

Quarter 3 Test - REVIEW QUES. SET

Date _____ Period _____

Simplify each expression.

Q3 Test is on March _____

1) $-3(r - 8) - 4(10r - 5)$

Find all roots. One root has been given. *use calculator to start, show work after.*

2) $x^3 + 6x^2 - 7x - 60 = 0$; 3

3) $x^3 + 4x^2 + 6x + 4 = 0$; -2

4) $x^4 + x^3 - 23x^2 - 3x + 60 = 0$; -5

Divide.

5) $(k^4 - 4k^3 + 7k - 35) \div (k - 4)$

6) $(-27 + 2r^3 - 45r - 9r^2) \div (5 + 2r)$

Simplify.

7) $\frac{3}{2\sqrt[5]{81}}$

Simplify each expression.

8) $\frac{18x - 36}{x - 4} \cdot \frac{7x + 7}{14x - 28}$

9) $\frac{8r + 56}{5r - 35} \div \frac{r^2 - r - 56}{r - 8}$

Solve each equation. Remember to check for extraneous solutions.

10) $\sqrt{\frac{n}{2}} + 4 = 7$

11) $\sqrt{2x + 17} = \sqrt{-1 - x}$

Solve each equation. *Be careful with your \pm *

12) $(n + 16)^{\frac{2}{3}} = 25$

13) $1 = -7 + 2(-14 - 3v)^{\frac{1}{3}}$

Simplify. Your answer should contain only positive exponents.

$$14) \frac{(2x^{-1}y^{-4}z^2)^4}{x^0y^{-3}z^4 \cdot x^2y^3}$$

$$15) \frac{(pq^0r^0)^{-4}}{p^3q^3 \cdot 2r^3}$$

Evaluate each function.

$$16) w(x) = 3|x - 3| + 1; \text{ Find } w(-3)$$

Perform the indicated operation.

$$17) \begin{aligned} g(n) &= -n + 4 \\ h(n) &= 3n - 3 \\ \text{Find } g(n) + h(n) \end{aligned}$$

$$18) \begin{aligned} g(x) &= 2x - 5 \\ f(x) &= x^3 + 1 \\ \text{Find } g(x) - f(x) \end{aligned}$$

$$19) \begin{aligned} g(x) &= -4x + 2 \\ h(x) &= -3x^3 - 3x \\ \text{Find } g(x) \cdot h(x) \end{aligned}$$

Perform the indicated operation. State the domain.

$$20) \begin{aligned} g(x) &= x^3 - 3x \\ h(x) &= 3x + 2 \\ \text{Find } g(x) \div h(x) \end{aligned}$$

Perform the indicated operation.

$$21) \begin{aligned} h(a) &= -3a^2 - 2 \\ g(a) &= 4a + 3 \\ \text{Find } h(g(a)) \end{aligned}$$

$$22) \begin{aligned} f(x) &= x - 3 \\ \text{Find } f(f(x)) \end{aligned}$$

$$23) \begin{aligned} f(a) &= -4a + 5 \\ \text{Find } (f \circ f)(7) \end{aligned}$$

$$24) \begin{aligned} f(n) &= 4n - 5 \\ g(n) &= n^2 + 3n \\ \text{Find } (f \circ g)(-8) \end{aligned}$$

Describe the end behavior of each function.

$$25) f(x) = x^5 - 2x^3 + x - 1$$

$$f(x) \rightarrow \text{--- as } x \rightarrow +\infty$$

$$f(x) \rightarrow \text{--- as } x \rightarrow -\infty$$

$$26) f(x) = -x^4 - x^3 + 3x^2 - 3$$

$$f(x) \rightarrow \text{--- as } x \rightarrow +\infty$$

$$f(x) \rightarrow \text{--- as } x \rightarrow -\infty$$

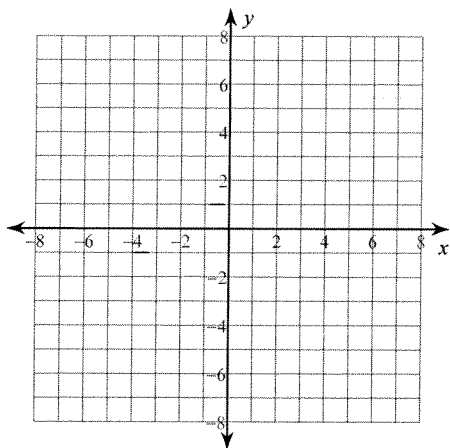
State the possible rational zeros for each function. p's and q's (5.6)

27) $f(x) = 2x^3 + 25x^2 + 15x - 27$

Identify the domain and range of each. Then sketch the graph.

28) $y = 2\sqrt{x+3} - 4$

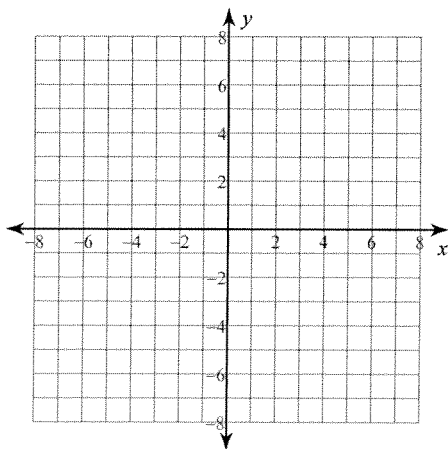
Need to show at least 3 specific points on graph, more if they will fit.



D: _____

R: _____

29) $y = -3\sqrt[3]{x+4} - 1$



D: _____

R: _____

Find the inverse of each function.

30) $f(x) = -2x^3 + 2$

Show work to justify if the given functions are inverses.

$$31) f(x) = \frac{2x - 4}{5}$$

$$g(x) = \frac{4 + 5x}{2}$$

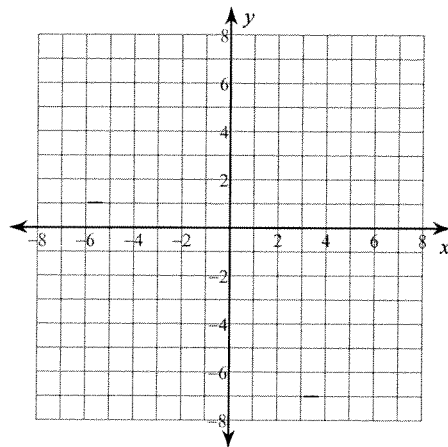
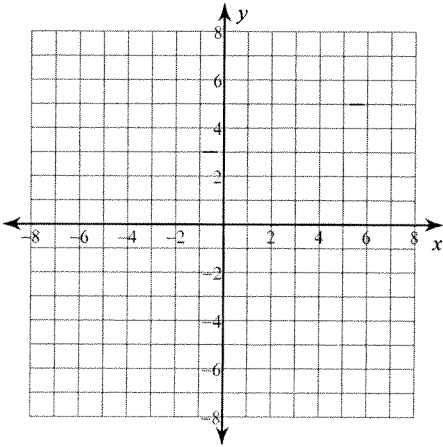
$$32) g(n) = -n^3$$

$$f(n) = \sqrt[3]{\frac{n-3}{2}}$$

State the maximum number of turns the graph of each function could make. Then sketch the graph. State the number of real zeros. Approximate the relative minima and relative maxima to the nearest tenth.

$$33) f(x) = x^3 - 3x^2 + 2$$

$$34) f(x) = -x^4 + 4x^2 - 3x - 2$$



for #33/#34

1. graph
2. relative/local maximum(s) : _____
 relative/local minimum(s) : _____
 absolute maximum(s) : _____
 absolute minimum(s) : _____
3. # of turns : _____
4. $f(x) \rightarrow$ _____ as $x \rightarrow +\infty$
 $f(x) \rightarrow$ _____ as $x \rightarrow -\infty$
5. increasing and decreasing intervals (in interval notation)

* One of these word problems will appear on the Q3 Test *

Application Questions for Quarter 3 Test

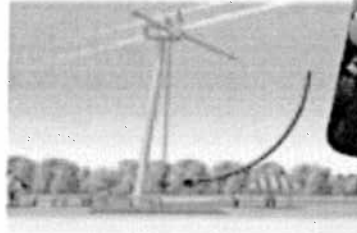
Name:

1. The cost (in dollars) of g gallons of gasoline can be modeled by $C(g) = 2.25g$. The amount of gasoline used by a SUV can be modeled by $g(d) = 0.025d^{1.24}$ where d is the distance (in miles). Find $C(g(d))$. Evaluate $C(g(500))$. What does $C(g(500))$ represent?
2. You are shopping at a nutritional supplement store, such as GNC, for whey protein. The original price of the protein is \$39.99. You have a discount card that give 20% off the purchase price. You also have a \$10 gift card that can be applied to your purchase.

Using composition of functions to determine your answer, which discount should be applied first to give you the best deal? State the lowest final price.

3. A rental car costs \$35 for a 1-day rental, plus \$.05 per mile. The total cost (in dollars) is given by the equation $C(m) = 35 + .05m$ where m represents the mileage. The car averages 32 miles per gallon, and so the total mileage is given by the equation $m(g) = 32g$. Find $C(m(g))$, and find the total cost after using 8 gallons of gas.
4. A store that sent you a coupon for 10% off any item has a sale for \$5 off all jeans. The pair you want is \$39.50. What do you pay if the 10% off must be applied after the \$5 is taken off?
(a) \$3.45 (b) \$19.75 (c) \$30.55 (d) \$30.72 (e) \$31.05

5. **MAXIMUM SPEED** In an amusement park ride called the Sky Flyer, a rider suspended by a cable swings back and forth like a pendulum from a tall tower. A rider's maximum speed v (in meters per second) occurs at the bottom of each swing and can be approximated by $v = \sqrt{2gh}$ where h is the height (in meters) at the top of each swing and g is the acceleration due to gravity ($g \approx 9.8 \text{ m/sec}^2$). If a rider's maximum speed was 15 meters per second, what was the rider's height at the top of the swing?



6. **★ EXTENDED RESPONSE** "Hang time" is the time you are suspended in the air during a jump. Your hang time t (in seconds) is given by the function $t = 0.5\sqrt{h}$ where h is the height of the jump (in feet). A basketball player jumps and has a hang time of 0.81 second. A kangaroo jumps and has a hang time of 1.12 seconds.
- Solve** Find the heights that the basketball player and the kangaroo jumped.
 - Calculate** Double the hang times of the basketball player and the kangaroo and calculate the corresponding heights of each jump.