Test 18 (Lessons 35–36): The Fundamental Theorem of Algebra and Variation

1) Explain the number of roots and maximum number of turning points for $q(x) = x^3(x^2 + 4)(x - 8)$.
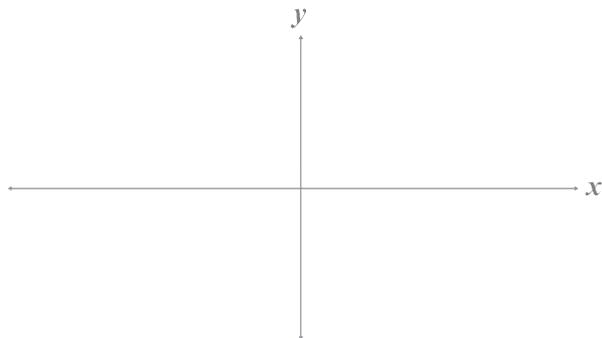
2) Sketch a fourth degree polynomial with a double root and two non-real, complex roots when $a < 0$.

$\longleftrightarrow x$

For problems 3–5, use technology and the equation: $f(x) = (x^3 - x)(x^2 - 2)$

3) Sketch a graph of the equation.

4) Label all roots and turning points on the graph.

y

$\longleftrightarrow x$

5) Determine the relative minimum and maximum across the interval $[-1.5, 0]$.

Fill in the blanks.

6) g varies jointly as the square of h and j, and inversely as the square of m, can be modeled by

the equation _____.

7) In the equation $Q = \dfrac{\pi r^2 v}{t}$, Q varies _____ as $r^2 v$, and _____ as t with the

constant of variation _____.

8) Determine the constant of variation if y varies inversely as x when $y = \dfrac{5}{2}$ and $x = \dfrac{12}{65}$.

9) When the rate is constant, the distance traveled is directly related to the time. If you drive 24.75 miles in three-quarters of an hour, how long will it take you to travel 82.5 miles?

10) y varies jointly as x, and the square of z.
    If $y = -40$ when $x = 5$, and $z = 4$, find y when $x = 0.3$ and $z = -5$.