EMT 111/112 Practice Test I

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1. Solve the inequality.

   (a) $(x + 1)(3x - 1) \leq 0$

   (b) $\frac{4x}{2x+3} \geq 0$

   (c) $\frac{1}{1-x} \leq \frac{3}{x}$

   (d) $x^2 < 4$

   (e) $x^3 > x$

   (f) $|5x - 2| < 6$

   (g) $\frac{1}{|x+7|} > 2$

2. Solve for x: $|2x + 1| = |x - 2|$

3. Find the gradient of the line through $(1, 4)$ and $(-2, 0)$.

4. Find the equation of the line that satisfies the given conditions.

   (a) through $(3, -1)$; gradient -2

   (b) x-intercept -2; y-intercept 5

   (c) y-intercept 2; parallel to $x + 2y - 3 = 0$

   (d) through $(1, 1)$; perpendicular to $x + 5y + 8 = 0$

5. Draw the following graphs.

   (a) $2x - y = 1$

   (b) $3x - y + 5 = 0$

(c) $x = -1$

6. Factor the expression completely.

    (a) $6x^2 + x - 12$

    (b) $t^3 - 2t^2 - t + 2$

    (c) $a^2y - b^2y$

7. Solve the equation for the indicated variable.

    (a) $F = G\frac{mM}{r^2}$; for r

    (b) $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$; for R_1

8. Simplify.

    (a) $\left(\frac{-2x^{\frac{1}{3}}}{y^{\frac{1}{2}} z^{\frac{1}{6}}} \right)^4$

    (b) $\left(\frac{3a^{-2}}{4b^{-\frac{1}{3}}} \right)^{-1}$

9. Find the equation of the circle that satisfies the given conditions.

    (a) center $(1, -3)$; radius 1

    (b) center $(-1, 0)$; passes through $(-2, 3)$

10. Find the center and radius of the given circle.

    (a) $x^2 + y^2 - 8x + 2y + 1 = 0$

    (b) $3x^2 + 3y^2 + 6x - 18y - 36 = 0$

11. Solve for x.

    (a) $10^{-x} = 2$

    (b) $4 + 3^{5x} = 8$

    (c) $e^{3-5x} = 16$

    (d) $x^2 2^x - 2^x = 0$

    (e) $e^{2x} - e^x - 6 = 0$

    (f) $\log x = -2$

(g) $\log(3x + 5) = 2$

(h) $\log_3(2 - x) = 3$

(i) $\log_2 3 + \log_2 x = \log_2 5 + \log_2(x - 2)$