

1. What is the greatest common factor of $15x^4y^3 - 21x^3y^3 + 6x^2y^2$?
- A x^2y^2
- B xy
- C $3xy^2$
- D $3x^2y^2$
2. Simplify: $\frac{14c^3d^2 - 21c^2d^3}{14cd^2}$
- A $c^2 - \frac{3cd}{2}$
- B $c^2 - \frac{3c^2d}{2}$
- C $c^2 - 21c^2d^2$
- D $c^2d - \frac{3cd}{2}$
3. Simplify: $(x + 2)(x^2 + 2x + 3)$
- A $x^3 + 7x + 6$
- B $5x^2 + 7x + 6$
- C $2x^3 + x^2 + x + 6$
- D $x^3 + 4x^2 + 7x + 6$
4. Which binomial is a factor of $3x^2 + 2x - 5$?
- A $3x - 1$
- B $x - 1$
- C $3x - 5$
- D $x - 5$
5. What is the quotient when $(6x^4 - 9x^2 + 12x)$ is divided by $3x$?
- A $2x^4 - 3x^2 + 4x$
- B $2x^3 + 6x + 4$
- C $2x^3 + 3x + 4$
- D $2x^3 - 3x + 4$
6. Which expression is a factor of $(6x^3 - 13x^2 - 28x)$?
- A $x - 4$
- B $2x - 7$
- C $2x + 7$
- D $3x - 4$

7. Multiply:

$$(3x^6y^4)^{-1}(3x^5y^3)^2$$

A $-27x^{11}y^7$

B $-18x^{11}y^7$

C $2x^4y^2$

D $3x^4y^2$

8. Suppose that the value, V , of a used machine can be calculated by using the formula $V = P\left(1 - \frac{n}{20}\right)$, where P represents the price of a new machine and n represents the machine's age in years. A company purchased a new machine for \$15,000. The value of the machine is now \$12,375. How old is the machine?

A 1.2 years

B 3.5 years

C 4.3 years

D 5.7 years

9. To find the image length, L , of a 4-foot-tall object in a spherical mirror with a focal length of 2 feet, $L = 4\left(\frac{2}{o-2}\right)^2$ can be used, where o is the distance, in feet, of the object from the mirror. What is the image length of the object when it is 1.5 feet away from the mirror?

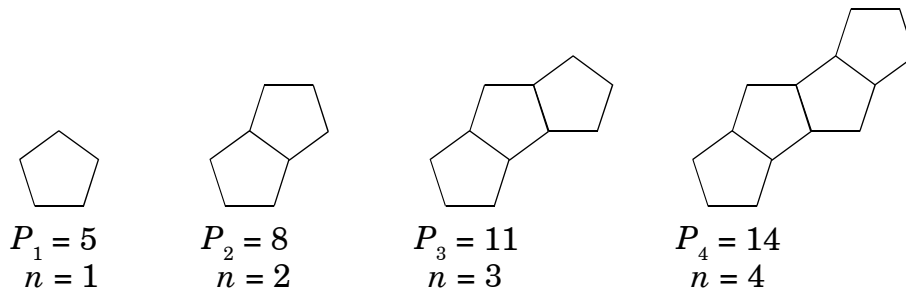
A 256 feet

B 128 feet

C 64 feet

D 32 feet

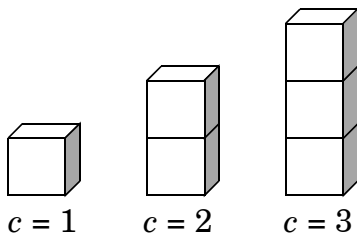
10. The following figures are created with regular pentagons. Each pentagon has a side length of one unit. P_1 is the perimeter of the first figure, P_2 is the perimeter of the second figure, and so on.



According to this pattern, what would be the rule for the perimeter, P_n , of the n th figure when $n > 1$?

- A $P_n = 2P_{n-1} - 2$
- B $P_n = 2P_{n-1} + 4$
- C $P_n = P_{n-1} - 3$
- D $P_n = P_{n-1} + 3$

11. Which expresses the total surface area (including the top and bottom) of a tower of c cubes each having side length e ? (do not include faces that cover each other)



- A $(4c + 2)e^2$
- B $c \cdot e^3$
- C $6c \cdot e^2$
- D $4c \cdot e^2$

12. The number of bacteria in an experiment can be represented by the formula $N_{t+1} = 2.5N_t$. In the formula, N_t is the number of bacteria at the end of t minutes, and N_{t+1} is the number of bacteria at the end of $t + 1$ minutes. There are 16,400 bacteria in the experiment at the end of 7 minutes. How many bacteria will be in the experiment at the end of 10 minutes?

- A 23,429
- B 102,500
- C 123,000
- D 256,250

13. Hooke's law states that the distance a vertical spring stretches varies directly with the weight hanging from it. A spring stretches 14 inches when a 35-pound weight is hanging from it. How much weight is needed to stretch the spring 44 inches?

- A 110 pounds
- B 65 pounds
- C 17.6 pounds
- D 11.1 pounds

14. When x is 3, y is 12. If y varies directly as x , which equation relates x and y ?

A $y = x + 9$

B $y = 15 - x$

C $y = \frac{36}{x}$

D $y = 4x$

15. Suppose that y varies directly as x , and $y = 5$ when $x = 2$. What is the value of y when $x = 7$?

A 2.8

B 10

C 17.5

D 35

16. Neglecting reaction time, the distance required for a car to stop is directly proportional to the square of its velocity. If a car can stop in 8.5 meters at 20 kilometers per hour, **approximately** how many meters are needed to stop at 50 kilometers per hour?

A 13.4

B 21.3

C 53.1

D 117.6

End of Goal 1 Sample Items

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