Interest

Find the final amount for each investment:

1. \$2000 at 5% interest compounded annually for 20 years.
2. \$1600 at 2.4% interest compounded quarterly for 10 years.
3. \$1800 at 4.65% interest compounded daily for 6 years.
4. \$1500 at 3.75% annual interest compounded continuously for 4 years.

Exponential and Logarithmic Equations

Solve the following equations. Round your answers to the nearest hundredth.

1. $e^{2x} = 12$

2. $\ln(x) = 2$

3. $4^{2x} + 3 = 50$

4. $2\ln(x) = \ln(4x + 12)$

5. $\ln(2x + 3) = \ln(7x - 4)$

6. $\ln(-12x - 20) = \ln(x^2)$

7. $3^{x+1} = 50$

8. $5 + \log_3 x = 7$

9. $2(5^x) + 3 = 205$

10. $\log_x 125 = 3$

Logarithmic Word Problems (applications)

1. Newton's Law of Cooling follows the formula: $T(t) = T_R + (T_0 - T_R)e^{-.389t}$, where t is time, T_R is the surrounding temperature and T_0 is the initial temperature. The lasagna's temperature is 370 degrees immediately after it is removed from the oven into the 65 degree room. Find out how long it would take the lasagna to cool to a more edible 90 degrees.

Variation Problems

1. The amount each person will need to pay for a wedding gift varies inversely as the number of people going in on the gift. If 4 people pay \$27.50 each, how much would it cost per person if 6 people went in on the gift?

2. The distance a car travels before stopping after the driver brakes varies directly as the square of the speed of the car. If a car travels 30 feet after the driver brakes when the car's speed is 20 mph, how far will the car travel after the driver brakes if the car's speed is 60 mph?

PERMUTATIONS

1. How many ways are there to arrange
 - (a) 5 objects in a row
 - (b) any 5 different letters of the alphabet
 - (c) the letters in the word ASSESSMENT

COMBINATIONS

1. A coed dodgeball team must consist of 3 boys and 3 girls. A team has 8 boys and 5 girls on its roster. How many ways are there to select the players to start the game?
2. How many 5-card poker hands are there that consist of 3 Aces and 2 Face Cards?
3. An ice cream parlor has 30 different flavors. You can choose from 20 toppings. How many sundaes can be made that use exactly 3 flavors and exactly 2 toppings?

DIFFERENTIATE BETWEEN PERMUTATIONS/COMBINATIONS

1. Eight percussionists are trying out for the 3 snare drum positions on Eagan's Drumline.
2. In a local election, there are seven people running for three positions. The person that has the most votes will be elected to the highest paying position. The person with the second most votes will be elected to the second highest paying position, and likewise for third place.
3. 8 people are to be photographed, but there are only 5 seats available. In how many ways can 8 people be seated in 5 seats?
4. An arcade has 15 different arcade games. You want to play 5 of them.

DISJOINT/OVERLAPPING EVENTS

1. You choose a card from a standard deck of cards. What is the probability that it is a face card or red?
2. Christina has a stack of playing cards consisting of 10 hearts, 8 spades, and 7 clubs. If she selects a card at random from this stack, what is the probability that it is a heart or a club?
3. There are 2400 subscribers to an Internet service provider. Of these, 1200 own Brand A computers, 500 own Brand B, and 100 own both A and B. What is the probability that a subscriber selected at random owns either Brand A or Brand B?

CONDITIONAL PROBABILITIES

1. You draw one card from a deck of 52. What is the probability that you get a face card, given that the card is red?
2. You roll a pair of dice. What is the probability that the sum is even, given that the sum is less than 7.

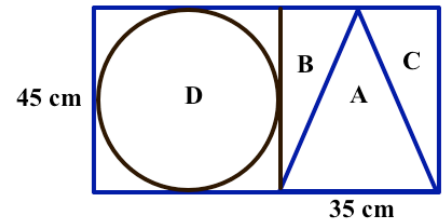
COMPLEMENTS

1. If $P(E) = 0.73$, $P(\bar{E}) = \underline{\hspace{2cm}}$.
2. Two six-sided dice are rolled. What is the probability that the sum is not 11?

GEOMETRIC PROBABILITY

A point inside the rectangle is selected at random.

1. What is the probability that the point is in circle D?
2. What is the probability that the point is in triangle A?
3. What is the probability that the point is in triangles B or C?

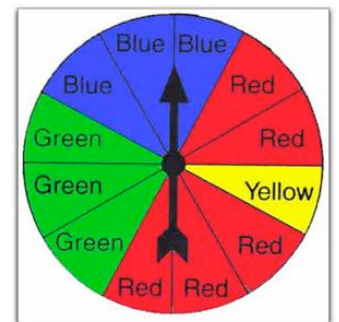


FUNDAMENTAL COUNTING PRINCIPLE

1. How many computer passwords are possible if the password must consist of 5 letters followed by 2 digits. Repetition is allowed.
2. How many ways can you make a sandwich if you can select from 4 kinds of bread, 3 types of meat, and 5 varieties of cheese? (1 each)
3. Matt is taking a geology quiz.
How many ways can he answer all the questions on the quiz if...
 - (a) the test has 5 multiple-choice questions, each having 4 choices?
 - (b) the test has 3 true-false questions, followed by 2 multiple-choice questions having 4 choices each?

DEPENDENT/INDEPENDENT EVENTS

1. What is the probability that you spin twice and get blue both times?
2. What is the probability that you spin twice and get red on the first spin and green on the second spin?
3. If you draw cards from a standard deck, what is the probability that you get 3 Aces with replacement?
4. If you draw cards from a standard deck, what is the probability that you get 3 black cards without replacement?



BINOMIAL DISTRIBUTIONS

The probability that Karissa makes a free-throw is 83%.

1. Find the probability that she makes 8 of the next 12 free-throw attempts.
2. Find the probability that she makes **at least** 8 of the next 12 free-throw attempts.
3. Find the probability that she makes **no more** than 1 of her next 5 attempts.