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1. (1 point)
Compute the length of the curve $\mathbf{r}(t) = \langle 2t, \ln t, t^2 \rangle$ over the interval $1 \le t \le 2$
$L =$ ______
Answer(s) submitted:
- `4+ln(2)-1-ln(1)`

(correct)

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2. (1 point)
Find the arclength of the curve $\mathbf{r}(t) = \langle -8\sin t, -4t, -8\cos t \rangle$, $-7 \le t \le 7$

______
Answer(s) submitted:
- `56sqrt(5)`

(correct)

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3. (1 point)
Find the arclength of the curve $\mathbf{r}(t) = \langle 7\sqrt{2}t, e^{7t}, e^{-7t} \rangle$, $0 \le t \le 1$

______
Answer(s) submitted:
- `2sinh(7)`

(correct)

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4. (1 point)
Find the length of the curve $\mathbf{r}(t) = \mathbf{i} + 9t^2\mathbf{j} + t^3\mathbf{k}$, $0 \le t \le \sqrt{28}$
$L =$ ______
Answer(s) submitted:
- `296`

(correct)

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5. (1 point) Starting from the point $(-1,-1,5)$, reparametrize the curve
$\mathbf{x}(t) = < -1-t, -1+t, 5+2t >$ in terms of arclength.
$\mathbf{y}(s) = <$ ______, ______, ______ $>$
Answer(s) submitted:
- `-1-(s/sqrt(6))`
- `-1 + (s/sqrt(6))`
- `5+2(s/sqrt(6))`

(correct)

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6. (1 point)
Find an arc length parametrization of $\mathbf{r}(t) = \langle e^t \sin t, e^t \cos t, 3e^t \rangle$
$\mathbf{r}_1(s) = \langle$ ______, ______, ______ $\rangle$

Answer(s) submitted:
- `((s/sqrt(11))+1)sin(ln((s/sqrt(11))+1))`
- `((s/sqrt(11))+1)cos(ln((s/sqrt(11))+1))`
- `3((s/sqrt(11)) + 1)`

(correct)

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7. (1 point) For the curve given by $r(t) = \langle 7\sin(t), 4t, -7\cos(t) \rangle$,
Find the unit tangent
$T(t) = \langle$ ______, ______, ______ $\rangle$
Find the unit normal
$N(t) = \langle$ ______, ______, ______ $\rangle$
Find the curvature
$\kappa(t) =$ ______
Answer(s) submitted:
- `(7/sqrt(65))cos(t)`
- `4/sqrt(65)`
- `(7/sqrt(65))sin(t)`
- `-sint`
- `0`
- `cost`
- `(7/sqrt(65))/sqrt(65)`

(correct)

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8. (1 point) For the curve given by

$$r(t) = \langle \sin(t) - t\cos(t), \cos(t) + t\sin(t), 2t^2 + 4 \rangle$$

Find the unit tangent
$T(t) = \langle$ ______, ______, ______ $\rangle$
Find the unit normal
$N(t) = \langle$ ______, ______, ______ $\rangle$
Find the curvature
$\kappa(t) =$ ______
Answer(s) submitted:
- `sint/sqrt(17)`
- `cost/sqrt(17)`
- `4/sqrt(17)`
- `cost`
- `-sint`
- `0`
- `(1/sqrt(17))/(tsqrt(17))`

(correct)

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9. (1 point) For the curve given by $r(t) = \langle 1t, e^{-5t}, e^{5t} \rangle$,
Find the derivative
$r'(t) = \langle$ ______, ______, ______ $\rangle$
Find the second derivative
$r''(t) = \langle$ ______, ______, ______ $\rangle$
Find the curvature at $t = 0$
$\kappa(0) =$ ______
Answer(s) submitted:
- `1`
- `-5e^(-5t)`
- `5e^(5t)`
- `0`
- `25e^(-5t)`
- `25e^(5t)`

- `sqrt(250^2 + 25^2 + 25^2)/(sqrt(51)^(3))`

(correct)

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10. (1 point) For the curve given by $r(t) = \langle -2t, -7t, 1 + 3t^2 \rangle$,

Find the derivative

$r'(t) = \langle$ __________, __________, __________ $\rangle$

Find the second derivative

$r''(t) = \langle$ __________, __________, __________ $\rangle$

Find the curvature at $t = 1$

$\kappa(1) =$ ____________________

Answer(s) submitted:

- `-2`
- `-7`
- `6t`
- `0`
- `0`
- `6`
- `sqrt(42^2 + 12^2)/ (sqrt(4+49+36)^(3))`

(correct)