

Exponential Functions Assignment

K / 21
T / 16
C / 15
A / 18
Total / 70

Name: _____

1. Simplify each as much as possible, and give your answer with only positive exponents.

a) $c^2 c^4 =$

b) $\frac{d^{-2}}{d^2} =$

c) $(m^{-3})^{-2} =$

d) $(r^1 r^{-2})^{-3} =$

6 K

e) $\left(\frac{V}{nb}\right)^{-2} =$

f) $\left(\frac{2q^{-2}}{3r^{-2}}\right)^2 =$

g) $\frac{s^{\frac{1}{6}} s^{\frac{2}{6}}}{s^{\frac{1}{2}}} =$

6 T

h) $(2n^{\frac{1}{2}})^3 (n^{\frac{3}{2}})^3 =$

i) $(y^{\frac{1}{3}} z^0 x^{\frac{1}{2}})^{\frac{2}{7}} =$

2. Evaluate the following, and give your answer as an integer or fraction (do not have exponents in your answer!)

a) $\sqrt[3]{-64} =$

b) $16^{-\frac{1}{4}} =$

4 K

c) $\left(\frac{2}{7}\right)^{-2} =$

d) $\left(\frac{-16}{-9}\right)^{-\frac{3}{2}} =$

3. Give the co-ordinates of each of the following for $y = -(2)^{\frac{1}{3}(x-3)} + 9$

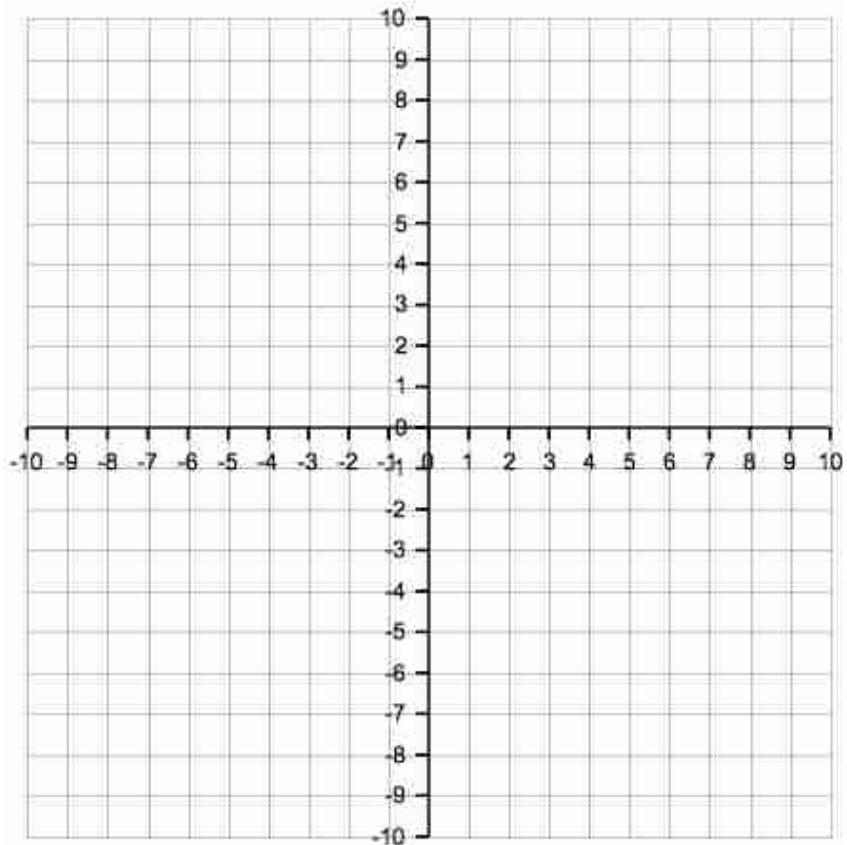
New origin:

1st point

4 K a 2nd point:

a 3rd point:

4. Now, graph the function.



5. Using exponent rules, prove that the graph of $y = 2^{x-5} + \frac{1}{16}$ is the same as the graph of $y = \frac{1}{4}(2)^{x-3} + \frac{1}{16}$.

2 K

6. **Diazepam**, a drug first marketed as Valium, has a half-life in the body of about 7 days.
- a) If a patient took a 500-mg pill, what is the concentration of diazepam in the patient's body after 1 months (4 weeks)?

2 A

- c) Suppose a second dose is required once the amount in his body was just 1 milligram. How long does it take for the mass of diazepam in his body to decrease to this amount?

2 A

7. The Mercedes Benz SLR McLaren is currently selling for \$495,000.
- a) Hoffman buys a McLaren today. Assuming that the car loses 30% of its value each year, estimate how much he could sell the car for in 2016 (5 years from now). Please show your work.

2 A

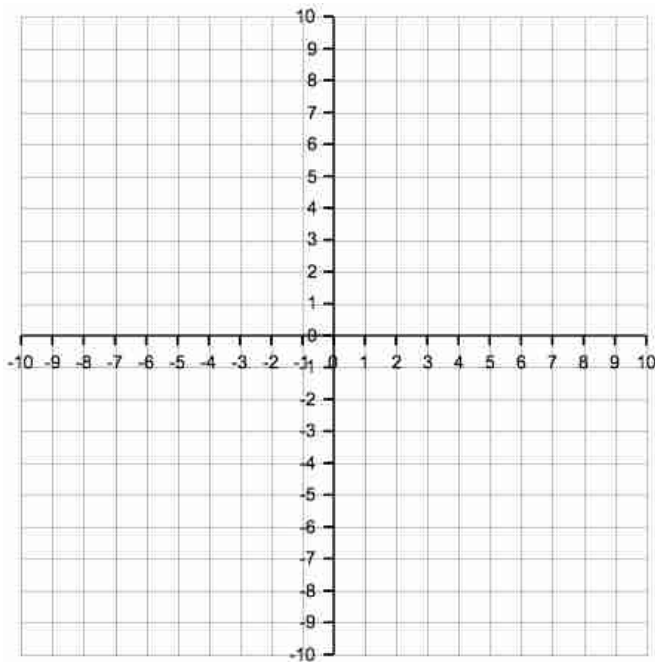
- b) A Ford Focus will sell for \$15000 in 2020. In 10 years, what will be worth more, the 10-year-old McLaren, or the new Ford Focus?

3 A

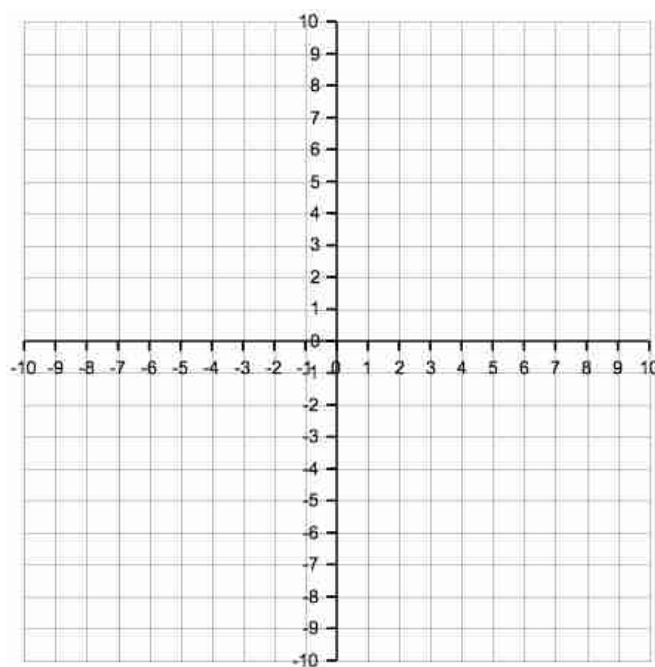
8. Graph each of the following functions.

$$f(x) = -3(2)^{\frac{1}{4}(x-2)} + 7$$

6 C



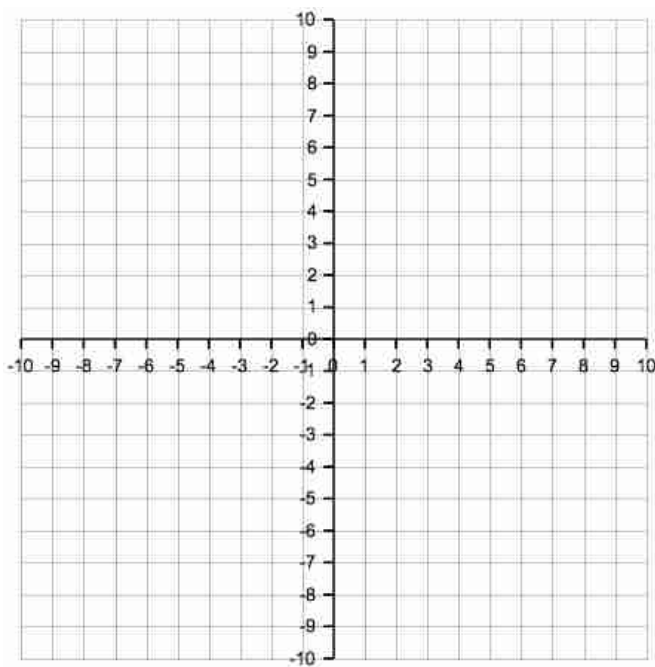
$$g(x) = \frac{1}{2}3^{x-2} - 7$$



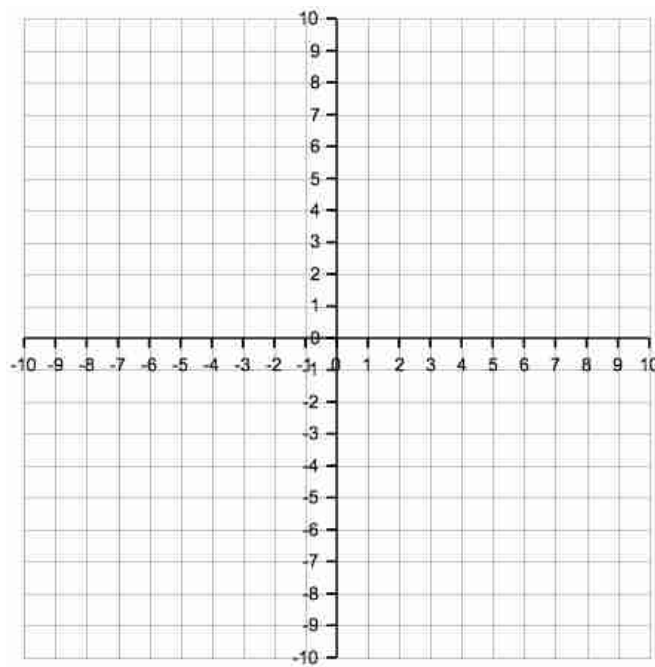
$$h(x) = 3\left(\frac{1}{3}\right)^{\frac{x-3}{3}} - 3$$

6 C

2 T

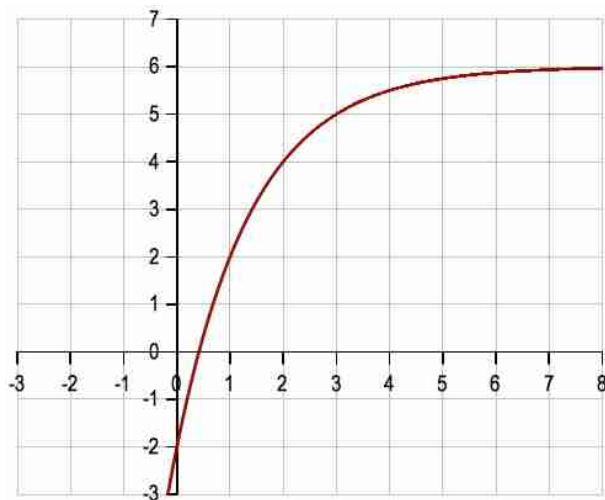
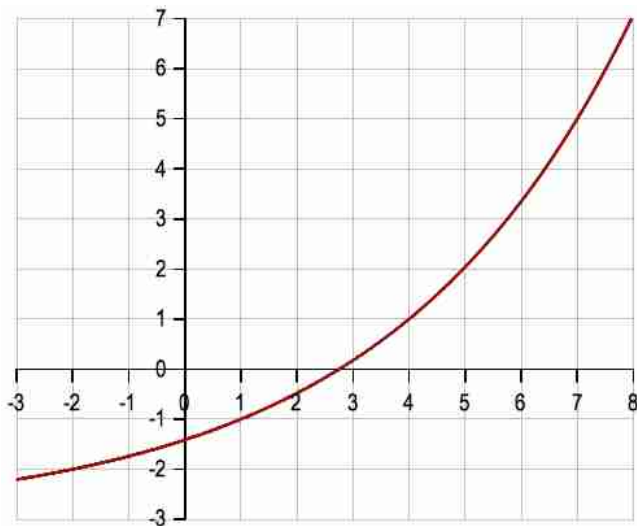


$$-(2)^{4-x} + 3$$

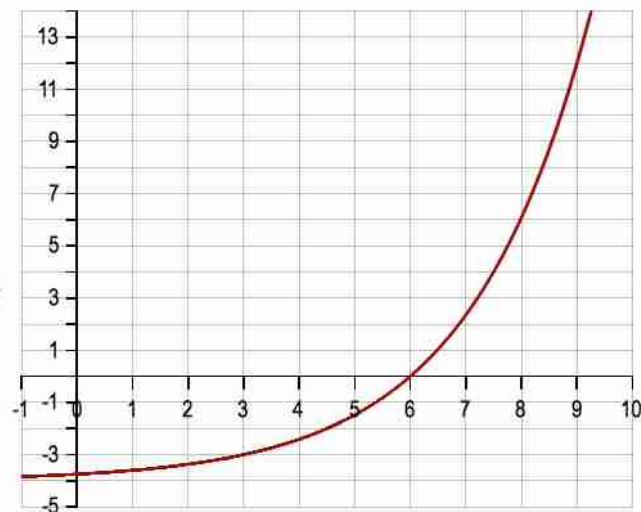
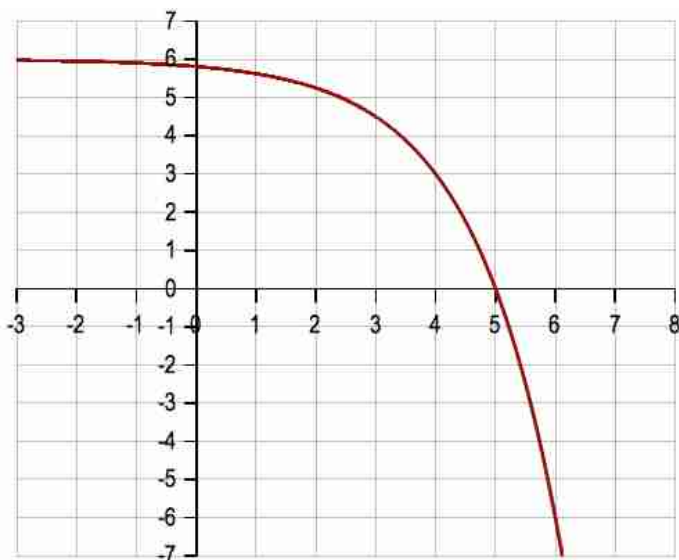


9. Give a valid equation for each of the following functions:

5 A



5 A



10. Write **two** equivalent exponential expressions for each of the following.

a) $f(x) = -2(4)^{\frac{1}{4}(x-2)} + 7$

b) $g(x) = \frac{1}{2}8^{x-2} - 7$

4 T

c) $h(x) = 3\left(\frac{1}{3}\right)^{\frac{x-3}{3}} - 3$

d) $j(x) = -(2)^{4-x} + 3$

4 T

11. The half-life of a particular radioactive isotope is 1 year.

a) Write an equation to relate the mass of radioactive material remaining to time.

1 K

b) Starting with 250 g, what mass will remain in 10 years?

2 K

c) If, after 7 years, a sample of the material was found to have a mass of 70 mg, what was the initial mass of the sample?

2 K