**Directions:** You have 90 minutes to complete this exam. There are 25 questions. Each question is worth 4 points. (There is no partial credit on multiple choice questions). Partial credit is rare, but possible; so please show your work. Write your answers clearly, and use the space provided for the answer!

For problems 1 - 5, write the **letter** of the correct answer in the space provided. <u>Only one answer is correct.</u>
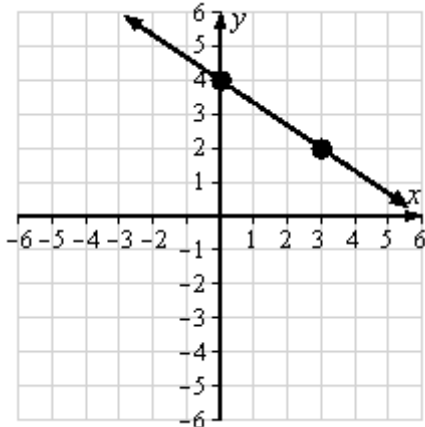
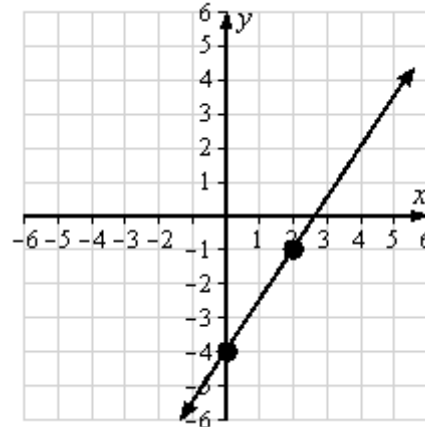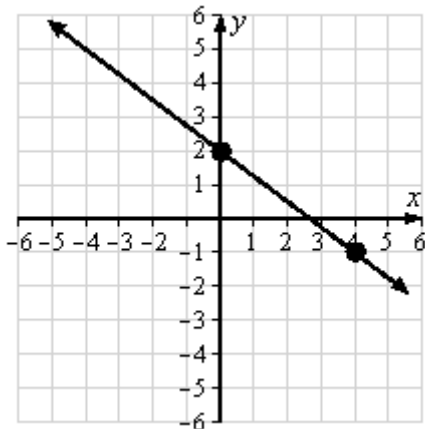___ 1. Graph by using the slope and *y*-intercept: $y = -\dfrac{2}{3}x + 4$

A)

B)

C)

D)

E)
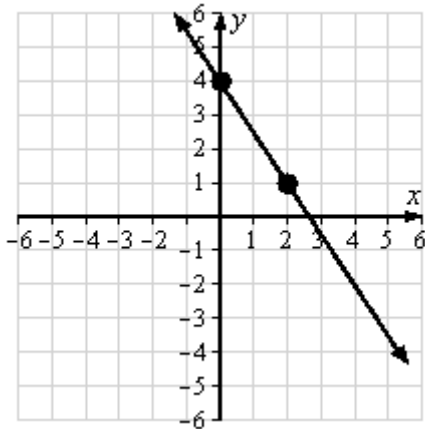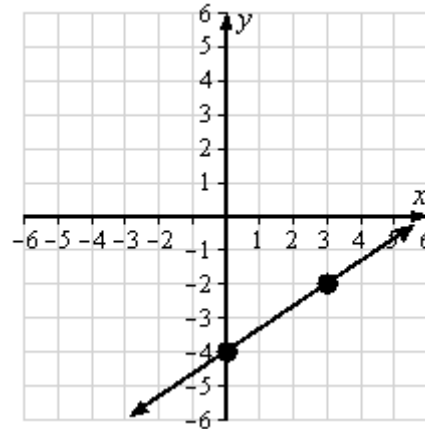
___ 2. Write the number 5.1×10^{-3} in decimal notation.

A) 0.51   B) 0.0051   C) 5.1   D) 0.00051   E) 0.051

___ 3. Multiply: $(4z+5)(4z-5)$.

A) $16z^2 + 20z + 25$ B) $16z^2 - 10$ C) $16z^2 + 20z - 25$ D) $16z^2 - 25$ E) $16z^2 + 25$

___ 4. Simplify: $\left(7n^{-4}z^{-5}\right)^2$.

A) $49n^8 z^{10}$ B) $\dfrac{49}{n^8 z^5}$ C) $\dfrac{7}{n^8 z^{10}}$ D) $\dfrac{49}{n^8 z^{10}}$ E) $\dfrac{49n^8}{z^{10}}$

___ 5. Multiply.
$(8vw)(-8vw)(-8v^3w^2)$

A) $512v^5w^4$ B) $-8v^5w^4$ C) $-512v^3w^2$ D) $-512v^5w^4$ E) $512v^3w^2$

6. State whether the polynomial is a monomial, binomial, or a trinomial.
$4q^4r^3 - 7q^3r^2$

7. Simplify.
$\dfrac{5q^{-9}r^{-2}}{-10qr^7}$

8. Divide: $\dfrac{3c^{13} - 4c^{10} - 2c^7}{c^4}$.

9. Find the slope of the line containing the given points.

$$P_1(3,-1), \quad P_2(8,0)$$

10. Subtract.
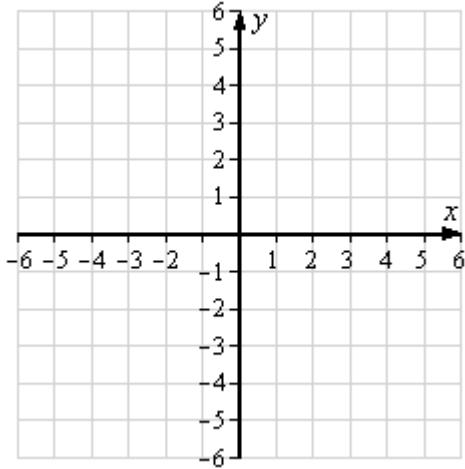$$(6m^3 + m - 4) - (-2m^2 + 5m + 6)$$

11. Multiply: $(v-6)^2$.

12. Find the equation of the line that passes through the y-intercept (0, 8) and the point (–5, 6).

13. Graph the solution set.

$$2x - 3y \geq -6$$

14. Find the equation of the line that passes through the points (–3, 9) and (3, –3).

15. Divide and write the answer in scientific notation.

$$\frac{1.17 \times 10^{-1}}{7.8 \times 10^{8}}$$

16. Solve by graphing.

$3x + 5y = 25$

$$y = -\frac{3}{5}x + 5$$

17. Simplify: $\left(-x^4 y^2\right)^8$.

18. Multiply: $\left(5y^3 + 4y^2 + 6\right)\left(6y - 1\right)$.

19. Solve by substitution:

$$y \;=\; 2x \;+\; 13$$
$$y \;=\; 3x \;+\; 18$$

20. Solve by the addition method.

$3x + y = -1$

$x - y = -1$

21. Solve by the addition method:

$$18x \; + \; 48y \; = \; 23$$
$$18x \; + \; 32y \; = \; 18$$

22. **Sports** A basketball team scored 70 points in two-point baskets and three-point baskets. If the two-point baskets had been three-point baskets and the three-point baskets had been two-point baskets, the team would have scored 80 points. Find how many two-point baskets and how many three-point baskets the team scored.

23. A small plane, flying into a headwind, flew 500 miles in 7 h. Flying with the wind, the plane traveled 1150 miles in 4 h. Find the rate of the plane in calm air and the rate of the wind. Round your answer to nearest whole number.

24. Multiply: $-3x^3\left(5x^2 - 3x + 1\right)$.

25. Divide: $\left(2t^2 - 2t - 10\right) \div \left(t - 3\right)$.

Answer Key

1. B
2. B
   Grading: (4p) No partial credit.

   ⋮

3. D
   Grading: (4p) No partial credit.
4. D
   Grading: (4p) No partial credit.
5. A
6. | binomial | (4p) No partial credit. |

7. | $-\dfrac{1}{2q^{10}r^9}$ | (4p) 2 points for exactly one mistake, no points thereafter. Take 1 point off if the answer is correct, but not fully simplified (e.g. single instances of each variable respectively, but to a negative power). |

8. | $3c^9 - 4c^6 - 2c^3$ | (4p) 2 points for exactly one computational mistake, no points thereafter. |

9. | $\dfrac{1}{5}$ | (4p) 2 points for exactly one computational mistake, no points thereafter. Exception: 1 point for inverse formula for the slope (dx/dy), and correct numeric computation for this wrong formula. |

10. | $6m^3 + 2m^2 - 4m - 10$ | (4p) 2 points for exactly one computational mistake, no points thereafter. |

11. | $v^2 - 12v + 36$ | (4p) 2 points for exactly one computation error; no points thereafter. 1 point if the middle term is missing, but all other terms are correct. |

12. | $y = \dfrac{2}{5}x + 8$ | (4p) 2 points for correct slope, 1 point for exactly one computational mistake; no points for wrong formula for slope. 2 points for correct equation based on found slope (even if slope is incorrect). |

13.

14. | $y = -2x + 3$ | (4p) 2 points correct computation of slope; 1 point for exactly one computational mistake, no points thereafter; no points for incorrect slope formula. 2 points for correct point-slope formula, even with incorrect slope from first step; 1 point for exactly one computational mistake. Allow for not simplified answer (the question does NOT require simplification or a specific format: standard, slope-intercept). |

15.

1.5×10^{-10}	(4p) 2 points for correct division; 1 point for exactly one computational mistake (either in division of mantissa or the powers of 10); allow for minor precision errors. 2 points for correct scientific notation of answer; 1 point if the answer has the right mantissa, but the power of 10 is off; no points for any other alternatives.

16. infinitely many solutions (dependent)

17.

$x^{32}y^{16}$	(4p) 2 points for exactly one computational mistake, no points thereafter. Exception: only 1 point off for wrong sign.

18.

$30y^4 + 19y^3 - 4y^2 + 36y - 6$	(4p) 2 points for exactly one computation error; no points thereafter.

19. (–5, 3)

20. $\left(-\dfrac{1}{2}, \dfrac{1}{2}\right)$

21. $\left(\dfrac{4}{9}, \dfrac{5}{16}\right)$

22. 20 two-point baskets; 10 three-point baskets

23. plane: 150 mph; wind: 79 mph

24. $-15x^5 + 9x^4 - 3x^3$

25.

$2t + 4 + \dfrac{2}{t-3}$	(4p) 1 point off for each computational mistake, up to four, no points thereafter. No points for major mistakes (e.g. cancellation from sums).